BEER AND CARDIOVASCULAR HEALTH: EFFECTS ON MORBIDITY AND MORTALITY

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Beer and Health

THE 7TH EUROPEAN

BEER AND HEALTH SYMPOSIUM

Epidemiological ***observational studies*** consistently suggest a protective effect of regular and moderate alcohol consumption against fatal and not-fatal cardiovascular events and mortality for any cause.

Excess of drinking, however, is definitely harmful.

This epidemiological evidence is usually described through a **"J-shaped" relationship**, where teetotallers and heavy drinkers are at the highest risk, whereas light-moderate drinkers are at the lowest risk.

FOCUS ON

- the effects of alcohol in **women** and **men**
- in **patients at high cardiovascular risk**
- the impact on health of **different alcoholic beverages**

Exposure:

Alcohol

Beer

Wine

Outcome:

Vascular events

Cardiovascular Mortality

All-cause Mortality

Study Population

Apparently healthy

At high cardiovascular risk

ARE BENEFITS ON CARDIOVASCULAR RISK OF MODERATE ALCOHOL COUNTERACTED BY HARMS ON OTHER DISEASES?

A meta-analysis of alcohol consumption and the risk of 15 diseases

Giovanni Corrao, Ph.D.,[a] Vincenzo Bagnardi, Sc.D.,[a]
Antonella Zambon, Sc.D.,[a] and Carlo La Vecchia, M.D.[b,c,*]

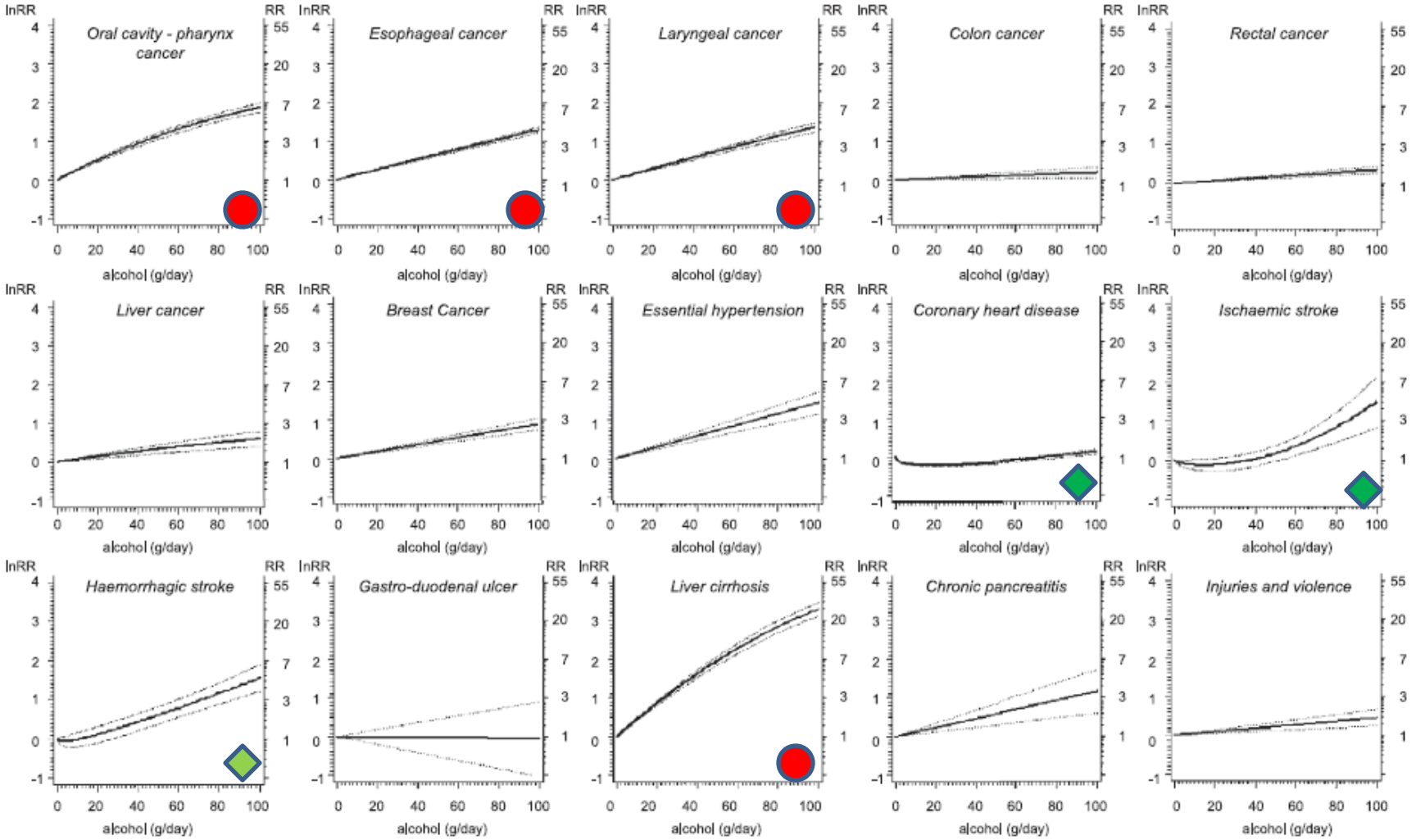


Fig. 1. Relative risk functions and corresponding 95% confidence intervals describing the dose-response relationship between alcohol consumption and the risk of 15 alcohol-related conditions obtained by fitting meta-regression models.

WHAT IS THE EFFECT OF ALCOHOL AT DIFFERENT DOSES ON TOTAL MORTALITY?

Alcohol Dosing and Total Mortality in Men and Women

An Updated Meta-analysis of 34 Prospective Studies

Augusto Di Castelnuovo, ScD; Simona Costanzo, ScD; Vincenzo Bagnardi, ScD; Maria Benedetta Donati, MD, PhD; Licia Iacoviello, MD, PhD; Giovanni de Gaetano, MD, PhD

Background: Moderate consumption of alcohol is inversely related with coronary disease, but its association with mortality is controversial. We performed a meta-analysis of prospective studies on alcohol dosing and total mortality.

