

# The combined effect of alcohol and obesity on risk of liver disease

## a systematic review and meta-analysis of cohort studies

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### Background

Clustering of unhealthy behaviours is common.<sup>1</sup> More than one quarter of the population of England have both increased alcohol consumption and increased BMI/waist circumference.<sup>2</sup>

Liver disease caused by alcohol and obesity is preventable, by risk factor modification. Understanding the degree of risk, in order to communicate this to patients, is therefore very important.

Evidence from individual studies about the extent of increased risk in people who have both alcohol and obesity risk factors is inconsistent. Quantifying this risk is important and will:

- Help patients make informed choices about lifestyle risk factors
- Support primary care professionals in risk stratifying patients
- Enable appropriate referral pathways to hepatology services
- Provide evidence for policy makers

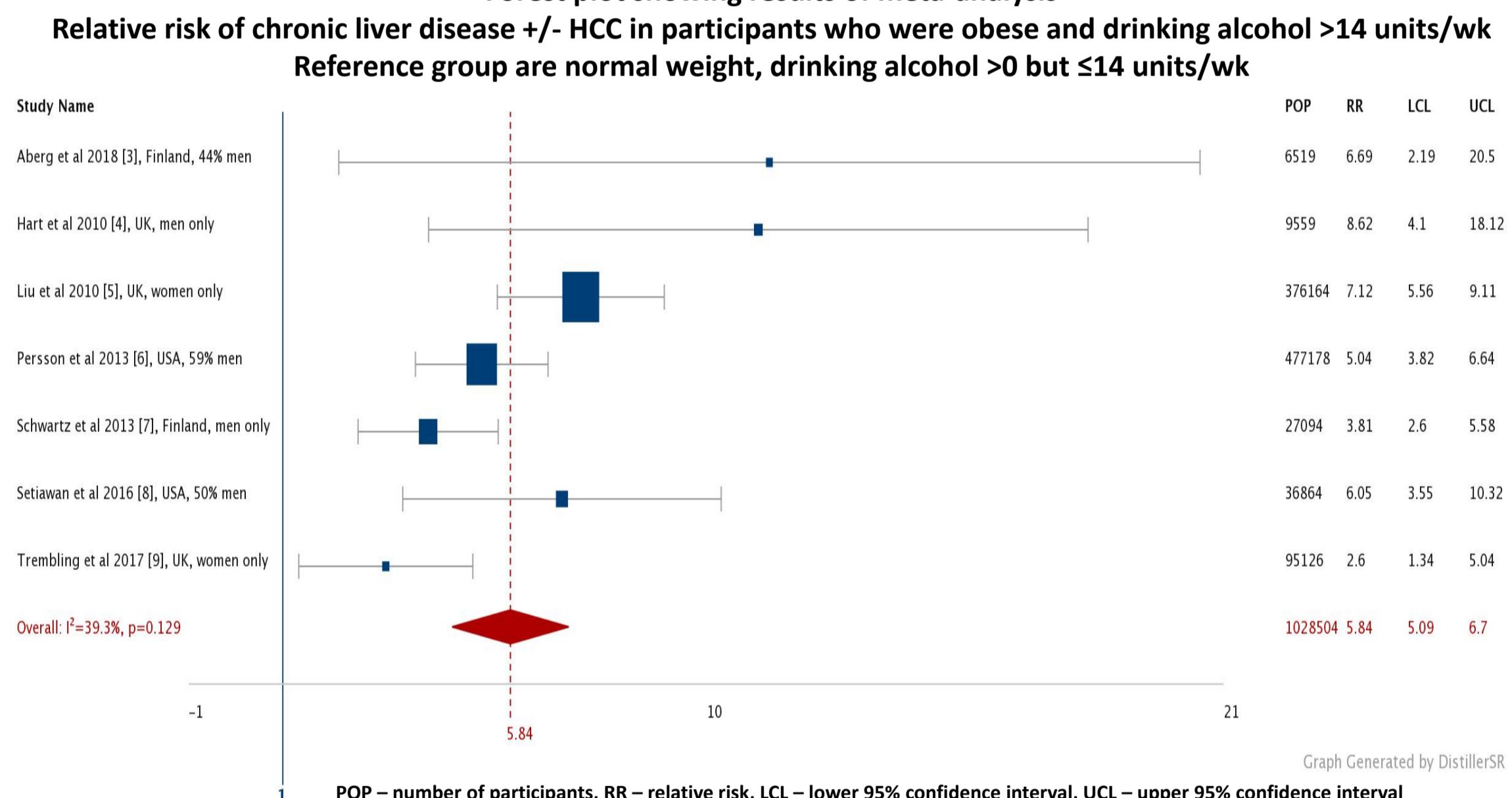
### Results

The search identified 2904 studies. 64 underwent full text review. Eight cohorts (Two from the USA, six from Europe) were included in the meta-analysis, totalling 1,029,962 participants.

There was no statistical interaction between alcohol and obesity in the model.

Risks of liver disease in those with both increased BMI and alcohol consumption were significantly increased and were multiplicative, as per the properties of the log-linear model.

