

## **Short-term effects of alcohol on the human body can take many forms.**

The drug alcohol, to be specific ethanol, is a central nervous system depressant with a range of side-effects. Cell membranes are highly permeable to alcohol, so once alcohol is in the bloodstream it can diffuse into nearly every biological tissue of the body.

The concentration of alcohol in blood is usually measured in terms of the blood alcohol content. The amount and circumstances of consumption play a large part in determining the extent of intoxication; for example, eating a heavy meal before alcohol consumption causes alcohol to absorb more slowly. Hydration also plays a role, especially in determining the extent of hangovers. After excessive drinking, unconsciousness can occur and extreme levels of consumption can lead to alcohol poisoning and death (a concentration in the blood stream of 0.40% will kill half of those affected. Alcohol may also cause death by asphyxiation from vomit.

Alcohol is an addictive drug that can greatly exacerbate sleep problems. During abstinence, residual disruptions in sleep regularity and sleep patterns are the greatest predictors of relapse.

**The long term effects of alcohol** range from possible health benefits for low levels of alcohol (ethanol) consumption to severe detrimental effects in cases of chronic alcohol abuse. There is a strong correlation between 'high levels' of alcohol consumption and an increased risk of developing alcoholism, cardiovascular disease, malabsorption, chronic pancreatitis, alcoholic liver disease, and cancer. Damage to the central nervous system and peripheral nervous system can occur from chronic alcohol abuse. Long-term use of alcohol in excessive quantities is capable of damaging nearly every organ and system in the body. The developing adolescent brain is particularly vulnerable to the toxic effects of alcohol, as is the developing brain of the unborn, possibly resulting in the fetal alcohol syndrome (FAS).

Historically doctors have promoted alcohol for its perceived health benefits and most recently for protection against coronary heart disease. This is known as the French paradox. There is evidence of cardiovascular benefits from drinking 1 - 2 drinks per day; however, the health benefits from moderate intake of alcohol are controversial. Alcohol should be regarded as a recreational drug with potentially serious adverse effects on health and it is not recommended for cardio-protection in the place of safer and proven traditional methods such as exercise and proper nutrition.

Some experts argue that the benefits of moderate alcohol consumption may be outweighed by other increased risks, including those of injuries, violence, fetal damage, certain forms of cancer, liver disease and hypertension. As the apparent health benefits of moderate alcohol consumption are limited for populations at low risk of heart disease, other experts urge caution because of the possibility that recommending moderate alcohol consumption may lead to an increased risk of alcohol abuse.

## **Scientific Studies**

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The adverse effects of long-term excessive use of alcohol are close to those seen with other sedative-hypnotics (apart from organ toxicity which is much more problematic with alcohol). Withdrawal effects and dependence are also almost identical. Alcohol at moderate levels has some positive and negative effects on health. The negative effects include increased risk of liver diseases, oropharyngeal cancer, esophageal cancer and pancreatitis. Conversely moderate intake of alcohol may have some beneficial effects on gastritis and cholelithiasis. Chronic alcohol misuse and abuse has serious effects on physical and mental health. Chronic excess alcohol intake, or alcohol dependence, can lead to a wide range of neuropsychiatric or neurological impairment, cardiovascular disease, liver disease, and malignant neoplasms. The psychiatric disorders which are associated with alcoholism include major depression, dysthymia, mania, hypomania, panic disorder, phobias, generalized anxiety disorder, personality disorders, schizophrenia, suicide, neurologic deficits (e.g. impairments of working memory, emotions, executive functions, visuospatial abilities and gait and balance) and brain damage. Alcohol dependence is associated with hypertension, coronary heart disease, and ischemic stroke, cancer of the respiratory system, and also cancers of the digestive system, liver, breast and ovaries. Heavy drinking is associated with liver disease, such as cirrhosis.<sup>[12]</sup> Studies have focused on both men and women, various age groups, and people of many ethnic groups. Published papers now total in the many hundreds, with studies having shown correlation between moderate alcohol use and health that may instead have been due to the beneficial effects of socialization that is often accompanied by alcohol consumption. Some of the specific ways alcohol affects cardiovascular health have been studied. The impact of alcohol on aging is negative when excessive amounts of alcohol are consumed.