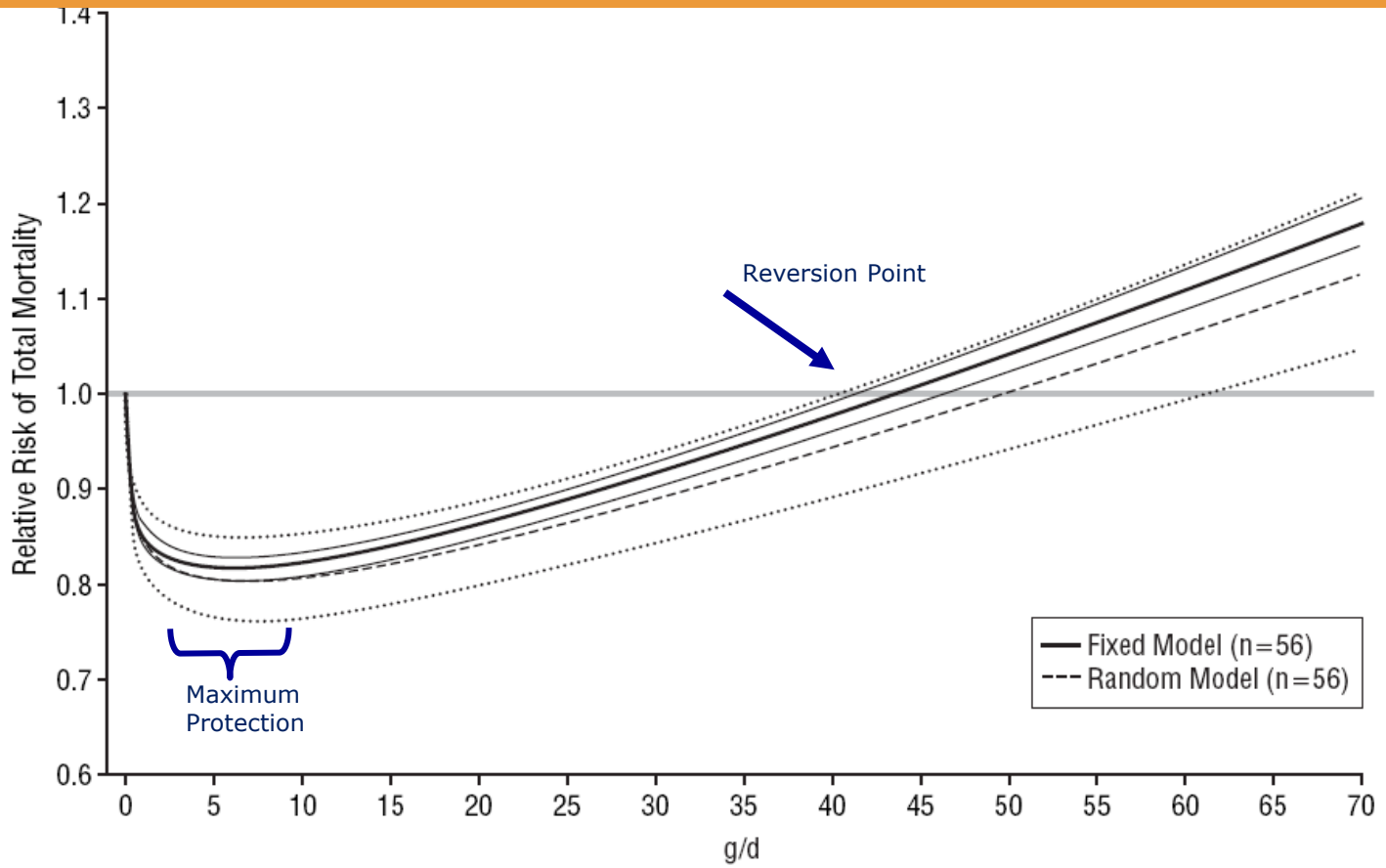
Methods: We searched PubMed for articles available until December 2005, supplemented by references from the selected articles. Thirty-four studies on men and women, for a total of 1 015 835 subjects and 94 533 deaths, were selected. Data were pooled with a weighed regression analysis of fractional polynomials.

Results: A J-shaped relationship between alcohol and total mortality was confirmed in adjusted studies, in both men and women. Consumption of alcohol, up to 4 drinks per day in men and 2 drinks per day in women, was inversely associated with total mortality, maximum protection being 18% in women (99% confidence interval, 13%-22%) and 17% in men (99% confidence interval, 15%-19%). Higher doses of alcohol were associated with increased mortality. The inverse association in women disappeared at doses lower than in men. When adjusted and unadjusted data were compared, the maximum protection was only reduced from 19% to 16%. The degree of association in men was lower in the United States than in Europe.

Conclusions: Low levels of alcohol intake (1-2 drinks per day for women and 2-4 drinks per day for men) are inversely associated with total mortality in both men and women. Our findings, while confirming the hazards of excess drinking, indicate potential windows of alcohol intake that may confer a net beneficial effect of moderate drinking, at least in terms of survival.

Arch Intern Med. 2006;166:2437-2445

ALCOHOL CONSUMPTION AND MORTALITY FOR ANY CAUSE



Thirty-four studies provided 56 independent dose-response curves for a total of **1,015,835 subjects** and **94,533 deaths from any cause**.
The association with a lower mortality was apparent up to 42 g/d and the lowest mortality was seen at 6 g/d, (RR, 0.81 [95% CI, 0.80-0.83]).

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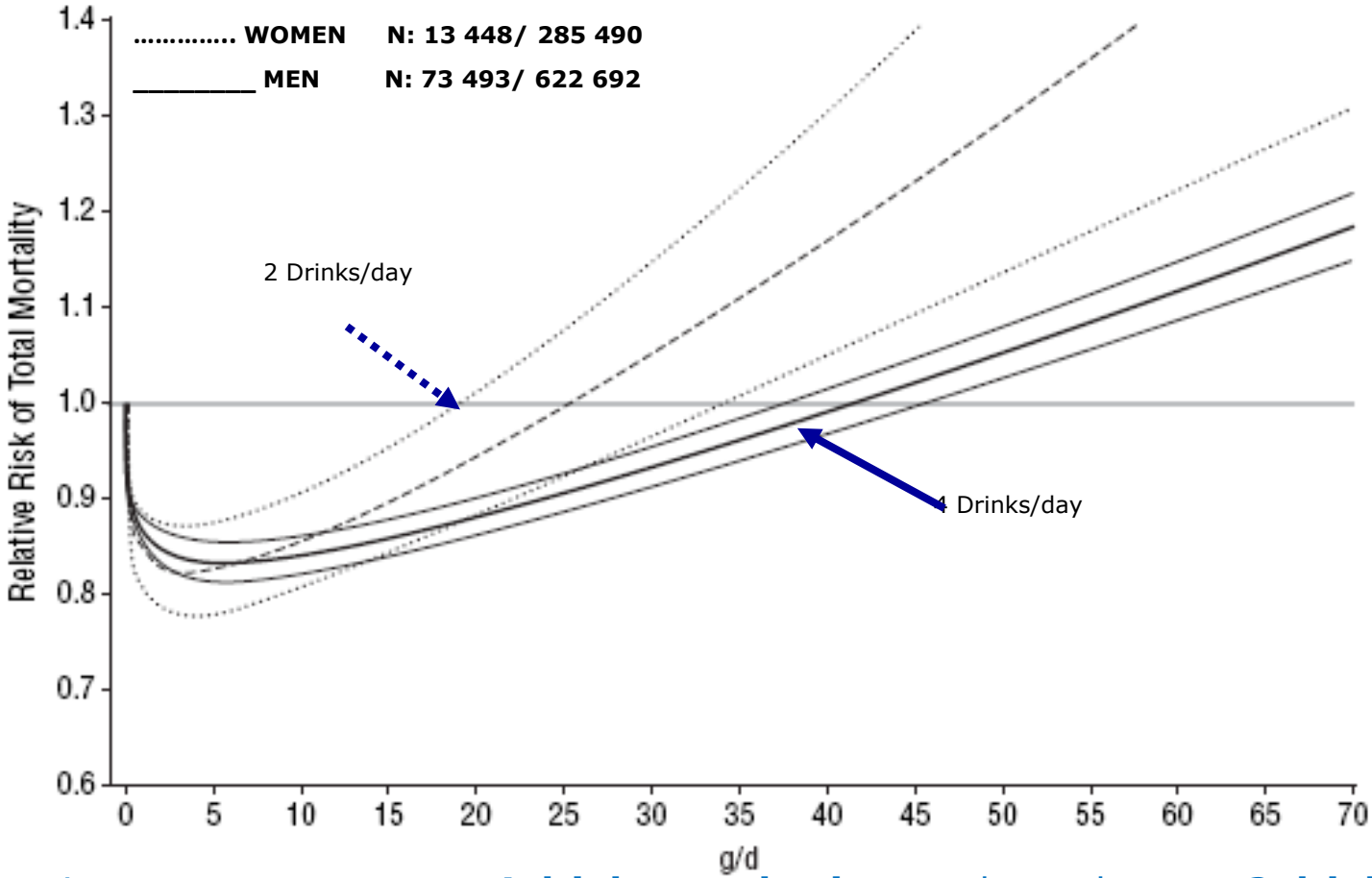
Di Castelnuovo A et al. Arch Intern Med 2006

