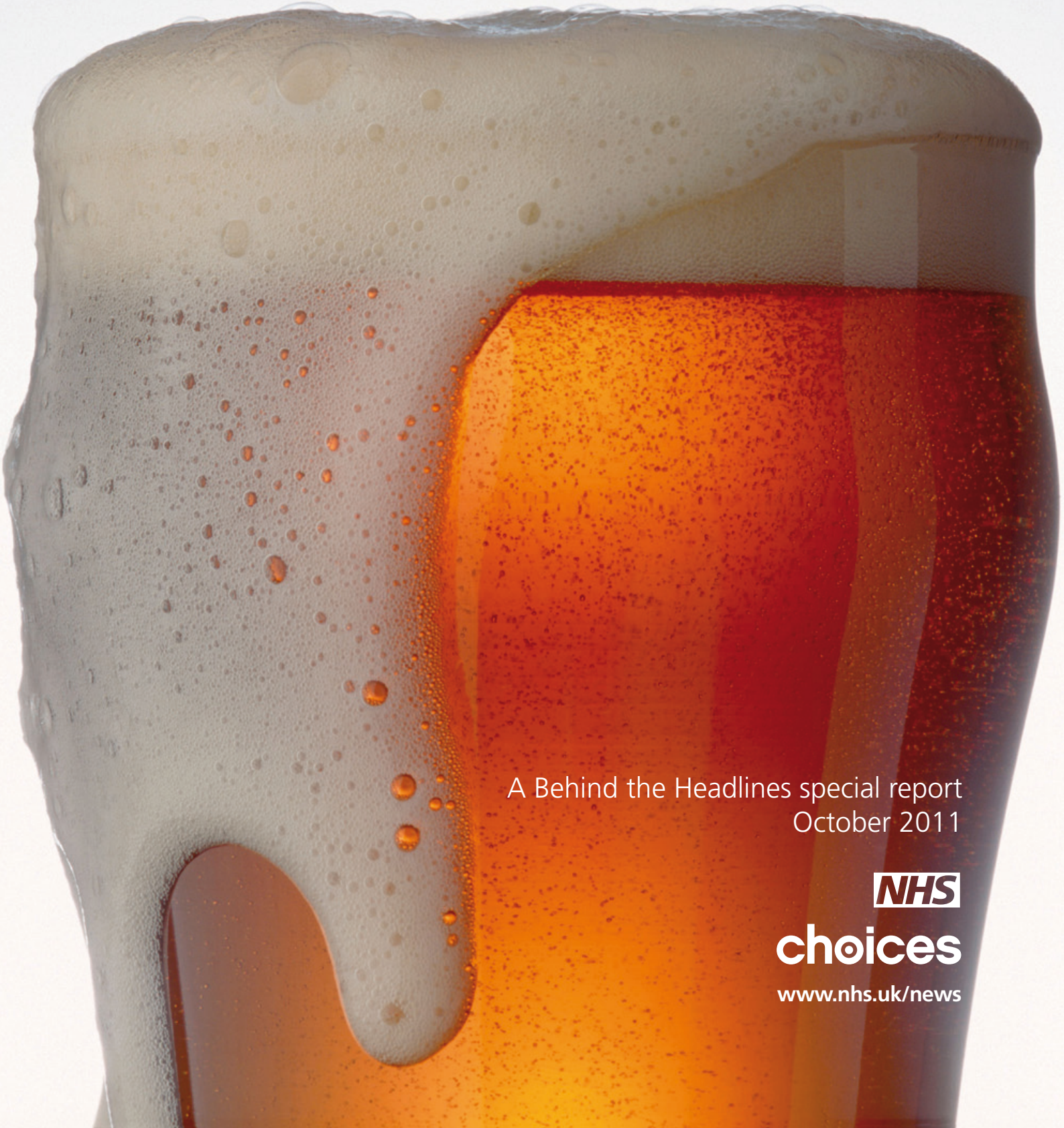
What's your poison?

A sober analysis of alcohol and health in the media



A Behind the Headlines special report
October 2011

NHS choices

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Contents

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Alcohol and the media: a healthy relationship?

Most of us like to drink alcohol from time to time, even if it's just a glass of sherry at Christmas or champagne to celebrate a birthday, we know that drinking alcohol can feel nice and may help us to socialise.

What's more, the media often tell us that a drop of what we fancy does us good. For instance, the *Daily Mail*'s alliterative headline "How a daily tipple could help topple risk of heart disease" (February 23 2011) may have had readers drinking a toast to their health

Headlines about booze aren't always a cause for celebration

Yet just two days earlier, the same paper reported that "250,000 extra lives could be lost in the next 20 years" because of people drinking too much cheap booze. Obviously, there was no scientific breakthrough that suddenly made alcohol safe on Tuesday of that week. So why the apparent contradiction in the reports? Was the science flawed or the coverage overstated?

Press coverage can help us understand the potential effects of alcohol on our health. However, it can also create confusion. For example, newspapers often discuss the possible benefits of red wine without mentioning the drawbacks of heavy drinking, such as liver damage.

Researchers may, wittingly or unwittingly, influence this. For instance, researchers are probably more excited about studying the potential health benefits of newly discovered compounds in red wine than in studying liver disease, which has been known about for many years. If this influences the amount of research being carried out, it is natural if more of this "cutting-edge" science is then reflected in the press.

In a country where most people enjoy a drink, a story suggesting that this habit is good for you is likely to make for a more appealing front page than a story about its adverse effects. Even when the downsides of alcohol are reported, it can be easier to live in denial and think they don't apply to you.

As with all research, contradictory messages often arise because studies on alcohol are reported by the press in isolation. It means that one day we read about alcohol's potential cardiovascular benefits, and the next of the link between alcohol and cancer. Even studies looking at the same area of health can come up with conflicting findings. The media aren't great at pointing this out or at getting across the limitations of individual pieces of research. Therefore, it's hardly surprising that people are confused and doubt the apparently conflicting claims of "medical experts".

In this report, we examine the studies on alcohol that have been reported in Behind the Headlines. We look at the messages these studies are reported to give and investigate why they aren't always reported accurately.

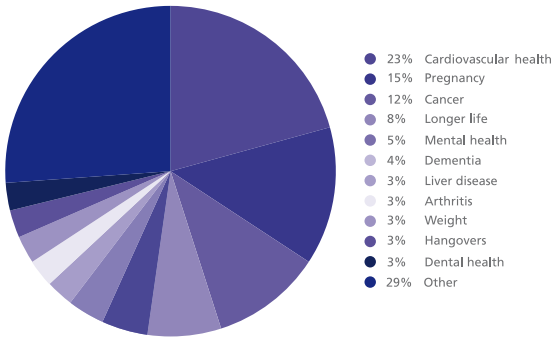
Our report is not a systematic review and cannot summarise all studies about alcohol and health. We put the findings of individual studies into context by looking at what existing systematic reviews and national guidelines say on the key questions of alcohol and health.