### **Maximum quantity recommended**

#### *Recommended maximum intake of alcoholic beverages*

Different countries recommend different maximum quantities. For most countries, the maximum quantity for men is 140 g–210 g per week. For women, the range is 84 g–140 g per week. Most countries recommend total abstinence whilst pregnant or breastfeeding.

### **Alcohol-related deaths**

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Over-consumption of alcohol is one of the leading preventable causes of death worldwide. One study links alcohol to 1 in every 25 deaths worldwide and that 5% of years lived with disability are attributable to alcohol consumption.

Countries collect statistics on alcohol-related deaths. While some categories relate to short-term effects, such as accidents, many relate to long-term effects of alcohol.

## **Russia**

### **Alcoholism in Russia**

One study claims that "excessive alcohol consumption in Russia, particularly by men, has in recent years caused more than half of all the deaths at ages 15-54 years." However, there are some difficulties with this study. For instance the same study also found a protective effect of heavy drinking on breast cancer mortality. This contradicts the well established scientific view that alcohol increases breast cancer risk. On this account in further correspondence it was advised that "careful interpretation of mortality statistics in relation to alcohol use is needed, taking into account other relevant risk factors, incidence, and survival."

The authors replied that "whether or not the apparent shortfall in breast cancer mortality among heavy drinkers is real, it accounts for only about 0.1% of adult deaths in Russia. Careful interpretation of it is therefore of little relevance to the findings for alcohol and overall mortality".

## **United Kingdom**

Alcohol-related deaths in the United Kingdom are coded using the Tenth Revision of the International Classification of Diseases (ICD-10). ICD-10 comprises:

- Mental and behavioral disorders due to use of alcohol – ICD-10 F10
- Degeneration of nervous system due to alcohol – ICD-10 G31.2
- Alcoholic polyneuropathy – ICD-10 G62.1
- Alcoholic cardiomyopathy – ICD-10 I42.6
- Alcoholic gastritis – ICD-10 K29.2
- Alcoholic liver disease – ICD-10 K70
- Chronic hepatitis, not elsewhere classified – ICD-10 K73
- Fibrosis and cirrhosis of liver – ICD-10 K74 (Excluding K74.3-K74.5 – Biliary cirrhosis)
- Alcohol induced chronic pancreatitis – ICD-10 K86.0
- Accidental poisoning by and exposure to alcohol – ICD-10 X45
- Intentional self-poisoning by and exposure to alcohol – ICD-10 X65
- Poisoning by and exposure to alcohol, undetermined intent – ICD-10 Y15

UK statistical bodies report that "There were 8,724 alcohol-related deaths in 2007, lower than 2006, but more than double the 4,144 recorded in 1991. The alcohol-related death rate was 13.3 per 100,000 population in 2007, compared with 6.9 per 100,000 population in 1991."

In Scotland, the NHS estimate that in 2003 one in every 20 deaths could be attributed to alcohol.

A 2009 study found that 9,000 people are dying from alcohol-related diseases every year, three times the number 25 years previously.

## **United States**

The Centers for Disease Control and Prevention report, "From 2001–2005, there were approximately 79,000 deaths annually attributable to excessive alcohol use. In fact,

excessive alcohol use is the 3rd leading lifestyle-related cause of death for people in the United States each year." A 1993 study estimated US deaths through alcohol at 100,000.

### **Overall mortality**

A 23-year prospective study of 12,000 male British physicians aged 48–78, found that overall mortality was significantly lower in the group consuming less than 2 "units" (British unit = 8 g) per day than in the non-alcohol-drinking group. Greater than 2 units per day was associated with an increased risk of mortality.