ALCOHOL CONSUMPTION AND MORTALITY FOR ANY CAUSE IN MEN AND WOMEN



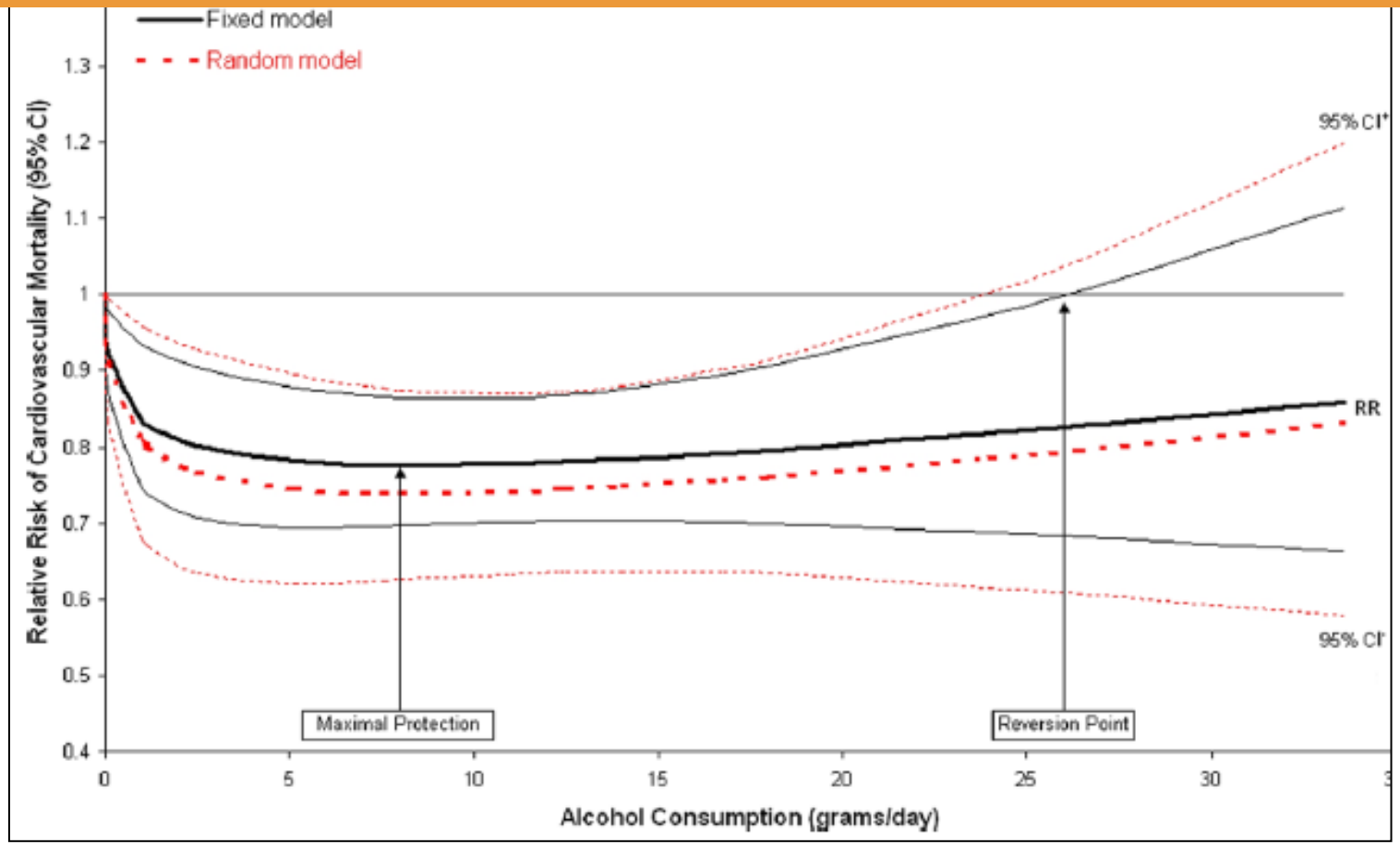
The protection was apparent up to **4 drinks per day in men** but only up to **2 drinks per day in women**. **Maximum risk reduction similar in men** (17%) and **women** (18%) at **light alcohol intake** (6 gr/d).

Beer and Health

Di Castelnuovo A et al. Arch Intern Med 2006

CARDIOVASCULAR AND TOTAL MORTALITY IN INDIVIDUALS AT HIGH CARDIOVASCULAR RISK

ALCOHOL CONSUMPTION AND CARDIOVASCULAR MORTALITY IN PATIENTS WITH CARDIOVASCULAR DISEASE



From **7 studies** comprising 12,819 CVD patients, the overall relationship was interpreted as a **J-shaped curve**, showing a **protective effect** (average 22%) that was **maximal** in the **range of 5 to 10 g/day** and still was significant up to approximately 26 g/day.

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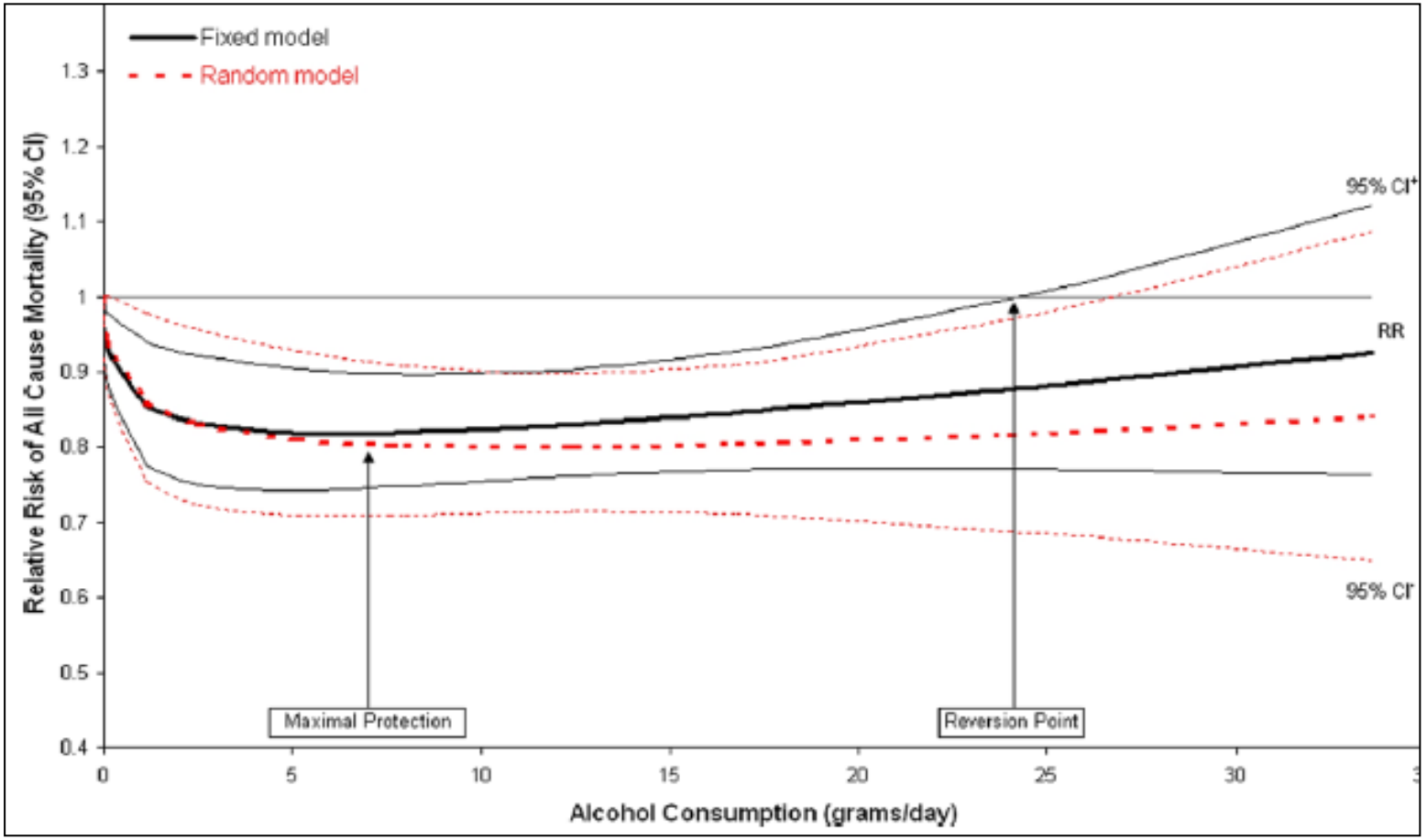
Costanzo S et al. J Am Coll Cardiol. 2010

