Drinking and our health – a review of current evidence, by Helena Conibear

As we draw towards the end of the year, it is interesting to look back at our increasing understanding of alcohol and health over the years. Alcohol had changed from being seen as a medicine, common until the end of the C19th, to being the subject of Prohibition in the US (1919–1939). Now we have moved to a polarised position in the medical community where many in public health believe less is better, and none is better still. Whereas epidemiologists and cardiologists continue to find the evidence that drinking in moderation, in most cases for older populations, protects against coronary heart disease (CHD) and stroke as well as late-onset diabetes, Alzheimer's disease and indeed all cause mortality.

The evidence base began with a publication in The Lancet in 1979 by St Leger et al which found that drinking appeared to be protective against heart disease, more than 150 studies have confirmed the association since, and this is now recognised in most countries responsible drinking guidelines, ie that drinking in moderation can form part of a healthy diet and lifestyle for adults.

Sir Richard Doll, Emeritus Professor of Medicine at the University of Oxford, commenting in the 1990's sums up attitudes well: "The Belief that alcohol was bad for health was so ingrained that the idea that small amounts might be good for you was hard to envisage, and it is only in the past ten years that cardiologists and specialists in preventative medicine have begun to take it seriously".

We now understand many of the biological mechanisms as to how alcohol reduces the risk of CHD.

In simple terms, alcohol favourably alters the balance of fats or lipids in the blood, by stimulating the liver to produce 'good' high density lipoprotein cholesterol (HDL). HDL removes the 'bad' LDL from arteries and veins for disposal via the bile, which is referred to as reverse cholesterol transport.

Alcohol also decreases the 'stickiness' of red blood cells, which if untreated, could form a clot , blocking blood flow in an artery or vein – causing a heart attack or ischemic stroke. The message is 'little and often' as the protective effect, i.e. the blood thinning 'and HDL effects of alcohol work at a level of one drink a day, and lasts for approximately 24 hours. Although most people do drink sensibly, many do not have good drinking patterns, and tend to drink nothing all week, then drink heavily at weekends. In this case we recommend a 'liver holiday' after drinking to excess to give the liver a chance to recover.

UK guidance: "The health benefits are more evident from regular daily drinking." Specifically, men over age 40 and postmenopausal women are emphasised as recipients of a "significant health benefit in terms of reduced coronary heart disease mortality and morbidity." Middle aged or elderly non-drinkers or infrequent drinkers and especially those at risk for heart disease "may wish to consider the possibility that light drinking may be of benefit to their overall health and life expectancy."

US guidelines 2010: An average daily intake of one to two alcoholic beverages is associated with the lowest all-cause mortality and a low risk of diabetes and CHD among middle-aged and older adults. Despite this overall benefit of moderate alcohol consumption, the evidence for a positive association between alcohol consumption and risk of unintentional injuries and breast and colon cancer should be taken into consideration. The DGAC recommends that if alcohol is consumed, it should be consumed in moderation, and only by adults...

In most Western countries where chronic diseases such as CHD, cancer, stroke and diabetes are the primary causes of death, results from large epidemiological studies consistently show that alcohol has a favourable association with total mortality especially among middle age and older men and women.

Wine

We are often asked, is wine, particularly red wine, better than spirits or beer in terms of preventing heart disease? We do not have definitive data on this, and generally small amounts of all types of alcoholic beverages have a protective effect against heart disease. However, antioxidants in wine, dark beers and traditional ciders may have additional benefits. On the other hand, wine drinkers are different in many ways from beer or spirits drinkers. They tend to be better-educated, have higher incomes, smoke

less, and exercise more than beer or spirit drinkers, so it is still difficult for an epidemiologist to be sure that wine drinkers are healthier because they drink wine, or whether it is just that people who have healthier lifestyles drink wine.