Alcohol stories analysed in Behind the Headlines

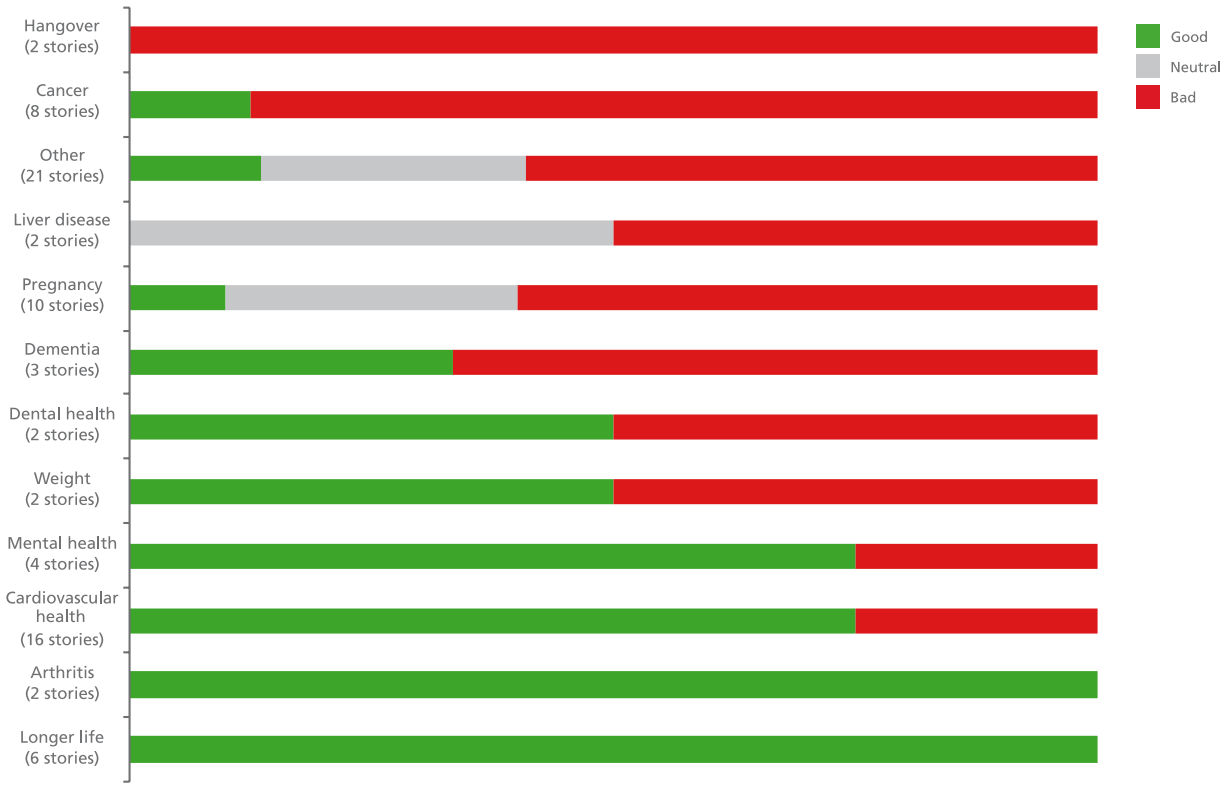
Between July 2007 and July 2011, we have analysed 75 studies related to alcohol, which were covered in 242 news reports. The pie chart to the right shows how these studies can be grouped according to the different areas of health addressed.

A broad mix of alcohol-related topics is covered in the media, yet by far the most common is cardiovascular health, which accounts for 23% of the stories. Also popular are the effects of alcohol in pregnancy (15% of stories), the relationship between alcohol and cancer (12%), and whether alcohol can help you live longer (8%).

If we group the stories in each area according to the broad message of the headlines – namely whether alcohol is good, bad or neutral – some interesting patterns emerge. Most of the headlines tell us that alcohol is good for cardiovascular health and longevity. With pregnancy and cancer, the headlines tell a different story, and alcohol is generally reported



Pie chart showing the areas of health addressed by alcohol-related studies in Behind the Headlines (some stories fall into more than one category, so percentages add up to more than 100%)



Graph showing how Behind the Headlines stories break down into different subject areas, and the proportion of the stories that have a positive, negative or neutral heading. Stories are classified as having neutral coverage if the headlines do not suggest that alcohol is either good or bad. If headlines about a study were a mix of neutral and either good or bad, the study is classified based on the non-neutral headlines, to illustrate the range of messages conveyed

as being bad for our health. Many of the mixed bag of "other" studies are also about alcohol being bad. This is partly because they include studies about the UK's binge drinking problems and alcohol-related hospital visits.

A headline gives a subjective assessment of a study's message, and headlines obviously do not give as much information as the entire news story. However, the graph indicates that it is possible for mixed messages to be conveyed. These mixed messages occur for almost all aspects of health, so it's easy to see why people might be confused.

Do we drink more than is good for us?

Most adults in the UK – about 90% of those in England and 75% in Northern Ireland – drink alcohol. In England in 2009, the average weekly alcohol consumption for adults aged 16 and over was 16.4 units for men and 8.0 units for women, according to the NHS Information Centre. This average is below the maximum recommended limit, which adds up to 21-28 units a week for men and 14-21 units a week for women.

How much should I drink?

The current standard way to measure how much alcohol a person drinks is in units.

One unit is 10ml or 8g of pure alcohol.

Originally, one unit was defined as half a pint of normal strength beer, lager, cider or stout, a glass of wine or a single bar measure of spirits. As more and more alcoholic drinks of varying strengths became available, it made sense to give the unit a more precise definition, on which the current recommended alcohol limits are based.

Studies vary in the way they measure how much alcohol is consumed. Some older surveys used the older definition of units, and this could make it difficult to compare the results of surveys about drinking.

There is more information on alcohol units on the NHS Choices website.

Current government guidelines advise that:

- Women should not regularly drink more than 2–3 units (16–24g of alcohol) a day.
- Men should not regularly drink more than 3–4 units (24–32g of alcohol) a day.
- The guidelines are different for some groups, including women who are pregnant or trying to become pregnant, breastfeeding women and people with diabetes.

A drink is not the same as a unit. Many pubs and bars increasingly serve drinks in larger glasses or amounts, and many drinks are getting stronger. This means you might be drinking more than you think.

Alcohol content in drinks can be confusing

For example, a pint of premium lager, bitter or cider (5% alcohol by volume) contains about 3 units. This is the maximum recommended daily limit for a woman, and almost the maximum recommended daily limit for a man.

Use the NHS Choices alcohol unit calculator to find out how many units there are in different types and amounts of alcoholic drink.

Many people are drinking beyond the recommended limits

However, this assumes that the amount is drunk steadily over the week, which is not the case for a significant number of people. The inclusion of non-drinkers also reduces the average consumption. The NHS Information Centre reported that in England in 2009, 37% of men and 29% of women drank more than the recommended maximum daily limit on at least one day in the week before they were interviewed. To make matters worse, 20% of men and 13% of women reported "binge" drinking more than twice the recommended maximum daily limit in one day during the previous week.

In addition, people do not cut back after drinking too much on a single day. The same report found that 26% of men reported drinking more than the recommended 21 units in an average week, and 18% of women reported drinking more than the recommended 14 units in an average week.

More people are opting to drink at home rather than in pubs

What and where are people drinking?

Figures in a report from the NHS Information Centre show that most of the units consumed in an average week in 2009 were from beer, lager or cider in men (60%), while women drank most of their units in wine (57%).

People also drink more at home and less in licensed venues such as pubs and bars. The volume of alcoholic drinks bought for consumption outside the home in England decreased by 39% from 2001/02 to 2009, mainly as a result of reductions in beer purchases.

What happens to our bodies when we drink?

Alcohol is absorbed from the stomach and small intestine into the bloodstream. This starts within minutes of the alcohol reaching the stomach, and the level of alcohol in the blood peaks 45 to 90 minutes after the alcohol is drunk. This process happens more quickly if:

- you have an empty stomach
- you are drinking a strong drink
- the drink is carbonated
- you are a woman
- you are small

How does the body deal with alcohol?

Once the alcohol is absorbed, the body needs to process and get rid of it quickly. This is because alcohol in the blood is poisonous in high quantities, and our bodies cannot store it.

A very small amount of pure alcohol is excreted through urine and breath. Most alcohol is broken down by the liver into substances that can be stored or excreted. However, the liver can only process a small amount of alcohol at a time. On average, it takes about an hour for the liver to process one unit of alcohol. This generally means that if you drink more than one unit of alcohol every hour, the concentration of alcohol in your bloodstream will continue to increase.