ALCOHOL CONSUMPTION AND MORTALITY FOR ANY CAUSE IN PATIENTS WITH CARDIOVASCULAR DISEASE



Pooled analysis of **six studies**, comprising 12,553 patients with previous CVD confirmed an overall **J-shaped curve**: **the maximal protection was 20% in a range of 5 to 10 g/day.**

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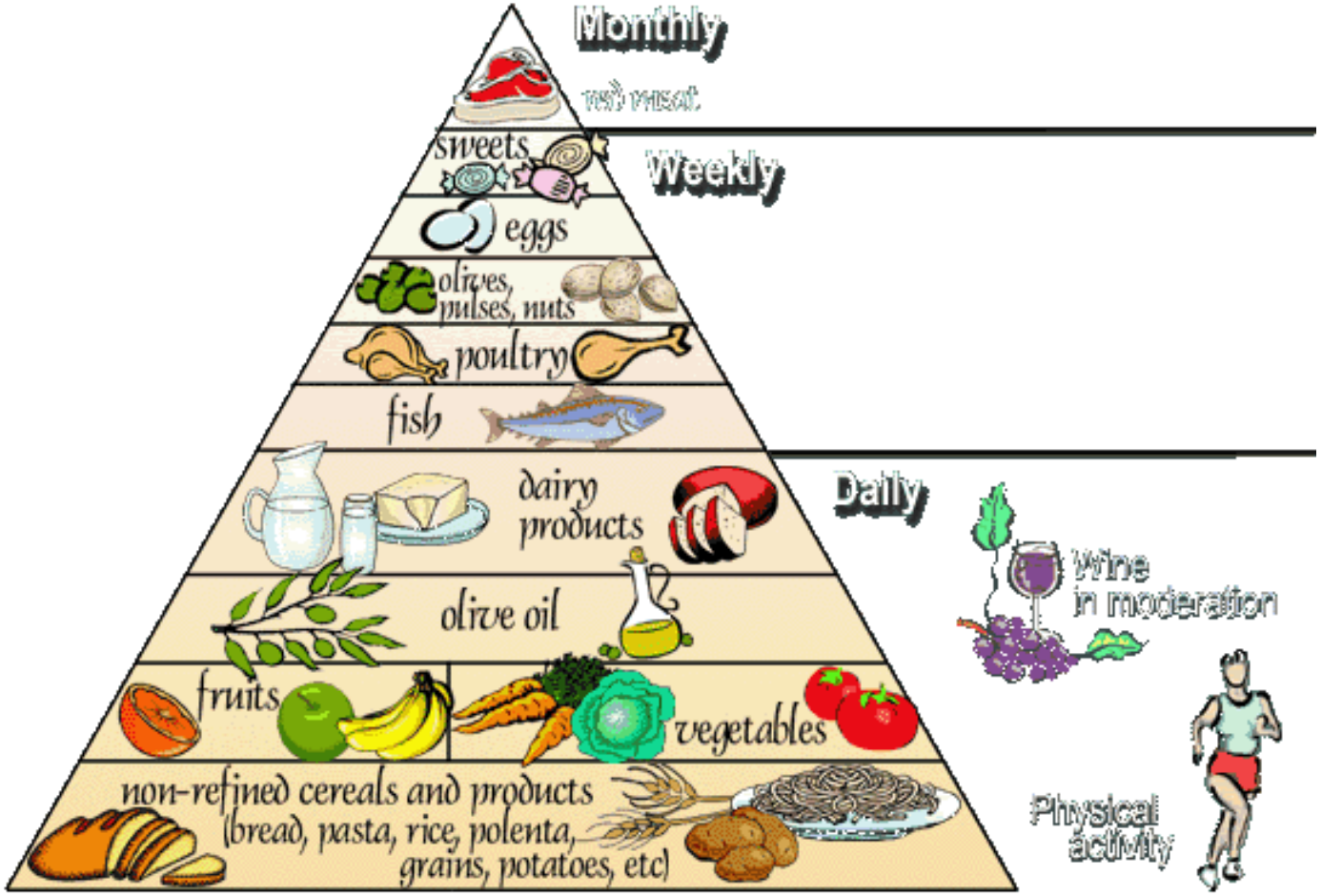
Costanzo S et al. J Am Coll Cardiol. 2010

PYRAMID OF MEDITERRANEAN DIET



Beer and Health

Meta-Analysis of Wine and Beer Consumption in Relation to Vascular Risk

Augusto Di Castelnuovo, MS; Serenella Rotondo, MS; Licia Iacoviello, MD, PhD; Maria Benedetta Donati, MD, PhD; Giovanni de Gaetano, MD, PhD

Background—Many epidemiological studies have evaluated whether different alcoholic beverages protect against cardiovascular disease. We performed a meta-analysis of 26 studies on the relationship between wine or beer consumption and vascular risk.