Emerging research concerning wine and its constituent parts

Much of the focus in recent years has been concerning the isolation and study of polyphenols, components from wine such as resveratrol and quertecin, and discovering more about their ability to counter oxidative reactions in the body and their ability to cause 'apoptosis' (cell death) in rapidly reproducing cancer tumour cells for example. When dietary elements with pharmaceutical potential are studied in this way, they are called 'nutraceuticals'

Changes in our understanding of polyphenols as antioxidants

Three important facts have emerged very recently from the lab where nutraceuticals' are being trialed.

1)It is now thought that nutritional antioxidants (such as different polyphenols, or vitamin C or E for example) are protective in low doses, by generating autoxidation oxidants, in turn able to activate antioxidant defenses through gene expression, but toxic in high 'artificial' doses (i.e. in pill form). Too high a dose of compounds such as resveratrol and quercetin results in a reduction of blood flow – due to a 'prooxidant effect', whereas a low dose on a regular basis increases vascular flow (relation of the aorta and endothelium). Hormesis is the name now given to the effect whereby antioxidants work by being low dose toxins. This suggests that dietary antioxidants – or indeed the wine itself, is a better way of combating oxidative stress.

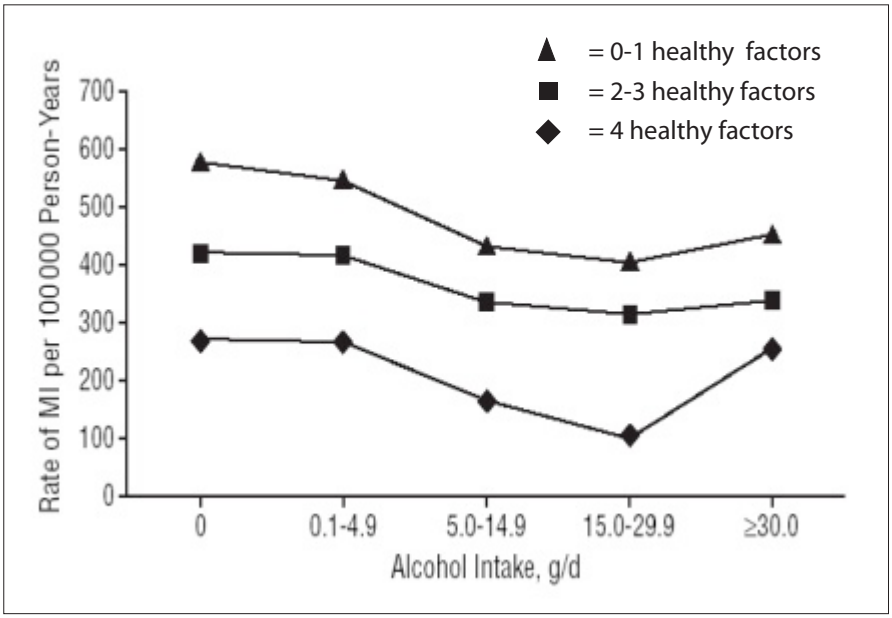
2) It is becoming apparent that the antioxidants' themselves cannot act directly in relaxing blood vessel walls. Rather, the beneficial effect is due to enzymes such as catalase, superoxide dimutase and nucleophiles (acting on compounds such as resveratrol and querticin) which act as antioxidants. This is because the antioxidants themselves can't be absorbed at a high dose, can't be metabolised in the liver or tissues and so can only act in the gut and act as carrier molecules.

3) Regarding the question of whether polyphenols can be absorbed into the blood and cells without being changed into different forms first, it is increasingly believed that these polyphenols mainly act in preventing the oxidative process in the gut, in countering fat rich foods, for example. The bioavailabililty of dietary polyphenols and whether they are able to cross the blood-brain barrier suggests that there is perhaps 1% absorption of anthocyanins in the small intestine and that protection via an antioxidant mechanism is unlikely outside of the gastrointestinal tract. Hence it is difficult to take the biological effects of specific components in isolation, and it is probably a combination of metabolites or red wine polyphenols that are responsible for the protective effects of red wine within the body.