Measuring alcohol in the blood

The level of alcohol in the blood (blood alcohol concentration) is usually measured in milligrams of pure alcohol per 100 millilitres of blood. The effects of alcohol will vary because of factors such as a person's age, weight, gender and genetic make-up, the type of drink, the speed at which it is consumed and how much someone has eaten before drinking. Generally, the more alcohol in the blood, the more potent the effects.
For example,

You may feel relaxed and full of wellbeing, but you may also be less alert and less inhibited than normal.

10-50mg/100ml

You may feel pleasure but you may also find it hard to co-ordinate movements or to reason.

60-100mg/100ml

You may feel angry or sad, or become manic and your speech may be slurred.

110-200mg/100ml

You could become aggressive or depressed. You'll also lack balance and your body will lose control of its temperature regulation.

210-300mg/100ml

You may lose bladder control and find it difficult to breathe. Your heart rate may slow, and you could even slip into a coma.

310-400mg/100ml

A level of alcohol above 410mg/100ml can result in death.

410mg or more/100ml

Headlines about boozy Britain have caused alarm

Bingeing and heavy drinking

There's no denying that *The Guardian's* famous 2004 exposé "On the streets of Binge Britain", written by restaurant critic Jay Rayner, has a ring of truth. This sparked huge media interest in stories about out-of-control youths causing drink-fuelled mayhem. And with research feeding such headlines, including one study that described British teenagers as "the third worst binge drinkers in Europe" (BBC News, March 26 2009), it's easy to see why these stories often hit the news.

This type of story appears to be the polar opposite of more positive, socially acceptable alcohol stories, aimed at the civilised one-glass-of-wine-a-day crowd. Yet the latest figures show that, while they may not be falling over in the streets, many people consistently drink far more than is good for them.

Binge drinking is usually defined as drinking twice the recommended daily limit on one occasion. The NHS Information Centre reported that in England in 2009, 20% of men surveyed reported binge drinking on at least one day in the past week, as did 13% of women. Binge drinking was highest among the 25-44 year-old age group for men (27%) and the 16-24-year-old age group for women (24%).

The Europe-wide study that prompted the 2009 BBC story surveyed students aged 15-16 years old in 35 countries. It found that the proportion of students who reported drinking an alcoholic beverage over the past year remained roughly the same between 1995 and 2007. Overall, reported

beer and wine consumption initially increased in this period, then appeared to decrease gradually up to 2007. However, the proportion of people who reported having five or more drinks on one occasion during the last 30 days (equivalent to about 10 units and considered a binge) increased from 12% in 1995 to 18% in 2007. In the UK, the proportion of people drinking five or more drinks on one occasion rose from 22% to 27% over the same period. The UK's figures were the fourth highest of the 35 countries assessed. The UK also had the third highest estimated average alcohol consumption on the most recent alcohol-drinking day.

Is the occasional binge OK?

Once the hangover has worn off, it's tempting to think that the odd bout of heavy drinking can cause no lasting harm. However, getting very drunk even occasionally is bad for you in several ways. The immediate risks include unintentional injuries such as traffic accidents, violence, risky sexual behaviour and alcohol poisoning, which is a dangerous medical emergency. However,

Drinking heavily can cause aggression, violence and injuries

Can I avoid a hangover?

Hangovers have been recognised since the time of the ancient Egyptians, yet surprisingly little is known about what happens in the body to cause hangover symptoms. As well as the obvious physical symptoms, such as headache, dry mouth, fatigue, nausea and tremor, hangovers have mental effects such as irritability and anxiety.

Experts now think that a hangover is caused by a combination of:

- direct physical effects of alcohol
- compounds produced when alcohol is processed by the liver (in particular acetaldehyde, which is more toxic than alcohol)
- other ingredients in alcoholic drinks (known as congeners)
- complex effects on the central nervous system of alcohol withdrawal, when someone stops a bout of heavy drinking

Research has found that a hangover begins within a few hours of stopping drinking, when blood levels of alcohol are falling. Symptoms are usually at their worst when the alcohol has completely left your bloodstream, and may continue for up to 24 hours afterwards.

Painkillers can only treat the symptoms of a hangover

A plethora of so-called hangover "cures" (including cabbage, cold showers and "hair of the dog") have been touted over the centuries. Searching for "hangover cure" on the internet will give you almost 8 million results. Despite this, one large systematic review on preventing or treating hangovers, published in the *British Medical Journal*, found little robust evidence that anything can prevent or get rid of a hangover, other than avoiding alcohol altogether or drinking only in moderation. See NHS Choices for more information on treating the symptoms of a hangover.

researchers now think that binge drinking may increase the risk of long-term health problems, in particular cardiovascular disease.

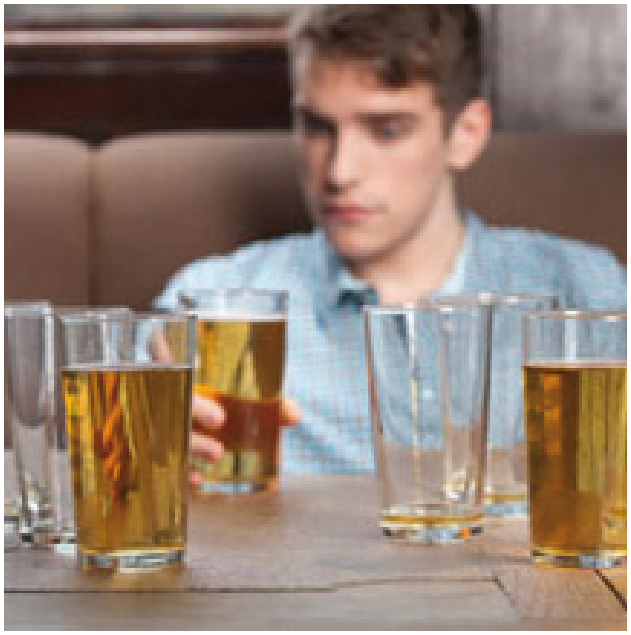
Some research covered by Behind the Headlines indicated that drinking patterns may be linked to heart health independent of the amount of alcohol consumed. This includes a study that resulted in the BBC headline: "Binge drinking 'doubles heart risk'" (November 24 2010). It showed that spreading alcohol consumption across the week, for example, is better for the heart than a smaller number of heavier drinking sessions.

The study involved almost 10,000 middle-aged men. It supports other research on the ill effects of binge drinking (defined in this study as drinking more than 50g or 6.25 units of alcohol on at least one day a week). It found that binge drinkers had almost double the risk of major coronary events, such as a heart attack, compared to regular non-binge drinkers (who drank on at least one day a week but did not binge). Despite some limitations, the results of this study are probably reliable.

Why do scientists have a problem with alcohol?

Most of us know that heavy drinking is harmful. However, there's a lot of confusion about whether regular light or moderate drinking is good or bad for your health. Sometimes this confusion is caused by press coverage of studies, and sometimes by conflicting messages from the studies themselves.

These conflicting messages are caused in part by the difficulties of researching the effects of alcohol on health. It is not possible to randomly assign people to a lifetime of drinking or not drinking alcohol, which might lead to complaints from both groups, not to mention the research ethics committee. Researchers have to rely on people making their own decisions about what they want to drink. They then have to assess people's alcohol consumption and see how it relates to their health. These are known as observational studies. However, people who drink different amounts may differ in other ways.



It can be hard to remember how many drinks you've had

For instance, heavier drinkers may have a poorer diet. This makes the effects of alcohol, whether positive or negative, difficult to single out.

Another complication of researching the effects of alcohol is that researchers usually have to rely on people to report how much they drink. It can be difficult to get people to record their alcohol consumption every day over a long period. Self-reporting is a problem when studying any lifestyle factor, but it can be particularly problematic with alcohol. This is because people may be reluctant to be completely honest, even to themselves, about how much they drink.