This is consistent with other research that found a J-curve dependency between alcohol consumption and total mortality among middle aged and older men. While the mortality rates of ex-drinkers and those drinking beyond moderation are significantly elevated, the all-cause mortality rates may be 15-18% lower among moderate drinkers (1–2 drinks per day) than among abstainers - a meta-analysis found. This claim was challenged by another study that found that in certain low quality studies occasional drinkers or ex-drinkers were included as abstainers, resulting in the increased mortality in that group. However, the J-curve for total and CHD mortality was reconfirmed by studies that took the mentioned confounders into account.

The observed decrease in mortality of light-to-moderate drinkers comparing to abstainers can be partially explained by superior health and social status of the drinking group;<sup>[35]</sup> however, the protective effect of alcohol in light to moderate drinkers remains significant even after adjusting for these confounders. Additionally, confounders such as underreporting of alcohol intake might lead to the underestimation of how much mortality is reduced in light-to-moderate drinkers.

The landmark INTERHEART Study has revealed that alcohol consumption in South Asians was not protective against CAD in sharp contrast to other populations who benefit from it.. In fact Asian Indians who consume alcohol had a 60% higher risk of heart attack which was greater with local spirits (80%) than branded spirits (50%). The harm was observed in alcohol users classified as occasional as well as regular light, moderate, and heavy consumers.

Another large study of 4465 subjects in India also confirmed the possible harm of alcohol consumption on coronary risk in men. Compared to lifetime abstainers, alcohol users had higher blood sugar (2 mg/dl), blood pressure (2 mm Hg) levels, and the HDL-C levels (2 mg/dl) and significantly higher tobacco use (63% vs. 21%).

Heavy drinking leads to increased mortality. For example a US study found that men who consumed 5 or more drinks on drinking days had a 30% higher mortality rate than those consuming only 1 drink.<sup>[34]</sup> According to another study, drinkers with heavy drinking occasions (six or more drinks at a time) have a 57% higher all-cause mortality than drinkers without heavy drinking occasions.

## **Cardiovascular system**

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### **Alcohol and cardiovascular disease**

A meta-analysis of 34 studies found a reduced risk of mortality from coronary heart disease in men who drank 2 - 4 drinks per day and women who drank 1 - 2 drinks per day.<sup>[28]</sup> A meta-analysis of randomized trials found that alcohol consumption in moderation decreases serum levels of fibrinogen, a protein that promotes clot formation and increases levels of tissue type plasminogen activator, an enzyme that helps dissolve clots. The serum levels of C-reactive protein (CRP), a marker of inflammation and predictor of CHD (coronary heart disease) risk, are lower in people who drink moderately than those who abstain from alcohol suggesting that alcohol consumption in moderation might have anti-inflammatory effects. In addition to its psychotropic properties, alcohol has anticoagulation properties similar to warfarin. Additionally, thrombosis is lower among moderate drinkers than teetotalers.

Despite epidemiological evidence, some criticize the idea of recommending alcohol for health benefits. A doctor at the World Health Organisation stated that recommending moderate alcohol consumption for health benefits is "ridiculous and dangerous". There have been no randomised controlled trials that have demonstrated cardiac benefits of alcohol. Due to the risks of abuse, dependence, and adverse effects, alcohol should never be recommended for cardiac benefits as a substitute to well-proven measures, such as a good diet, exercise or pharmaceutical drugs. It has been argue that the health benefits from alcohol are at best debatable and may have been exaggerated by the alcohol industry. Alcohol should be regarded as a recreational drug with potentially serious adverse effects on health and should not be promoted for cardio-protection.

### **Peripheral arterial disease**

"Moderate alcohol consumption appears to decrease the risk of PAD in apparently healthy men. In this large population-based study, moderatable alcohol consumption was inversely associated with peripheral arterial disease in women but not in men. Residual confounding by smoking may have influenced the results. Among nonsmokers an inverse association was found between alcohol consumption and peripheral arterial disease in both men and women."

### **Intermittent claudication (IC)**

A study found that moderate consumption of alcohol had a protective effect against intermittent claudication. The lowest risk was seen in men who drank 1 to 2 drinks per day and in women who drank half to 1 drink per day.