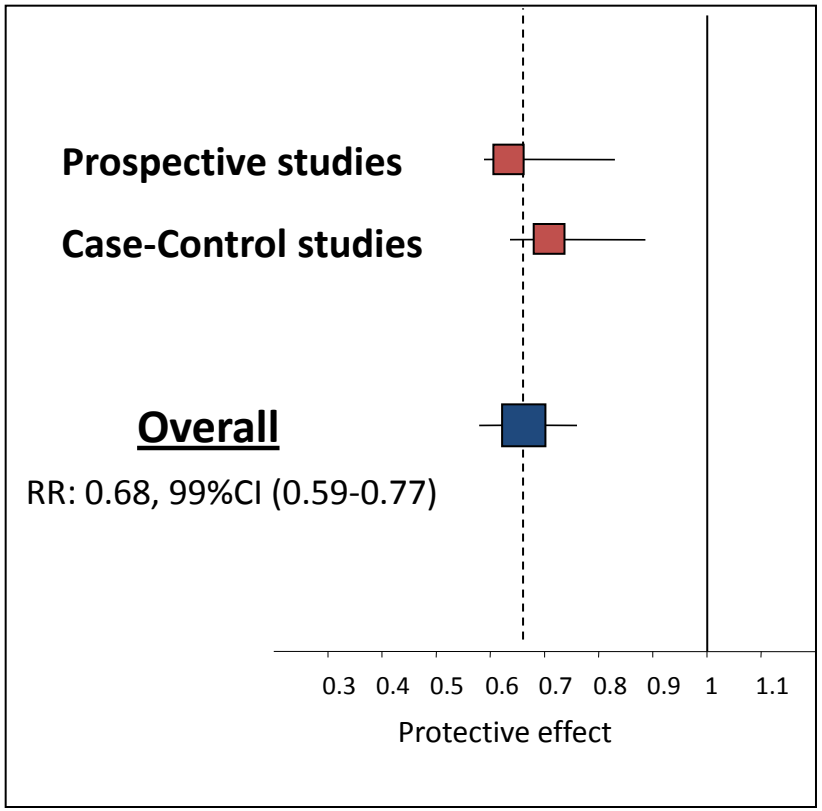
Methods and Results—General variance-based method and fitting models were applied to pooled data derived from 26 studies that gave a quantitative estimation of the vascular risk associated with either beverage consumption. From 13 studies involving 209 418 persons, the relative risk of vascular disease associated with wine intake was 0.68 (95% confidence interval, 0.59 to 0.77) relative to nondrinkers. There was strong evidence from 10 studies involving 176 042 persons to support a J-shaped relationship between different amounts of wine intake and vascular risk. A statistically significant inverse association was found up to a daily intake of 150 mL of wine. The overall relative risk of moderate beer consumption, which was measured in 15 studies involving 208 036 persons, was 0.78 (95% confidence interval, 0.70 to 0.86). However, no significant relationship between different amounts of beer intake and vascular risk was found after meta-analyzing 7 studies involving 136 382 persons.

Conclusions—These findings show evidence of a significant inverse association between light-to-moderate wine consumption and vascular risk. A similar, although smaller association was also apparent in beer consumption studies. The latter finding, however, is difficult to interpret because no meaningful relationship could be found between different amounts of beer intake and vascular risk. **(*Circulation*. 2002;105:2836-2844.)**

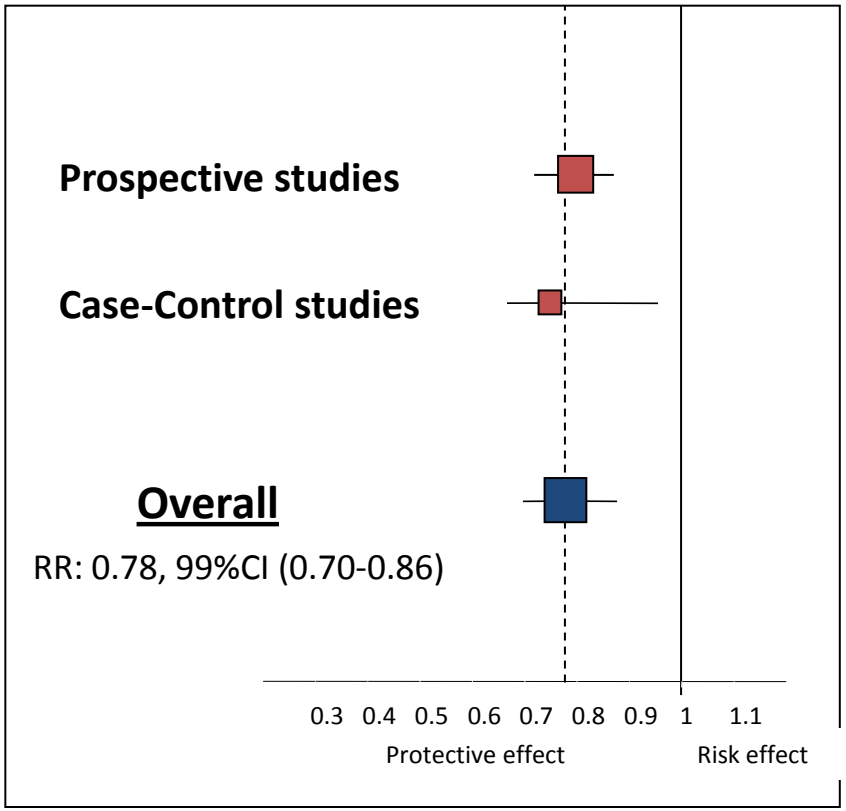
Key Words: cardiovascular diseases ■ wine ■ beer ■ meta-analysis

VASCULAR RISK COMPARING

wine intake vs. **no wine** intake
13 studies reporting data for wine
209,418 subjects



beer intake vs. **no beer** intake
15 studies reporting data for beer
208,036 subjects



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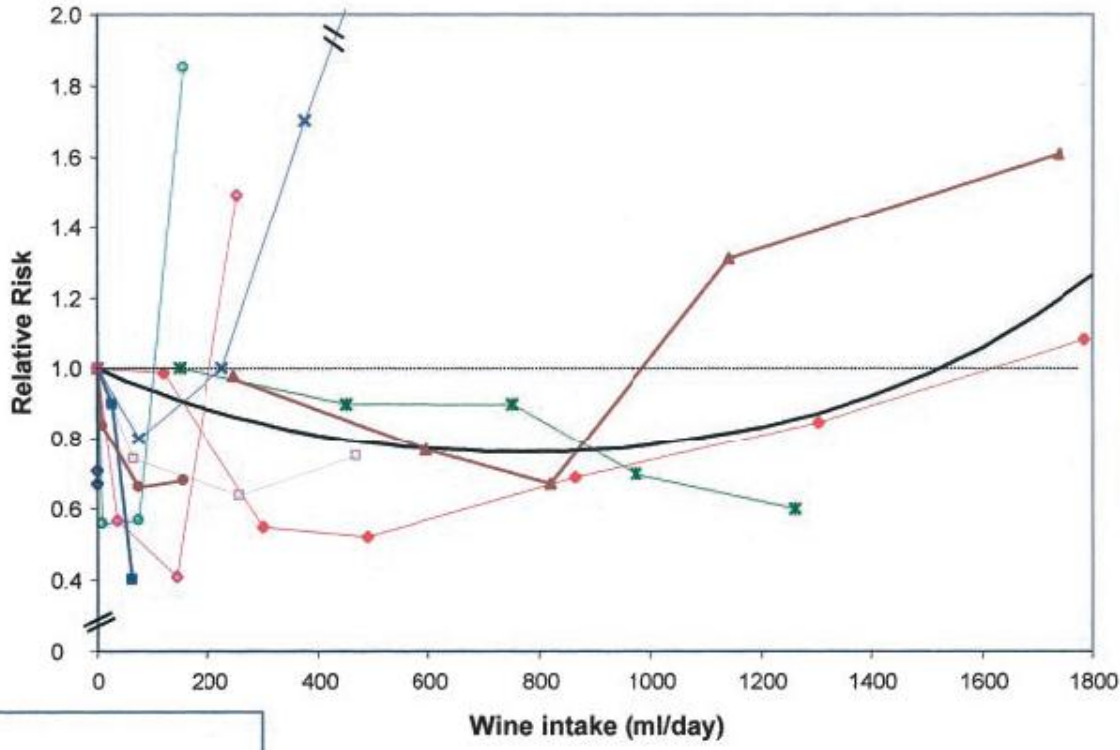
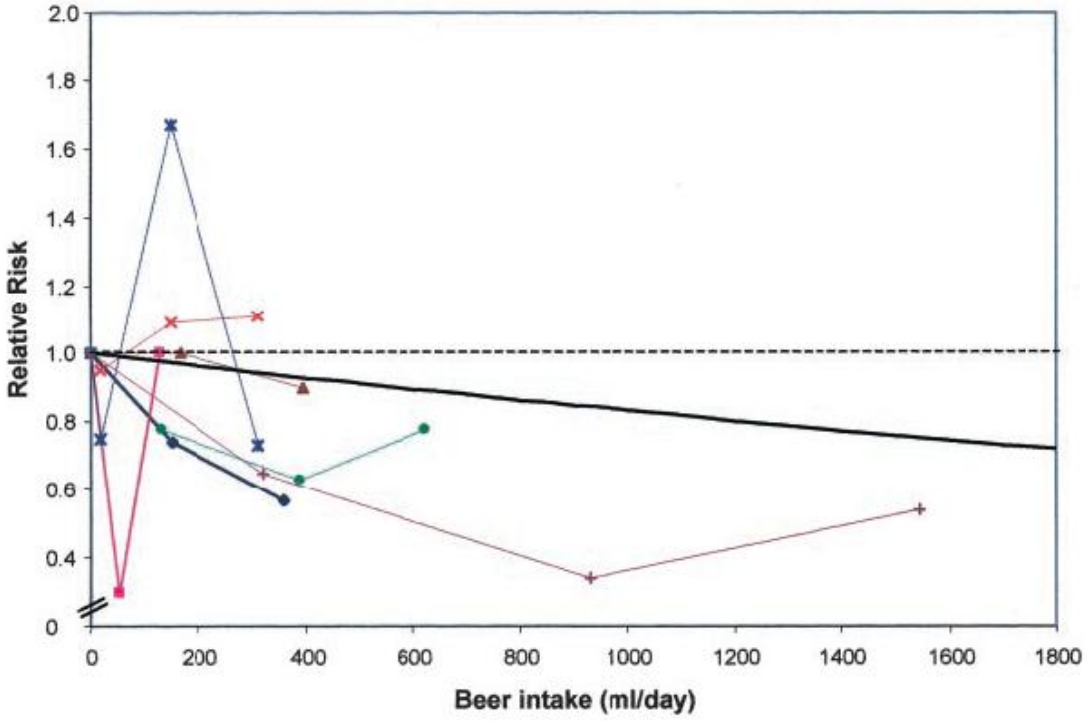
Di Castelnuovo et al, Circulation 2002