Researchers often ask people to report what they drank in the past. This is less reliable than following people over time and assessing their drinking at regular intervals.

It's also difficult to get consistent measurements. Researchers usually ask people to record how many glasses of different drinks they consume. However, glasses can vary in size and different drinks contain different amounts of alcohol.

All these variables make it difficult to estimate people's true alcohol consumption. Precise measurement of alcohol consumption is particularly important when studying the effects of "light to moderate" drinking, which can mean different things to different researchers and to different drinkers.

Finally, deciding which group to compare drinkers with is also problematic. If you compare the health of drinkers with that of teetotallers, this could include former drinkers or people who cannot drink for health reasons. This can skew findings on alcohol and health. Different patterns of alcohol consumption (for example, bingeing versus regular small amounts), which may have different health effects, further complicate any comparisons.

Below, we look at the press coverage of research on some of the important health issues associated with alcohol consumption, how this research has been reported and what we already know from reliable evidence.

Alcohol and the heart

First, the good news. On November 19 2009, *The Independent* claimed that you could "Drink half a dozen beers a day and have a healthier heart". Less than a month later, and just in time for Christmas, *The Guardian* had a message to boost the festive cheer: "A glass or two of champagne really does lift the heart" (December 14 2009).

The festive report on champagne was based on a small study looking at blood vessels

Yet the previous year, media stories on alcohol and the heart had struck a darker note. *The Daily Mail* claimed: "A second glass of wine is bad for your heart" (February 14 2008). A few months later, *The Daily Telegraph* covered a separate study warning that "Just two drinks a day can increase the risk of heart disease" (July 31 2008). With contradictory headlines such as these, it's not surprising if people are confused about alcohol's effect on the heart and circulation.

All of the studies quoted above have limitations that cast doubt on their findings. The study on champagne reported in *The Guardian* was a randomised trial, which means the effects seen should have been entirely due to the champagne. However, it involved just 15 volunteers. It also only looked at the short-term effect of champagne on blood vessels. This is very different from a clinical outcome such as heart disease, so the study can tell us little about the effect of bubbly on cardiovascular risk. None of the newspaper reports on this study pointed this out.

Half-a-dozen beers a day are likely to be more harmful than good

The Independent reported that the half-a-dozen-beers-a-day study found "that the protective effects of a daily tipple are not limited to those who drink moderately but also extend to those who consume at what are conventionally considered to be dangerously high levels".

Although the study found a link between higher alcohol intake and reduced risk of coronary heart disease in men, it had many limitations. These included the fact that the researchers did not examine participants for cardiovascular disease at the start of the study. Therefore, we can't be sure that people didn't already have cardiovascular disease before their drinking patterns were

assessed. Also, participants were asked to recall their alcohol consumption over several decades, and these estimates are likely to be inaccurate. As with all studies of this type, factors other than drinking could also have influenced the results.

Perhaps most importantly, this study did not assess the many known risks of excessive drinking such as liver disease, obesity and certain cancers. This means that it provides a very one-sided picture unless put into context. It certainly cannot tell us whether half-a-dozen beers a day are likely to do you more good than harm.

The other headlines above also provide opposing claims, but these studies have flaws too. For example, the study that led to the *Mail*'s headline that a second glass of wine is damaging to the heart was similar to the study on champagne. It was a randomised trial but included just 13 people. It also only measured short-term changes in blood circulation and blood vessel function after a single drink, and did not look at long-term cardiovascular health.

The 2008 story from *The Daily Telegraph* also suggested that two drinks a day could be bad for the heart. This story covered a US study that found that people who regularly drank more than the US guideline levels (two drinks a day for women and three for men) had an increased risk of metabolic syndrome. Metabolic syndrome applies to people with multiple cardiovascular risk factors including high cholesterol and high blood pressure. Although the message this story gives is in keeping with current advice to drink only in moderation, the study itself does have one major limitation. It was a cross-sectional study, which means that data on drinking and metabolic syndrome were collected at the same point in time. We cannot be sure that the people's drinking habits directly led to their metabolic syndrome.

What can we say about alcohol and the heart?

Is it true that "a daily tipple could help topple risk of heart disease", as the *Daily Mail* suggested on February 23 2011?

The latest systematic review on alcohol and heart disease, which is likely to be the most up-to-date and reliable summary of the available research, supports previous reviews on the same subject.

It looked at 30 years of research on alcohol and the heart, involving more than 80 studies of over 1 million adults. It found that light to moderate drinkers had a reduced risk of having a heart attack or dying from heart disease or a stroke, compared with non-drinkers. However, they were not less likely to have a stroke. These risks were expressed in relative terms (how many times more or less likely these events are in light to moderate drinkers than in non-drinkers). According to the study, light to moderate drinkers had about three-quarters of the risk of dying from cardiovascular disease as non-drinkers.

For women, any reduction in risk of heart attacks will be small

What this means for different groups of people will depend on their levels of risk. The effect of reducing your risk by a quarter will not be large if you have an inherently low risk of dying from cardiovascular disease, for example if you're a woman who doesn't smoke, doesn't have high cholesterol, is a healthy weight and has never had a heart attack or stroke. However, reducing your risk by a quarter will have a larger effect if you have a high risk of dying from cardiovascular disease, for example if you're a man who smokes, has high cholesterol, is obese and has already had a heart attack.

Alcohol and liver disease

One well-established, but perhaps less talked about, danger of regular heavy drinking is liver damage. This risk is not often reported in the media, although notably *The Guardian* claimed: "Sharp rise in liver cancer blamed on binge drinking and obesity" (August 20 2009). Perhaps liver cancer doesn't make such sexy headlines as the health benefits of red wine.

Although alcohol is broken down by the liver, regularly drinking more than the recommended alcohol limits can result in liver damage, which can lead to alcoholic liver disease. Liver damage often causes only mild symptoms until it is quite advanced. See NHS Choices for more information about alcoholic liver disease.

The figures from a 2011 article on liver disease from *The Lancet* paint a grim picture. The journal reported that deaths from liver disease in the UK have doubled since 1986, rising from 4.9 to 11.4 deaths per 100,000 people. The authors of the article also predicted that, unless definitive action is taken to prevent heavy alcohol consumption, up to 250,000 more deaths from liver disease could occur in the next 20 years.

The upward trend in deaths from liver disease in the UK in recent years is at odds with the decrease seen over the same period in other countries such as France. Factors thought to have contributed to this decrease in France include increasing knowledge of the effects of alcohol on the liver, and recent strict marketing regulations for alcohol. Excessive alcohol consumption, along with the increasing prevalence of obesity and hepatitis C, has been blamed for the sharp rise in primary liver cancer cases in the UK. The number of new cases has almost tripled, from 1.4 cases per 100,000 people in 1975 to 3.9 per 100,000 in 2006. Experts have predicted that cases of liver cancer, which used to be rare in the UK, will continue to rise.

How much is moderate drinking?

In this latest systematic review, light to moderate drinking was considered to be 2.5-14.9g of alcohol a day, which is about one-third of a unit to just under 2 units daily (roughly one or fewer drinks a day). This amount is below the maximum daily limits recommended in the UK, where men are advised to drink no more than 3-4 units (24-32g of alcohol) and women no more than 2-3 units (16-24g of alcohol) a day.

The picture was more complicated for people who drank more than moderate amounts. With higher alcohol consumption, the risk of some outcomes seemed to remain lower, but the risk of stroke appeared to increase.

The researchers got similar results when they compared people who drank with those who had never drunk, excluding people who used to drink alcohol but had given up. This is important because those who have given up drinking alcohol may have done so because of ill health. This factor has been thought to overestimate the protective effects of light drinking in other studies.