### **Heart attack and stroke**

Drinking in moderation has been found to help those who have suffered a heart attack survive it. However, excessive alcohol consumption leads to an increased risk of heart failure. A review of the literature found that half a drink of alcohol offered the best level of protection. However, they noted that at present there have been no randomised trials to confirm the evidence which suggests a protective role of low doses of alcohol against heart attacks. However, moderate alcohol consumption is associated with hypertension. There is an increased risk

of hypertriglyceridemia, cardiomyopathy, hypertension, and stroke if 3 or more standard drinks of alcohol are taken per day.

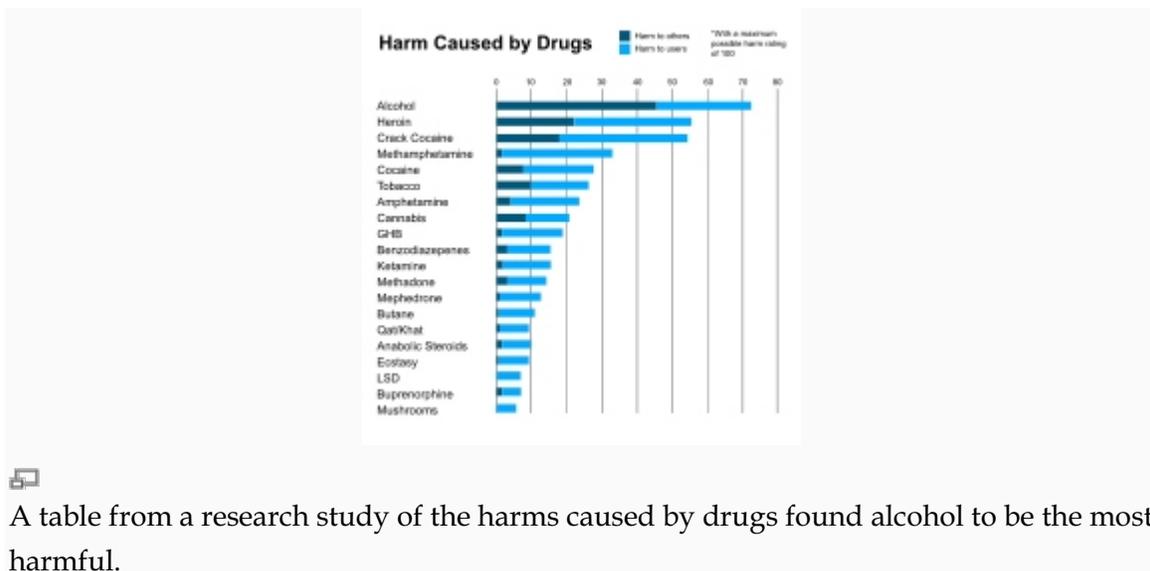
## **Cardiomyopathy**

Large amount of alcohol over the long term can lead to alcoholic cardiomyopathy. Alcoholic cardiomyopathy presents in a manner clinically identical to idiopathic dilated cardiomyopathy, involving hypertrophy of the musculature of the heart that can lead to congestive heart failure.

## **Hematologic diseases**

Alcoholics may have anemia from several causes; they may also develop thrombocytopenia from direct toxic effect on megakaryocytes, or from hypersplenism.

## **Nervous system**



A table from a research study of the harms caused by drugs found alcohol to be the most harmful.

Chronic heavy alcohol consumption impairs brain development, causes brain shrinkage, dementia, physical dependence, increases neuropsychiatric and cognitive disorders and causes distortion of the brain chemistry. Some studies however have shown that moderate alcohol consumption may decrease risk of dementia, including Alzheimer disease, although there are studies which find the opposite. At present, due to poor study design and methodology, the literature is inconclusive on whether moderate alcohol consumptions increases the risk of dementia or decreases it. Evidence for a protective effect of low to moderate alcohol consumption on age related cognitive decline and dementia has been suggested by some research, however, other research has not found a protective effect of low to moderate alcohol consumption. Some evidence suggests that low to moderate alcohol consumption may speed up brain volume loss. Chronic consumption of alcohol may result in increased plasma levels of the toxic amino acid homocysteine; which may explain alcohol withdrawal seizures, alcohol-induced brain atrophy and alcohol-related cognitive disturbances. Alcohol's impact on

the nervous system can also include disruptions of memory and learning (*see Effects of alcohol on memory*) such as resulting in a blackout phenomenon.