HOW MUCH BEER OR WINE SHOULD PEOPLE FROM GENERAL POPULATION DRINK TO GET HEALTH BENEFITS?

WINE EFFECT
DOSE-RESPONSE CURVES FROM 10 STUDIES





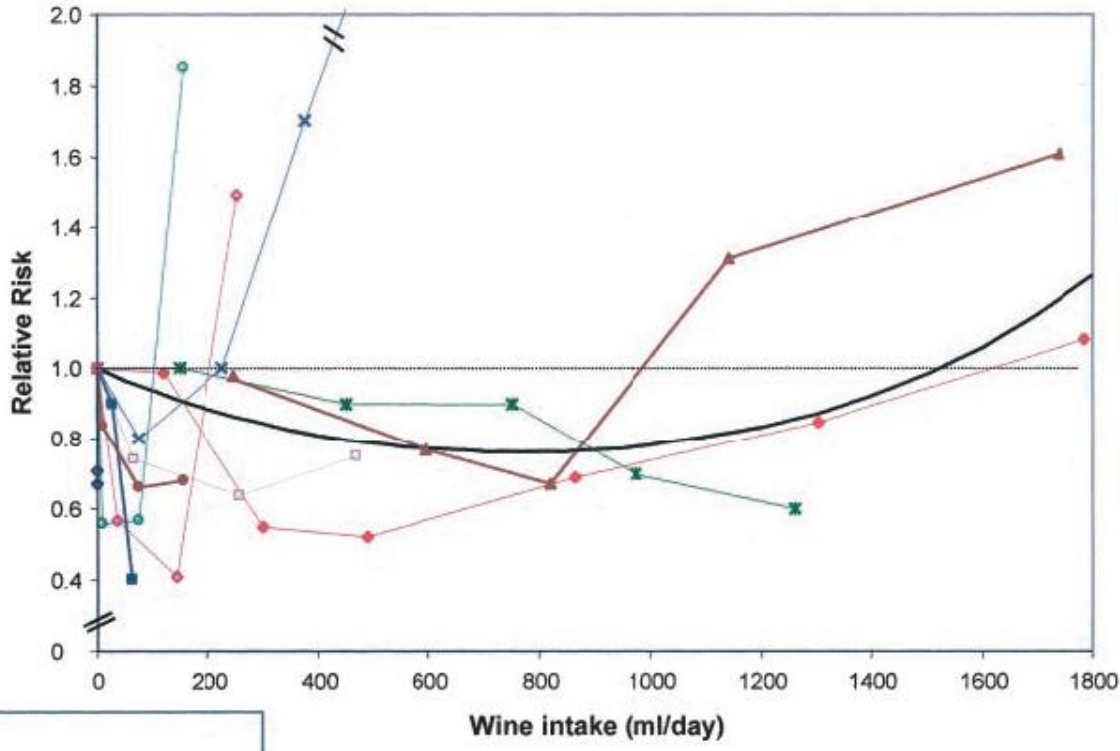
BEER EFFECT
DOSE-RESPONSE CURVES FROM 7 STUDIES

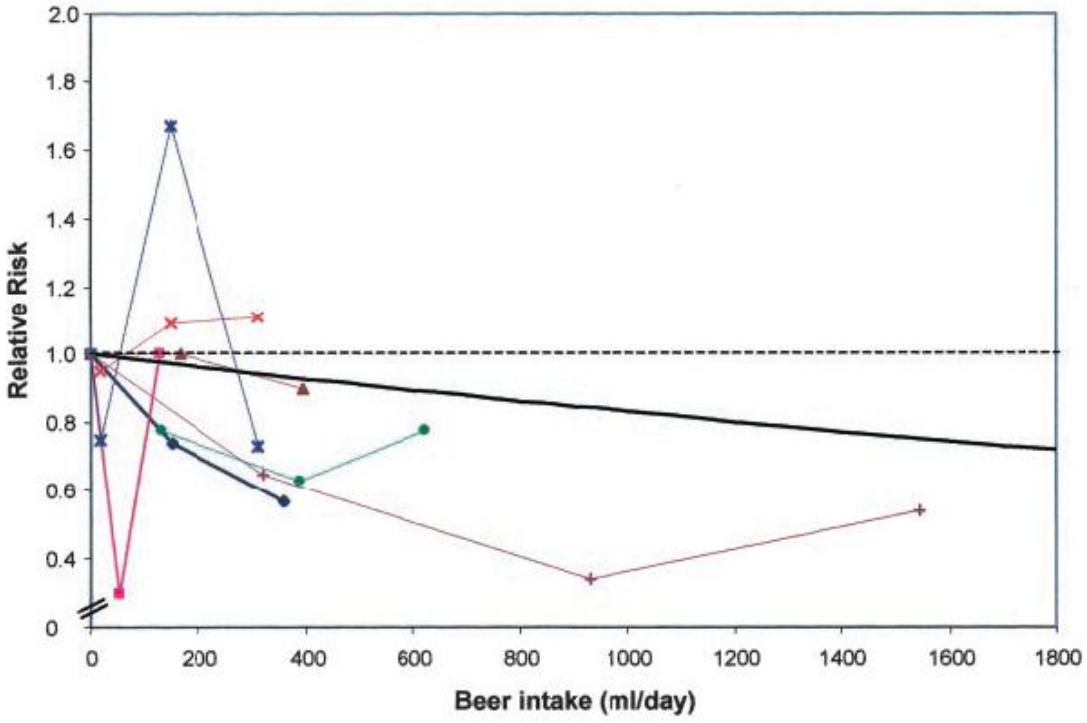
Di Castelnuovo et al, Circulation 2002

WINE EFFECT

DOSE-RESPONSE CURVES
FROM 10 STUDIES
176,042 subjects

STATISTICAL SIGNIFICANCE REACHED UP TO 150 mL/day WINE INTAKE





BEER EFFECT

DOSE-RESPONSE CURVES
FROM 7 STUDIES

NO CORRELATION BETWEEN THE AMOUNT OF DAILY BEER CONSUMPTION AND CARDIOVASCULAR RISK

Di Castelnuovo et al, Circulation 2002

Eur J Epidemiol
DOI 10.1007/s10654-011-9631-0

REVIEW

Wine, beer or spirit drinking in relation to fatal and non-fatal cardiovascular events: a meta-analysis