A companion review also showed that moderate alcohol consumption was associated with favourable changes in certain intermediate markers of heart disease risk, such as increased blood levels of "good" HDL cholesterol.

However, although light to moderate drinking may have benefits for the heart, it may increase the risk of other health problems such as cancer (see "Alcohol and cancer" on page 11).

Is it misleading to think that drinking might help the heart?

Despite findings that associate light or moderate drinking to better heart health, most experts agree that alcohol should not be specifically promoted as a way of improving health. Indeed, Cancer Research UK estimates that worldwide, alcohol causes twice as many deaths from heart disease as it prevents.

NHS advice is that drinking alcohol is never completely safe, and that people who choose

to drink should not exceed the recommended number of units.

That's because there is a strong association between heavy drinking and heart problems. Also at present, we can't predict the precise level of risks and benefits of alcohol for specific individuals, or the "optimal" level of alcohol that might have benefits but avoid the health risks.

It's also important to remember that heart disease is not caused or prevented by one thing alone. Factors such as smoking, blood pressure, diabetes and cholesterol all have a large impact on cardiovascular health.

There are other established ways to look after your heart including regular exercise, a healthy balanced diet and maintaining a healthy weight.

Does that mean red wine isn't good for you?

Many media stories about alcohol focus in particular on the alleged benefits of red wine. With headlines such as "Half a glass of wine a day can add five years to your life" (*The Daily Telegraph*, May 5 2009) or even "2½ bottles of wine a week could save your life" (*The Times*, January 9 2008), they sound convincing.

The interest in wine, and in particular red wine, began with the "French paradox". This is the observation, first made about 30 years ago, that French people have a relatively low incidence of coronary heart disease, despite a diet relatively rich in saturated fats. The theory that this might be related to wine consumption was raised in the early 1990s, and may have contributed to increases in wine consumption over the years.

There has also been a lot of excitement more recently about some compounds in red wine that might have health benefits, in particular resveratrol. This compound has been linked to a longer life in animal studies, and to anti-cancer effects on cells in the laboratory.

The truth for humans is less clear-cut. For one thing, some experts think the French paradox may involve several factors including differences in dietary habits, patterns of alcohol consumption, physical activity and socioeconomic

French wine is not proven to stop heart attacks

status. It is also possible that the true incidence of heart disease in France has been underestimated.

As for resveratrol, the doses used in some lab studies bear little relation to how much humans get from drinking red wine. In one study, resveratrol helped stop abnormal growth of blood vessels in the eyes of mice. Yet the human equivalent of the dose given would be several bottles of wine a day. We don't know yet if this compound can protect the heart. However, if it does, people might be better advised to take it as a supplement, rather than hitting the (red wine) bottle.

The evidence that red wine is responsible for the French paradox, and has benefits beyond those of other alcoholic drinks when consumed in light to moderate amounts, is not conclusive. What is beyond doubt is that excessive drinking has serious risks to health, whatever the type of alcoholic drink.

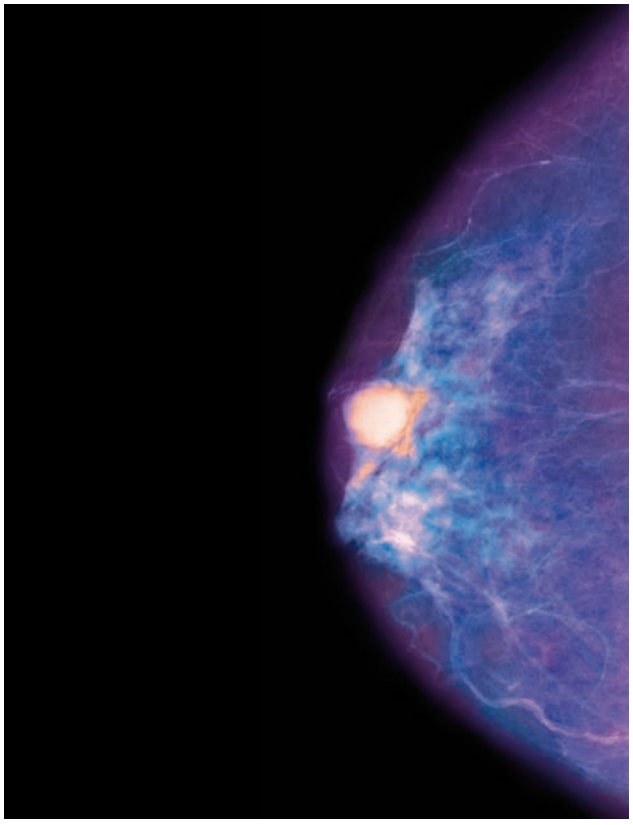
Alcohol and cancer

Between July 2007 and July 2011, Behind the Headlines has covered nine studies about the links between alcohol and cancer. Almost twice as many studies (17) were on alcohol and cardiovascular disease. We can't be sure if this difference is because there are fewer studies about alcohol and cancer, or because the press likes to stress the "good news" about alcohol.

Unfortunately, this could result in people knowing more about the possible benefits of light alcohol consumption for the heart and less about its link with cancer.

> "People are more likely to develop cancer if they drink a lot of alcohol, no matter whether they save it up and drink it in one go, or drink it steadily over a week."
> Cancer Research UK

Probably the most comprehensive look at the link between different foods and drinks and cancer is provided by the World Cancer Research Fund (WCRF). This led the *Daily Mail* to say: "Cancer report adds bacon, ham and drink to danger list". In the WCRF's systematic reviews, hundreds of experts all over the world identify and assess the available research evidence, to determine as definitively as possible which factors increase or decrease the risk of cancer.



Alcohol can increase women's risk of breast cancer

Their most recent systematic review, from 2007, says that evidence of a link between all types of alcohol and certain cancers is stronger than ever. Widely reported in the press, the report came up with some key "commandments" for reducing the risk, including limiting alcohol intake.

The WCRF says there is now convincing evidence that alcohol increases the risk of cancer of the:
mouth

- pharynx (the upper throat)
- larynx (voice box)
- oesophagus (food pipe)
- breast (in women)
- bowel (in men)