Healthy Lifestyle a holistic approach

Another important area of research is moderate consumption as one component of a healthy diet and lifestyle. Several studies have now shown that moderate drinking has an independent 'protective effect' on heart disease risk, late onset diabetes and stroke risk once other lifestyle elements are taken into account (i.e. if you don't smoke, stay slim, eat a diet rich in fruit and vegetables and low in red meat, and exercise – drinking in moderation will still reduce your risk of heart attack further) but that drinking should not be dealt with in isolation.

(Mukamal KJ, Chiuve SE, Rimm EB. Alcohol consumption and risk for coronary heart disease in men with healthy lifestyles. Arch Intern Med 2006;166:2145-2150).



Drinking at meal times is best

Research increasingly shows the importance of drinking at meal times, (known as the 'post prandial state'). This not only decreases the effect of alcohol (drinking on an empty stomach), but helps us counter damaging free radicals. Rich foods increase the state of 'oxidative stress' in the body, dietary antioxidants, including those from red wine, can help reduce the oxidation of cholesterol and lipoprotein, both implicated in cardiovascular disease. Research, focusing on the EPIC study (1993-97) of those aged 35–74 in Italy, and the Western New York Health Study (participants aged 35-79) found that drinking outside of meal times or abstinence increased the risk of blood pressure and all cause mortality significantly.

Metabolic syndrome (MeS) is a combination of unhealthy lifestyle combinations leading to multiple medical problems including high blood pressure, late onset diabetes, and high cholesterol. Moderate wine intake at mealtimes is thought to help reduce oxidative stress and the onset of MeS in those susceptible.

What are the safe limits of drinking?

Alcohol is a two-edged sword

Excessive drinking for many years causes many life-threatening ills, among them heart disease, hemorrhagic stroke, cancers of the liver and, especially in smokers, of the mouth, throat, larynx, and esophagus. A significant portion of the damaging effects of alcohol is due to acetaldehyde, the first step in the breakdown of alcohol. It is highly toxic material and promotes damaging oxidation and other adverse effects that can lead to diseases of the liver, brain, heart, and other organs, and to cancer. Ordinarily, acetaldehyde is neutralised very quickly, but, due to genetic variations in a portion of certain populations (east Asians, Puerto Ricans), some people accumulate acetaldehyde, so that they may be intolerant of any alcohol or at risk for the damages listed.

In healthy adults, however, the liver is the limiting organ in setting safe limits. It is the liver to which the first damage of too much alcohol occurs, but assessing dose as a separate factor from other risks such as being obese, paracetomol or other drug damage and hepatitis has proved difficult. A recent meta-analysis of research papers suggests that both men and women consuming a drink per day have a lower risk than non-drinkers but that risk increases for women at above 24 grams/day and men above 36 grams/day in line with country and WHO guidelines.

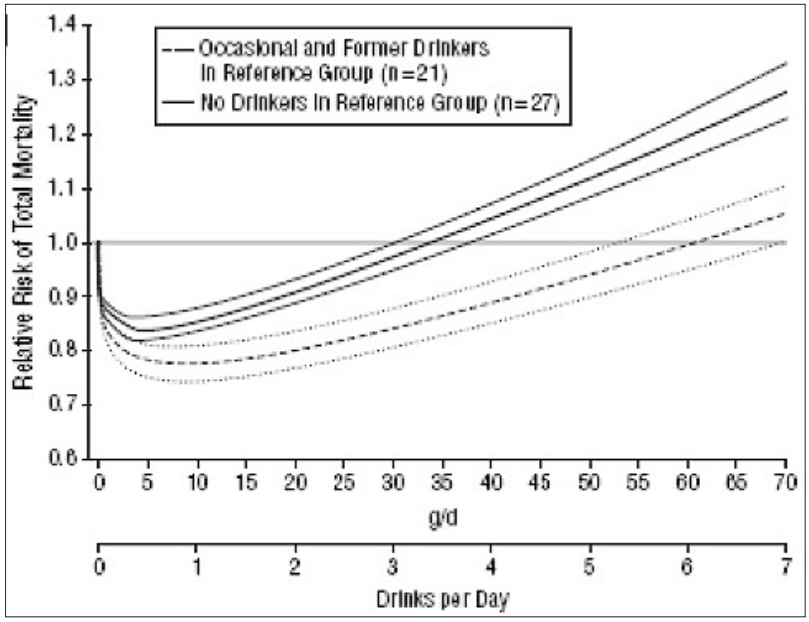
In general, responsible drinking guidelines from around the world, reflect the medical findings of the j shape curve, that is approximately 20g a day consumption for women and 30g consumption a day for men is considered as 'safe' or 'low risk' for most healthy adults. Visit www.alcoholinmoderation.com for international guidelines.