Simona Costanzo · Augusto Di Castelnuovo · Maria Benedetta Donati · Licia Iacoviello · Giovanni de Gaetano

Received: 15 July 2011 / Accepted: 31 October 2011

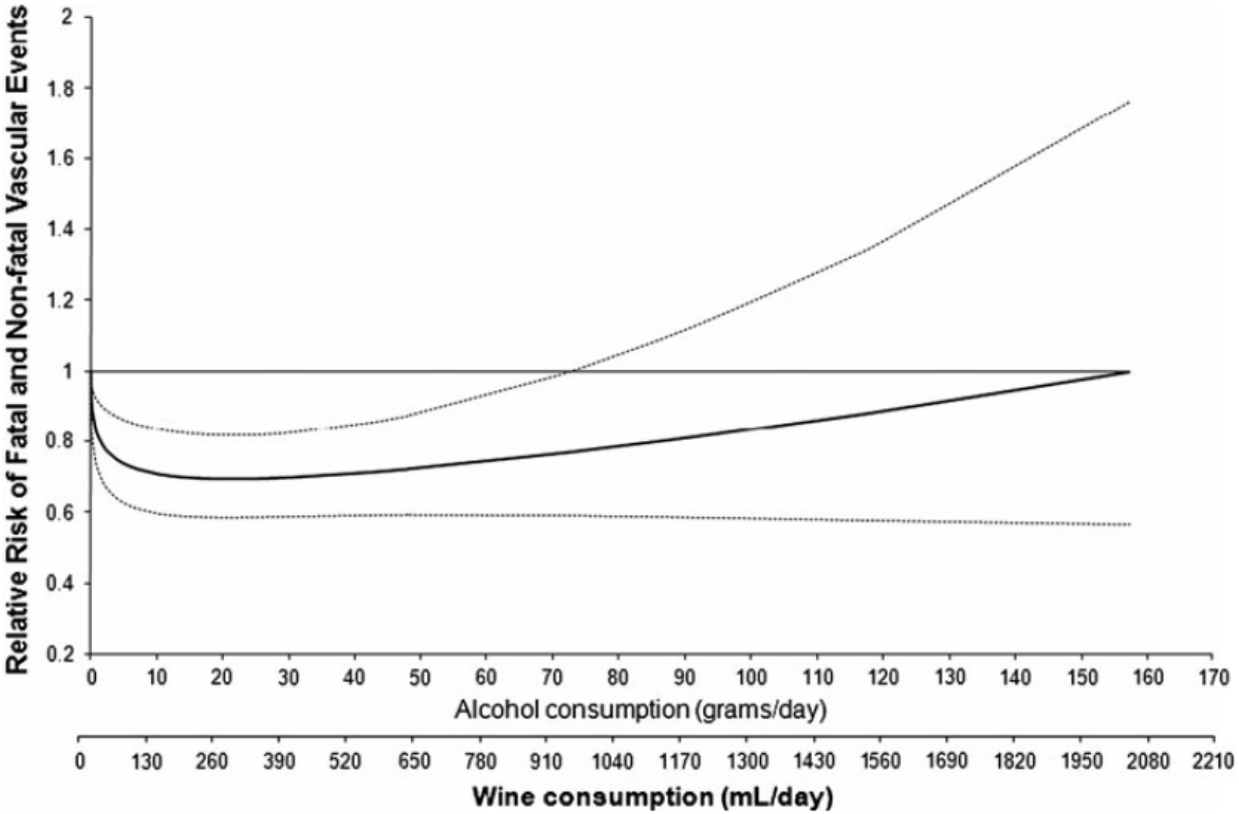
Abstract In previous studies evaluating whether different alcoholic beverages would protect against cardiovascular disease, a J-shaped relationship for increasing wine consumption and vascular risk was found; however a similar association for beer or spirits could not be established. An updated meta-analysis on the relationship between wine, beer or spirit consumption and vascular events was performed. Articles were retrieved through March 2011 by PubMed and EMBASE search and a weighed least-squares

Keywords Meta-analysis · Alcohol · Cardiovascular disease · Mortality

Introduction

The relationship between alcohol consumption and cardiovascular events or all-cause mortality in apparently healthy people or cardiovascular patients has been depic-

WINE CONSUMPTION IN RELATION TO VASCULAR RISK



Sixteen studies *(11 prospective studies: 288,363 individuals (5,554 events); 5 case-control studies: 2,060 cases/3,784 controls)* reported data on **wine consumption** in relationship with **vascular risk**.

A protective effect (average 31%) was **maximal** in the **range of 20 to 25g/day** and still was significant up to approximately 72 g/day.

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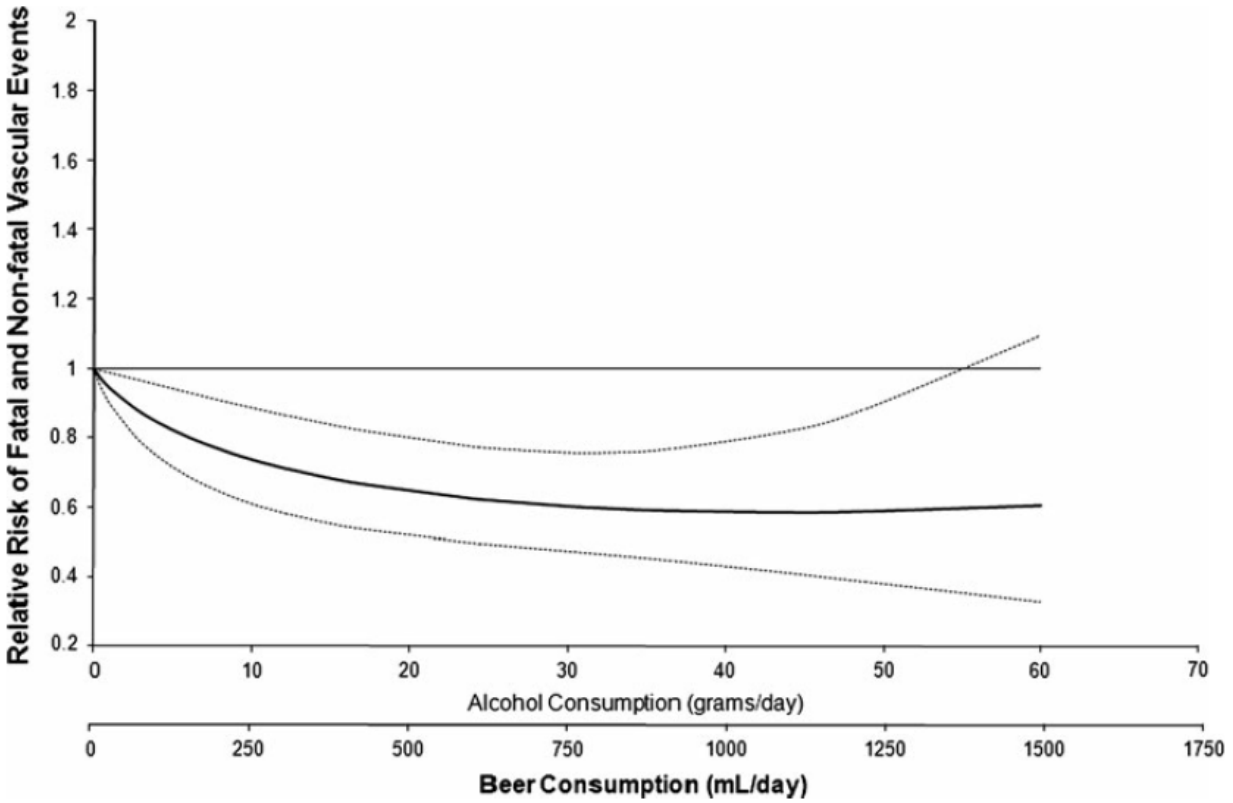
Costanzo S et al. Eur J Epidemiol. 2011