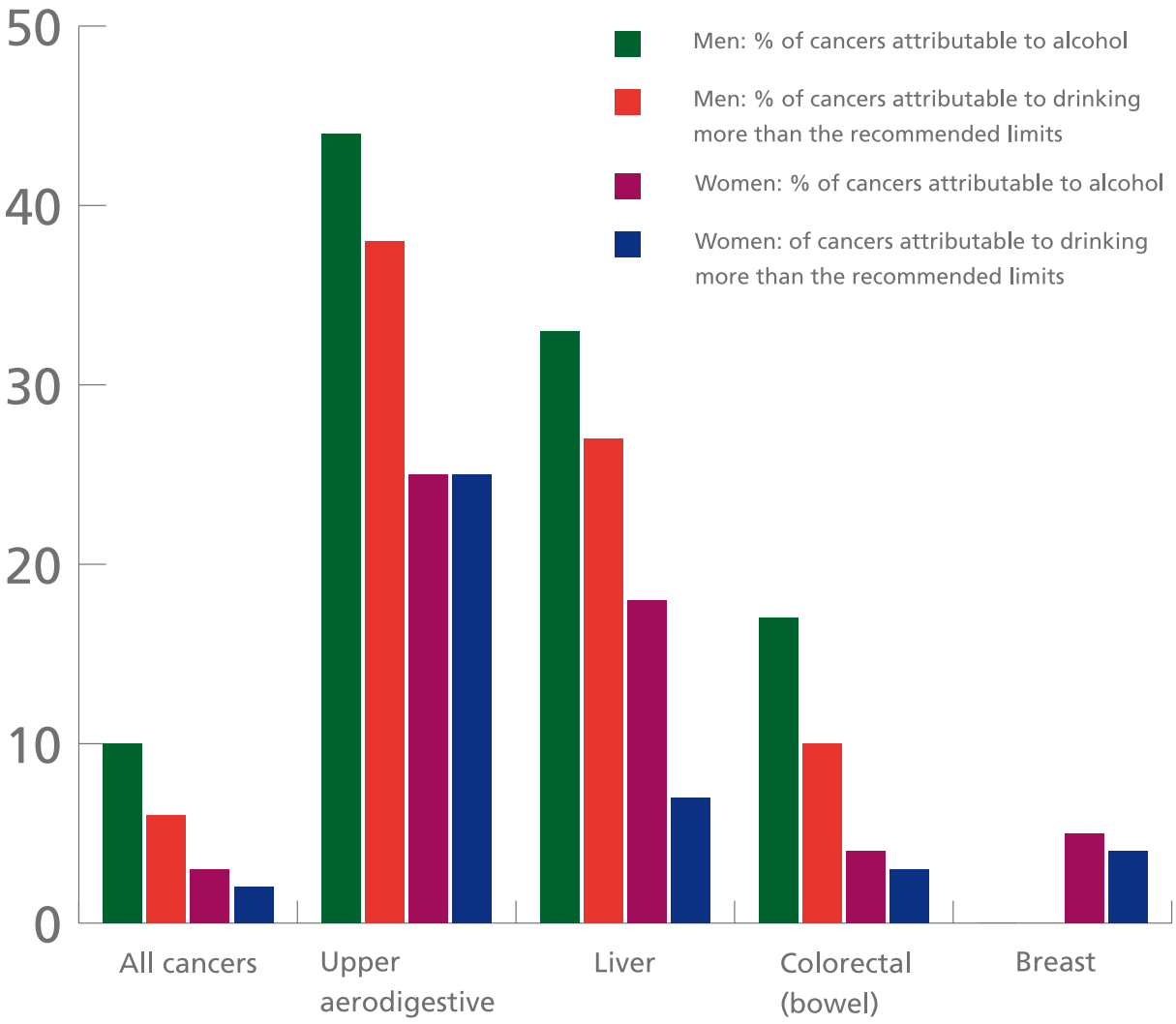
It also concluded that the evidence shows that alcohol probably increases the risk of liver cancer, as well as bowel cancer in women.

The research shows that along with smoking, alcohol causes the vast majority of mouth and oesophageal cancers. Cancer Research UK reports that in the last decade, mouth cancer has become more common and this is linked to higher levels of drinking.

The research also suggests that all alcoholic drinks have the same effect, with no evidence of any significant difference depending on the type of drink. The important factor is the amount of alcohol consumed.

Nor does the evidence suggest a "safe" level of alcohol consumption with regards to cancer risk. The European Cancer Code report, produced by the European Community, stated that as little as 10g of alcohol a day (about one-and-a-quarter units) has been associated with an increased risk of breast cancer, while as little as 20-30g a day (2.5-3.75 units) has been linked to other cancers. The more someone drinks, the higher the risk. In addition, tobacco and alcohol appear to work together to damage the cells of the body, so people who smoke and drink multiply their risk.

Researchers aren't sure how alcohol might cause cancer. One of the main theories is that alcohol directly damages DNA. Another theory is that alcohol increases the levels of some hormones such as oestrogen, which can increase the risk of breast cancer.



Graph showing the proportion of different types of cancer estimated to be attributable to alcohol overall, and to drinking more than recommended limits

Source: Schütze M, *et al*. **BMJ 2011; 342: d1584**

Is there a "safe" limit that will protect us from cancer?

A more recent large European study was covered widely and, for the most part, accurately in the press. The *Daily Mail*, for example, reported that "Alcohol still causes cancer, even if you drink a 'safe' amount" (April 8 2011). This study estimated that 10% of all cancers in men and 3% in women could be attributed to alcohol consumption.

The study calculated the percentages of specific cancers that could be attributable to alcohol consumption in Europe (called the alcohol attributable fraction), and the percentages that could be attributable to drinking above the maximum daily limit. The limit was defined in this study as more than 24g (3 units) for men and more than 12g (1.5 units) for women. The results are summarised in the graph above.

It found that for cancers to which alcohol contributes (mouth, throat, oesophagus and liver), much of the alcohol-related risk was due to drinking above these limits. The limits used in this study are below the maximum limits currently recommended in the UK. This fact was highlighted by The *Mail*, which said that drinking a "safe" amount of alcohol below the UK's recommended daily limit increases the risk of developing cancer.

One important – and very large – UK study that was widely reported found that for middle-aged women (average age 55), even low to moderate

alcohol consumption significantly raised the risk of breast and other cancers, compared to not drinking at all.

This study, called the Million Women Study, considered a drink to contain 10g of alcohol, or 1.25 units. Women in the study drank on average less than one alcoholic drink a day (about 6g of alcohol, or three-quarters of a unit). They were followed on average for just over seven years. This was a strong and well-conducted study, although it had some of the limitations inherent in this type of research.

The study estimated that in developed countries, regularly drinking an additional alcoholic drink (about 1.25 units) a day on average was associated with an increased cancer risk of 1.5% up to the age of 65. When split into the different types of cancer, this equated to an additional:

- 1.1% risk of breast cancer
- 0.1% risk of cancer of the mouth and throat
- 0.1% risk of cancer of the rectum
- 0.07% risk of cancer of the oesophagus
- 0.07% risk of cancer of the vocal cords
- 0.07% risk of cancer of the liver

Although the increase in risk linked to lower levels of alcohol consumption appears to be small for individuals, the study's authors say that the proportion of cancers attributable to alcohol is an important public health issue when considering the population as a whole. The researchers estimated that each year in the UK, alcohol accounted for about:

- 5,000 extra breast cancers (11% of all cases)
- 250 extra liver cancers (22% of all cases)
- 500 extra rectal cancers (9% of all cases)
- 1,200 extra cancers of the upper aerodigestive tract (25% of all cases of cancer of the mouth, tongue, throat, oesophagus and vocal cords)

The risk of cancer increased with higher alcohol consumption. The type of alcohol did not change this, so women who just drank wine had a similar risk to those who drank other drinks. Therefore, while *The Daily Telegraph's* headline "Glass of wine a day raises risk of cancer in women" (February 25 2009) was accurate, it did not tell the whole story as all forms of alcohol seem to have a similar effect.

Do the risks of drinking outweigh the benefits?

An editorial accompanying the analysis of the Million Women study highlights that, in terms of cancer, no level of alcohol can be considered safe. The authors say that the "fascinating" findings should give women who drink to protect their heart "pause for thought". While alcohol may have "modest benefits" for the heart and circulation, the authors point out that for middle-aged women, by far the biggest cause of death is cancer. Although cardiovascular disease is the leading cause of death among women overall, this is mainly in women over 75.

It is unrealistic for anyone to perfectly balance the risks of cancer (even from light alcohol consumption) with the suggested benefits for cardiovascular health. The risk of these conditions will vary according to many factors, including genetics. At present, few studies appear to have quantified the size of different risks and benefits from light or moderate alcohol intake in the same population.

Based on its review of the evidence, the WCRF says that to prevent cancer, it would be better not to drink at all.

Alcohol and pregnancy

Women who are trying to get pregnant or are expecting a baby have every right to feel confused about whether they can drink and, if so, how much. This is an important and emotive issue. However, it seems more prone than most topics to contradictory headlines, such as "Binge drink 'is safe for foetus'" (*The Sun*, November 14 2007) and "Pregnant women told to keep off alcohol" (*The Daily Telegraph*, October 26 2007).

Similarly, The *Daily Mail* reported: "Pregnant women who drink one or two units of alcohol a week may actually find their child is better behaved than if they abstained" (October 6 2010), only to warn a few months later that mothers who drink in early pregnancy "are more

likely to have unruly children" (March 22 2011).