Continuing evidence in support of the j shaped curve

Let's turn to the total mortality rates. In other words, are you more likely, or less likely, to die of any cause during a specified period if you drink or if you do not drink? In essentially every prospective study carried out, the net effect on total mortality of consuming one or two drinks per day is a lower death rate. As long as the alcohol intake is light to moderate, up to a couple of drinks per day, the risk of most diseases is lower, and the risk of dying of any cause is reduced.
Professor R Curtis Ellison

The j shape curve explains the importance of dose, in that more alcohol does not mean more heart protection – but an elevated risk of accident and disease at levels that are regularly above sensible levels.

Both the protective and the disease-causing activities of alcohol impact on the same sector of the population: - i.e. men and women, beginning in their 5th decade of life The issue here is a matter of dose. There is little evidence that drinking up to moderate levels (taken



to be 20g a day for women and 30g a day for men) is implicated in 'disease causing'. The J shaped curve applies for all cause mortality as regards alcohol, as well as for cardiovascular disease and late onset diabetes – the one notable exception is concerning breast cancer.

Di Castelnuovo A, et al. Alcohol dosing and total mortality in men and women. Arch Intern Med 2006; 166:2437-2445.

Are there cases when drinking in moderation should not be advised?

There are quite a few situations where drinking in moderation is not advised, such as when planning to drive, when working at heights, when on certain medications, when pregnant, if you have a history of addiction of mental illness, or have religious or cultural reasons why you may choose not to drink. The question we are asked most frequently in this respect, however, is in regard to breast cancer.

Cancer Research UK estimates that alcohol accounts for approximately 4% of breast cancers in the developed world and that one in eight women will develop breast cancer during her lifetime. It looks, based on a variety of studies, as though breast cancer risk could be increased by 6% at levels of as little as one drink a day (mitigated by a diet adequate in folate and maintaining a low BMI in some studies), suggesting that those with a genetic predisposition to breast cancer (10%) and those with breast cancer should be cautious about drinking. It should be remembered, however, that cardio-vascular disease and stroke are statistically much larger causes of mortality, and that alcohol consumption, within daily guidelines is protective for postmenopausal women both for heart disease and all cause mortality when compared with non-drinkers or heavy drinkers. The bottom line is that the guidelines reflect low risk well.

Alcohol and pregnancy

Increasingly, responsible drinking guidelines from around the world advise those who are pregnant, not to drink. Countries giving this advice include the USA, Canada, France, Italy, New Zealand, Israel and Poland for example. In the UK, guidance has changed from one or two units once or twice a week conferring no harm, to avoiding alcohol during the first trimester (due to an increase in miscarriage risk) and then one or two units once or twice a week.

Findings in 2008 by The Food Doctor and the UK charity 'New Life' found that 25% of babies in the UK are unplanned, and 17% of mothers didn't know they were pregnant until eight weeks or more. Therefore balanced advice concerning the effect of alcohol use in pregnancy is crucial to prevent unnecessary concern amongst this group of mothers to be.