Forest plot showing results of meta-analysis



### Conclusions

- We found no evidence of statistical interaction between alcohol and BMI, however their combined risk is multiplicative in nature
- Overweight and obese patients who also drink above UK recommended limits of alcohol, are at significantly increased risk of liver disease
- This increased risk must be considered when advising patients, in clinical care pathways and in public health policies
- Current guidelines for safe alcohol consumption may not be appropriate for overweight and obese patients

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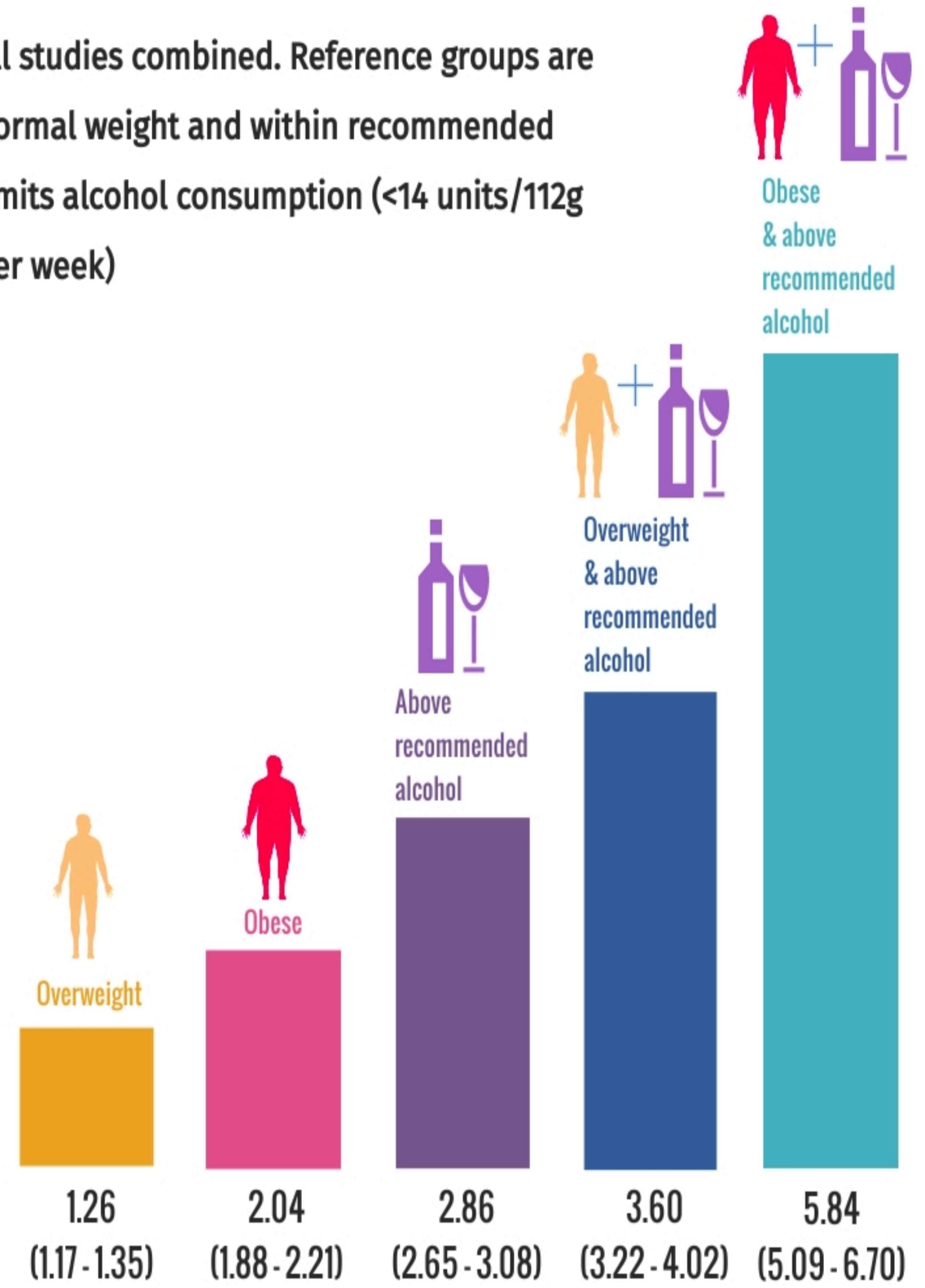
### Aim

To quantify the increased risk of liver disease associated with the combination of increased Body Mass Index (BMI) and alcohol consumption, in adult general population cohorts.

### Methods

We searched Ovid medline and Embase Classic + Embase. We included cohort studies in adult participants without pre-existing liver disease. Exposures were alcohol consumption and BMI. Outcomes were incident morbidity or mortality due to liver cirrhosis +/- hepatocellular carcinoma (HCC). Risk of bias was assessed using the Newcastle-Ottawa criteria for cohort studies. We used a Poisson regression, log-linear model to generate coefficients for combinations of BMI and alcohol consumption categories and conducted a one-stage meta-analysis.

All studies combined. Reference groups are normal weight and within recommended limits alcohol consumption (<14 units/112g per week)



### Relative risk of chronic liver disease +/- Hepatocellular carcinoma

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