The first study referred to by The *Mail* was large and looked at the emotional, behavioural and brain development of over 11,500 children. After the researchers took into account factors that could have distorted the results, they found some slightly better scores on two of the many tests performed in boys (but not girls) whose mothers had drunk lightly during pregnancy (one to two units a week or on each occasion). However, these findings need to be put in context.

Headlines on alcohol in pregnancy have been contradictory

These two tests were not related to behaviour, such as whether a child was obedient or hyperactive or aggressive. Instead, they assessed naming vocabulary and ability to identify picture similarities. The study carried out many statistical tests, which increases the risk of finding differences by chance, rather than because they truly exist. Although the study took into account a wide range of factors that could affect the results, these or other factors may still have had an effect.

The researchers themselves did not claim that light drinking in pregnancy had any benefits. They concluded that their findings suggest that there were no important behavioural problems or cognitive deficits at the age of five in children whose mothers drank lightly in pregnancy, compared to those who didn't. It is a big leap from this to suggesting that drinking in pregnancy is beneficial for the child.

The second study covered by the *Mail* found an association between conduct disorder in adolescents and drinking alcohol in the first trimester of pregnancy. Conduct disorder is a diagnosis that is characterised by a persistent, markerd pattern of repetitive antisocial behaviour that is beyond simply being unruly. The study was relatively small, with around 800 participants, and only 67 adolescents in the study experienced conduct disorder. Analysis of such small numbers increases the possibility that any association is due to chance rather than a true relationship.

In fairness to the press, the studies on drinking in pregnancy have themselves come up with conflicting results, and the messages they send to pregnant women on alcohol can be mixed too. These differences may in part be due to differences in how the studies were carried out and the limitations inherent in the types of study used.

There is no question that alcohol passes freely across the placenta to the foetus, and that heavy drinking can damage foetal development and lead to a condition called foetal alcohol syndrome. This syndrome is characterised by reduced birth weight and intellectual as well as physical abnormalities. As with alcohol-related liver disease, it's possible that because this link is well established, it is less researched. The potential effect of light or moderate consumption during pregnancy is less clear.

Alcohol passes across the placenta into the foetus

According to *The Independent*, one study warned that alcohol "damages DNA of unborn children beyond repair" (July 7 2011). However, the study, which did suggest that alcohol-related DNA damage might play a role in the development of foetal alcohol syndrome, was carried out in mice. These mice were genetically engineered to lack genes that help protect the body against the toxic effects of alcohol. It is not clear whether the results represent the way foetal alcohol syndrome occurs in humans, who would be expected to have working copies of these genes. However, research such as this does give us clues about the effects of alcohol on the foetus.

As with all research on alcohol and human health, it can be difficult to assess the effects of maternal drinking during pregnancy. This is because so many factors could affect the results, in particular socioeconomic status as well as smoking and other lifestyle factors. While researchers usually try to adjust their findings to account for the influence of these factors, both measured and unmeasured "confounding factors" (such as someone's genetic make-up) may still affect study results. Different studies also use different methods of measuring and categorising alcohol consumption in pregnant women. The results may also be prone to error because these studies often rely on women to report their own alcohol consumption. Sometimes, they are asked to remember how much they drank during a pregnancy several years earlier.

The NHS advises pregnant women to avoid alcohol

Even the experts can't agree on the effect of light to moderate alcohol consumption in pregnancy. In a debate published in the *British Medical Journal* and widely reported in the press (October 26 2007), one expert argued that there is emerging evidence that low to moderate alcohol consumption in pregnancy may be harmful for the foetus. Another argued that official advice had changed from permitting small amounts of alcohol to advising women not to drink alcohol at all, despite little change in the scientific evidence. This expert felt that women should be allowed to decide whether or not to drink small to moderate amounts of alcohol in pregnancy.

An accompanying comment from Sir Muir Gray noted that it's important to remember that saying "there is no evidence" that alcohol causes harm to the foetus is not the same as saying there is evidence that alcohol has no effect. Rather, it means that so far the research has found no conclusive evidence of harm from small amounts of alcohol in pregnancy. It's also been argued that if alcohol has a toxic effect in large amounts, the biological effects are likely to be on a continuum, with no level totally safe.

> "Experts agree that drinking large amounts of alcohol during pregnancy has seriously detrimental effects on the health of the baby."

It should be emphasised that experts agree that drinking large amounts of alcohol during pregnancy has seriously detrimental effects on the health of the baby.

What should women believe?

In the absence of conclusive evidence about whether low amounts of alcohol in pregnancy are safe, pregnant women may prefer to take a cautious approach and avoid alcohol altogether.

This is the approach currently recommended by the Department of Health, which says: "As a general rule, pregnant women or women trying to conceive should avoid drinking alcohol. If they do choose to drink, to protect the baby they should not drink more than 1-2 units of alcohol once or twice a week and should not get drunk."

The National Institute for Health and Clinical Excellence (NICE) has published guidance on antenatal care. NICE thoroughly reviewed all the evidence on alcohol consumption in pregnancy and outcomes for the baby.

It found that:

- Research has raised concerns that alcohol may be associated with slow growth of the baby, risk of miscarriage, stillbirth and premature birth.
- There was no evidence of any "threshold" level above which alcohol is harmful and below which it is safe.
- Low to moderate alcohol consumption (1.5 units a day or less) was not associated with harm, but the evidence is probably not strong enough to rule out any risk. There is a possibility of an increased miscarriage rate, although the evidence available at that time was limited and of poor quality.
- There was some evidence that binge drinking (defined by NICE in its guidance for pregnant women as drinking five or more standard drinks (or 7.5 UK units) on a single occasion) may be associated with harm to the baby's developing nervous system. However, the available evidence was limited and of poor quality. Also, the definition used by NICE is different to the National Alcohol Harm Reduction Strategy, which defines a binge as 6 units on a single occasion.

On the back of these findings, NICE's 2008 guidance recommends that:

- Pregnant women and women planning a pregnancy should avoid drinking alcohol during the first three months of pregnancy if possible, because it may be associated with an increased risk of miscarriage.
- If women choose to drink alcohol in pregnancy, they should drink no more than 1-2 UK units once or twice a week. Although there is uncertainty regarding a safe level of alcohol consumption, at this low level there is no evidence of harm to the unborn baby.
- Getting drunk or binge drinking during pregnancy (defined by NICE in its guidance for pregnant women as more than five standard drinks (or 7.5 UK units) on a single occasion) may be harmful to the unborn baby.

Because of the limited quality of the evidence, NICE has called for further research into the effects of alcohol consumption during pregnancy. This research would follow women as they go through their pregnancy and after the child is born, rather than looking back on those who had already given birth.

Other health issues

Dementia and other brain diseases

The *Daily Mail* stated: "Alcohol could cause one in four cases of dementia" (May 11 2009). However, *The Daily Telegraph* said that a "Glass of wine a day cuts dementia risk" (March 3 2011). Which one should we believe?

Although press reports on the relationship between alcohol and dementia have been conflicting, it's clear that heavy drinking over a long period can be associated with brain damage. One editorial covered by Behind the Headlines in 2008 highlighted the possibility that alcohol-related dementia is under-recognised, and suggested that it may account for up to 10% of all dementia cases.

However, less is known about the effects of light to moderate drinking. So far, the evidence about dementia appears to suggest an association between light to moderate

consumption and reduced risk of dementia. A large systematic review and meta-analysis from 2009, involving more than 30,000 participants, found that light to moderate drinkers had about three-quarters of the risk of getting any form of dementia compared with non-drinkers. However, researchers point out that it is unclear if the results reflect a true effect of alcohol consumption, or a bias in how participants were selected to take part in the study.