If you drink when pregnant, alcohol from the blood crosses the placenta and enters the baby's blood. As the foetus is still developing it takes longer for its liver to break down the alcohol, potentially exposing its organs and tissues to alcohol. As no threshold of safe drinking when pregnant has been established, the best advice if pregnant is not to drink. However, according to detailed analysis of the research by the National Institute of Clinical Excellence, The Royal College of Obstetricians and Gynecologists, small amounts of alcohol during pregnancy (not more than one to two units, not more than once or twice a week) have not been shown to be harmful.

Official National Institute Clinical Excellence Guidance

NICE antenatal care guidance (CG62, published June 2010) gives the current recommendations regarding alcohol in pregnancy for the UK:

'Pregnant women and women planning a pregnancy should be advised to avoid drinking alcohol in the first three months of pregnancy because it may be associated with an increased risk of miscarriage. If women choose to drink alcohol during pregnancy they should be advised to drink no more than 1 to 2 UK units once or twice a week. Although there is uncertainty regarding a safe level of alcohol consumption in pregnancy, at this low level there is no evidence of harm to the unborn baby. Women should be informed that getting drunk or binge drinking during pregnancy) may be harmful to the unborn baby'.

Alcohol and other cancers

The diseases where alcohol poses 'significant risk' at moderate levels or consumption are rare with the exception of breast cancer. The four leading cancers in the West are prostate, lung, colon and breast cancers.

There is no doubt that exceeding daily low risk guidelines on a regular basis increases the risk of a number of diseases, including a number of cancers. However, as with most issues regarding alcohol – it is how much that is drunk that is important.

'Alcohol as a cause of cancer' published by the Australian Cancer Institute concluded that moderate alcohol consumption two drinks of alcohol (10g) per day does not increase the risk of cancer in general. However, four drinks per day increases the risk of cancer by 22%. High alcohol consumption (8 daily drinks) increases the risk of cancer at any site by 90%. Evidence is clear, that alcohol is carcinogenic for some types of cancer, and that the risk is dose dependent

www.cancerinstitute.org.au/cancer_inst/publications/pdfs/pm-2008-03_alcohol-as-a-cause-of-cancer.pdf

The World Cancer Research Fund

The Panel judges that alcoholic drinks are or may be a cause of various cancers, irrespective of the type of alcoholic drink. The causal factor is evidently alcohol (ethanol) itself. The extent to which alcoholic drinks are a cause of various cancers depends on the amount of alcohol drunk'.

The World Cancer Research Fund (WCRF)/American Institute for Cancer Research (AICR) Report – 'Policy and Action for Cancer Prevention'

So, to conclude, as each year goes by, we understand more about alcohol and health as well as its social, psychological and physiological effects. There are still many areas which need further research, especially concerning alcohol and the brain, the liver and cancer, but it is gratifying for those of us who live largely 'moderate' lives that research repeatedly shows a drinking pattern of little and often is associated with being happier, suffering from less heart disease, late onset diabetes, ischemic stroke, stress, cognitive decline and indeed all cause mortality. The key is what we all know, but find difficult to do – to eat healthily, not smoke, exercise lightly, stay slim and drinking moderately. Our drinking should always be for pleasure and social reasons, however, and we shouldn't look to justify our drinking habits on 'health ground' we should enjoy a glass to enrich life, not to medicate it.

Helena Conibear is Director of Alcohol in Moderation and Co-Director of The International Scientific Forum on Alcohol Research, a forum of 40 Professors and medics who comment on emerging research in context with other papers via www.alcoholforum4profs.org

Helena is also the founder of The Alcohol Education Trust, which provides resources and material on responsible consumption to 11-16 year olds and their parents in the UK via www.talkaboutalcohol.com and www.alcoholeducationtrust.org

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AIM – Alcohol in Moderation

was founded in 1991 as an independent not for profit organisation whose role is to communicate "The Responsible Drinking Message" and to summarise and log relevant research, legislation, policy and campaigns regarding alcohol, health, social and policy issues.

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