BEER CONSUMPTION IN RELATION TO VASCULAR RISK



Thirteen studies *(8 prospective studies: 224,219 individuals (4,823 events);4 case-control studies: 1,964 cases/3,834 controls)* reported data on **beer consumption** in relationship with **vascular risk**.

A protective effect (average 40%) was **maximal** at 43 g/day and still was significant up to approximately 55 g/day.

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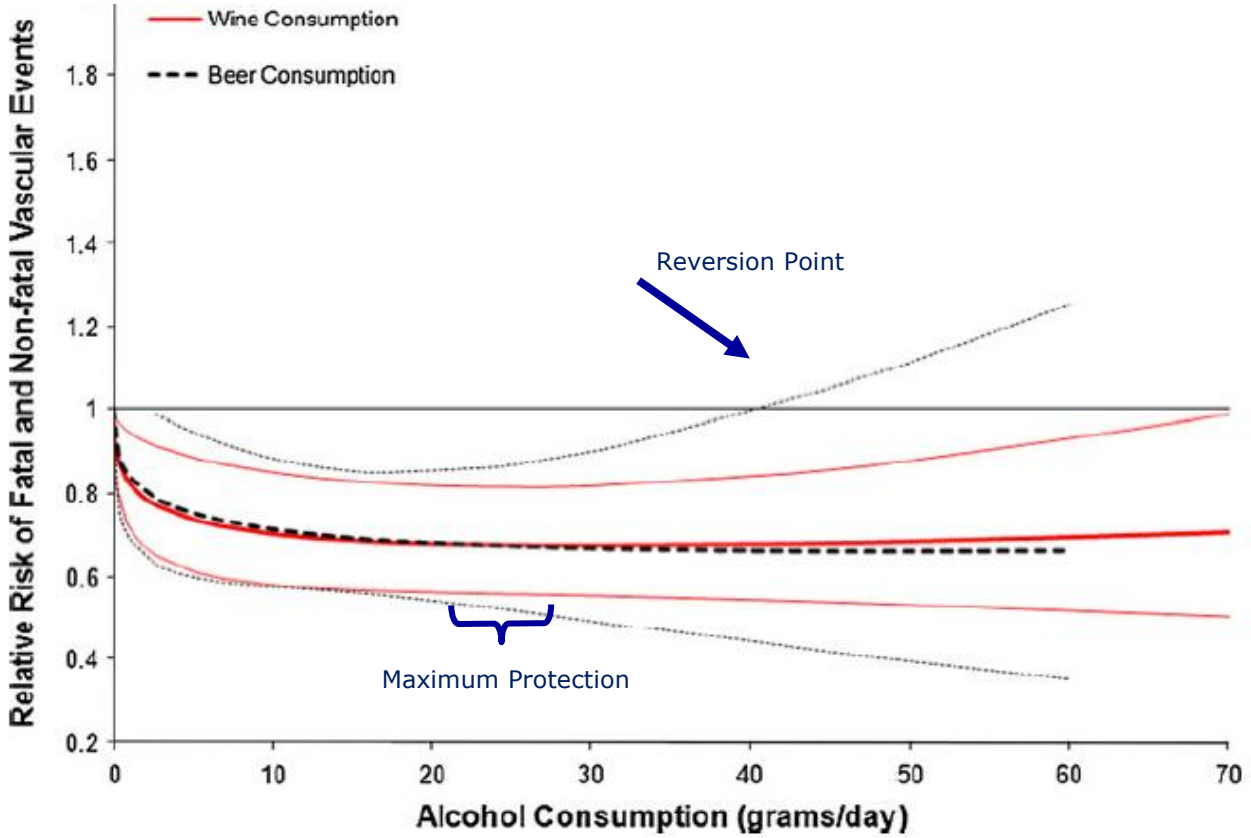
Costanzo S et al. Eur J Epidemiol. 2011

WINE AND BEER CONSUMPTION IN RELATION TO VASCULAR RISK



Twelve studies *(8 prospective studies: 224,219 individuals (4,823 events);4 case-control studies: 1,762 cases/3,099 controls)* reported separate data both on **wine and beer consumption** in relationship with **vascular risk**.
The two curves were closely overlapping, especially at light-moderate alcohol consumption and the **maximal protection by either beverage was 33% at 25 g/day**.

Costanzo S et al. Eur J Epidemiol. 2011

These findings indicate that the effects of wine and beer do not differ significantly, reiterating the hypotheses that:

1) Ethanol plays a major cardioprotective role regardless of the polyphenolic content of the various beverages.

2) Besides ethanol effect, non alcoholic components may have an additional role, but they are present both in beer and wine.

SUMMARY

Outcome	Maximal protection		Reversion Point
	% (95% CI)	gr/day	gr/day
Fatal and non-fatal CVD events			
	Apparently healthy		
Wine	**32** (18-44)	**25**	70
Beer	**33** (13-48)	**25**	43
CVD mortality			
	Apparently healthy		
Wine	**34** (18-47)	**24**	66
	At high cardiovascular risk		
Alcohol	**22** (13-30)	**8**	26
Total mortality			
	Apparently healthy		
Wine	**25** (14-34)	**10**	41
Alcohol	**19** (17-20)	**6**	42
Alcohol (Men)*	**17** (15-19)	**6**	38
Alcohol (Women)*	**18** (13-22)	**5**	18
	At high cardiovascular risk		
Alcohol	**24** (16-31)	**2.5**	15

*99% CI

CONCLUSIONS
…to drink or not to drink?

THESE META-ANALYSES …

EXISTENCE OF POTENTIAL WINDOWS
OF WINE, BEER OR TOTAL ALCOHOL INTAKE
WHICH MAY CONFER
A NET BENEFICIAL EFFECT OF DRINKING
IN MODERATION,
AT LEAST IN TERMS OF CARDIOVASCULAR RISK
AND MORTALITY REDUCTION,
NOT ONLY IN GENERAL POPULATION,
BUT IN PATIENTS WITH CVD TOO

From the health viewpoint...

Abstainers or light to moderate drinkers, should be warned to avoid heavy drinking.

The hazards of excess or binge alcohol drinking should be always highlighted; heavy or binge drinkers pushed to cut their consumption to a regular, low-moderate level.

Regular moderate drinkers with a history of CVD should not be advised to abstain from alcoholic beverages.

To drink a glass of wine or beer must be a pleasure, and not a treatment.

Vincent van Gogh, *The Drinkers, or the Four Ages of Man, 1890. Art Institute of Chicago.*