Mental health

Apart from the effects on mood of a few drinks or a hangover, few of the studies we have covered addressed the links between drinking alcohol and mental health.

More research is needed on alcohol's effects on mental health

A study referred to in *The Guardian* headline "Non-drinkers more prone to depression says study" (August 28 2009) had 38,390 participants and found that non-drinkers and heavy drinkers had a higher risk of anxiety and depression than moderate drinkers. However, this was a cross-sectional study, which can only show associations and cannot prove that abstaining or drinking heavily causes mental health problems. In particular, it is possible that people drink high levels of alcohol because they are anxious or depressed, rather than vice versa.

Another cross-sectional study in about 150,000 people from France found that men who drank low or moderate amounts of alcohol had lower depression scores than those who never drank or who were heavy drinkers.

Many experts think that heavy drinking plays a role in a number of mental health conditions, such as anxiety, depression and psychosis. Suicide has also been linked to excessive drinking. However, with studies such as those above, it is not possible to determine whether heavy alcohol consumption led to mental health problems, or whether mental health problems led to heavy alcohol consumption. It is possible that both are true. More good-quality research is needed in this area.

Longer life

Do drinkers really live longer than non-drinkers, as *The Daily Telegraph* claimed in the story "Half a glass of wine a day can add five years to your life" (April 20 2009)?

Looking at the evidence on alcohol consumption and deaths from specific health conditions gives us no clear answers. Research suggests that light to moderate drinkers may have a reduced risk of dying from heart disease or a stroke. However, it also shows that alcohol increases the risk of several cancers. Therefore, the overall effect of alcohol consumption on longevity is difficult to predict.

The study reported by the *Telegraph* suggested that long-term alcohol use in men was linked to a reduced risk of dying earlier. It found that overall, men who consumed an average of 6g of alcohol a day (less than one unit and considerably less than the maximum alcohol limits recommended in the UK) had a life expectancy that was 2.3 years longer at age 50 than those who did not drink alcohol. Wine had the strongest effect in this analysis, and beer and spirits on their own did not reduce the risk of death. However, the researchers suggest that this observation should be interpreted cautiously.

No-one should be prescribed booze for a longer life

This is because people who drank beer and spirits tended to drink more alcohol in general, which could have influenced the results.

Although this study had weaknesses, its findings are supported by a large meta-analysis of studies into the risk of early death and alcohol from 2006. This research, which involved over 1 million participants and examined the deaths of 100,000 of them, found a "J-shaped" relationship between alcohol consumption and risk of death. This means that risk is slightly higher among people who don't drink, lower among people who drink low to moderate amounts, and then increases again in people who drink higher levels. Drinking up to four drinks a day (a drink was generally assumed to contain 10g of alcohol, or 1.25 units) in men and two drinks a day in women was associated with a reduced risk of dying earlier. The reduction in risk was about 18% in women and about 17% in men. The lowest risk of death was seen in people who drank 6g of alcohol a day (three-quarters of a unit or about half a drink).

The study also confirmed the hazards of excessive drinking, with higher levels of consumption associated with an increased risk of dying earlier. The apparent benefits of alcohol for living longer in women disappeared at a lower level of alcohol consumption than in men.

However, the findings of the research were limited. The studies included in the analysis varied in how they quantified alcohol consumption, which meant researchers had to make assumptions about alcohol content in a few studies. The researchers also noted that they could not rule out the possibility that differences other than alcohol consumption might have contributed to the different mortality rates for people who drank different amounts.

The researchers say their study indicates that there may be "potential windows" of alcohol intake that mean moderate drinking has a "net benefit" for survival. They add that "heavy drinkers should be urged to cut their consumption, but people who already regularly consume low to moderate amounts of alcohol should be encouraged to continue".

It is also worth noting that this study only looked at overall mortality. It did not look at the day-to-day health of the people involved or the quality of life of those who survived. It also did not look at the potential damage of drinking to other people, such as drink driving accidents.

Harm to others

The studies we describe here are mainly about risks and benefits for the individual drinking the alcohol. Alcohol also has a wider social impact.

A report by the Independent Scientific Committee on Drugs that was published in *The Lancet* in 2010 ranked 20 drugs according to their harms in the UK. The drugs were given a score based on nine criteria relating to harms to the individual and seven criteria relating to harms to others. Both sets of criteria included physical, psychological and social harms.

Overall, alcohol was ranked as the most harmful drug to others, above "harder" drugs such as crack cocaine and heroin. Although alcohol was not in the top three harmful drugs to the individual, when the two areas were combined (harm to self and others), alcohol also came top of the list.

Alcohol scores highly because it is a legal, widely used drug. There is also unavoidably some subjectivity in the ranking process. However, the report is a reminder that personal harm is not the only potential consequence of alcohol misuse.

The message that seems to come from this study is that there might be an overall benefit associated with light to moderate drinking. However, despite being aware that heavy drinking is bad for us, many people seem incapable of sticking to a low to moderate amount of alcohol.

No–one should be advised to take up drinking alcohol to try to live longer.

Does alcohol keep you thin – or make you fat?

"Drink up girls: wine isn't fattening" was the headline in *The Times* on March 8 2010. The *Daily Express* went even further, claiming that "the odd glass of wine is less fattening than water".

Even without looking at the study, we can be sure that claiming a glass of wine is less fattening than water is ludicrous. Water contains zero calories per gram, while alcohol contains about seven calories per gram. This is almost as many calories per gram as pure fat, which has nine calories per gram. A 175ml glass of white wine contains about 130 calories. So for the average woman, one glass of wine a day would provide about 6.5% of her recommended daily calorie intake of 2,000 calories.

These news stories were based on a study into alcohol and women's weight. It found that higher alcohol consumption was associated with slightly lower weight gain over time. Researchers suggested this might be because while men tend to add alcohol to their daily dietary intake, women may substitute alcohol for other foods without increasing energy intake.

Despite the headlines, the study did not prove that alcohol aids weight loss or prevents weight gain. Although the study took into account some factors that could have influenced weight gain, these and other factors may still have had an effect. Also, the difference in weight between the study groups was small. At the end of the 13-year study, there was only about a 2kg difference between non-drinkers and people who drank the most (30g or more of alcohol a day). The other limitations of this study included the fact that alcohol intake was only assessed once at the start of the study, and consumption may have changed over the 13 years.

We analysed the study and concluded that it was not possible to say that alcohol consumption reduces the chance of weight gain. What is certain is that excessive alcohol consumption is bad for health in several ways. Drinking more in the belief that it will help you slim is not a good idea. See NHS Choices for more information about calories in alcohol.

Conclusion

Headline writers can have a lot of fun with stories about alcohol and health. However, for readers, the results can be confusing. Sometimes, this is because the stories themselves overstate or exaggerate the certainty of research findings. Stories about the benefits of red wine seem more likely to sell papers than warnings of the possibility of liver damage or cancer. Even where the press gets it right, the results of individual studies themselves can be conflicting.

We know with certainty that heavy drinking is bad for health and longevity, and evidence is accumulating that even an occasional binge is bad for you, too. The risks or benefits of light to moderate alcohol intake are less clear. The best research shows that any alcohol at all increases the risk of certain cancers, but there is also a suggestion that light to moderate drinking may reduce the risk of heart disease. It is not possible to precisely assess the ratio of risk to benefit for each individual as this will depend on many factors, including their genetic make-up.

No-one would deny the enjoyment of a cool beer or the odd glass of good wine. It's possible that the risk to long-term health of drinking low levels of alcohol may be small. However, the health risks of heavier alcohol consumption make it wise to drink within the recommended limits.

Alcohol should not be seen as an option for improving health, and it's best not to pay too much attention to studies or stories that highlight its "benefits" without also mentioning the risks.

Enjoy a drink – within the recommended limits