## **Strokes**

Epidemiological studies of middle-aged populations generally find the relationship between alcohol intake and the risk of stroke to be either U- or J-shaped.

"The consistency in the vascular benefit associated with moderate drinking (compared with non-drinking) observed across different studies, together with the existence of credible biological pathways, strongly suggests that at least some of this benefit is real. However, because of biases introduced by: choice of reference categories; reverse causality bias; variations in alcohol intake over time; and confounding, some of it is likely to be an artefact."

Drinking lots of alcohol has been negatively linked to stroke. According to the National Stroke Association, more than 2 drinks per day (one drink is ~5 ounces of wine) may increase stroke risk by 50% and lead to other medical problems. Because of this and other known harmful effects of heavy drinking, care should be taken when considering safe amounts of alcohol intake.

## **Brain**

Alcohol abuse is associated with wide spread and significant brain lesions. Alcohol related brain damage is not only due to the direct toxic effects of alcohol; alcohol withdrawal, nutritional deficiency, electrolyte disturbances, and liver damage are also believed to contribute to alcohol related brain damage. The long-term effects of alcohol on brain chemistry is an important cause of chronic fatigue.

## **Adolescent brain development**

Consuming large amounts of alcohol over a period of time can impair normal brain development in humans. Deficits in retrieval of verbal and nonverbal information and in visuospatial functioning were evident in youths with histories of heavy drinking during early and middle adolescence.

During adolescence critical stages of neurodevelopment occur, including remodeling and functional changes in synaptic plasticity and neuronal connectivity in different brain regions. These changes may make adolescents especially susceptible to the harmful effects of alcohol. Compared to adults, adolescents exposed to alcohol are more likely to exhibit cognitive deficits (including learning and memory dysfunction). Some of these cognitive effects, such as learning impairments, may persist into adulthood.

## **Mechanisms of action**

## **Neuroinflammation**

Ethanol can trigger the activation of astroglial cells which can produce a proinflammatory response in the brain. Ethanol interacts with the TLR4 and IL-1RI receptors on these cells to activate intracellular signal transduction pathways. Specifically, ethanol induces the phosphorylation of IL-1R-associated kinase (IRAK), ERK1/2, stress-activated protein kinase (SAPK)/JNK, and p38 mitogen-activated protein kinase (p38 MAPK). Activation of the IRAK/MAPK pathway leads to the stimulation of the transcription factors NF-kappaB and AP-1. These transcription factors cause the upregulation of inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) expression. The upregulation of these inflammatory mediators by ethanol is also associated with an increase in caspase 3 activity and a corresponding increase in cell apoptosis. The exact mechanism by which various concentrations of ethanol either activates or inhibits TLR4/IL-1RI signaling is not currently known, though it may involve alterations in lipid raft clustering or cell adhesion complexes and actin cytoskeleton organization.

## **Changes in dopaminergic and glutamatergic signaling pathways**

Intermittent ethanol treatment causes a decrease in expression of the dopamine receptor type 2 (D2R) and a decrease in phosphorylation of 2B subunit of the NMDA receptor (NMDAR2B) in the prefrontal cortex, hippocampus, nucleus accumbens, and for only D2R the striatum. It also causes changes in the acetylation of histones H3 and H4 in the prefrontal cortex, nucleus accumbens, and striatum, suggesting chromatin remodeling changes which may mediate long-term alterations. Additionally, adolescent rats pre-exposed to ethanol have higher basal levels of dopamine in the nucleus accumbens, along with a prolonged dopamine response in this area in response to a challenge dose of ethanol. Together, these results suggest that alcohol exposure during adolescence can sensitize the mesolimbic and mesocortical dopamine pathways to cause changes in dopaminergic and glutamatergic signaling, which may affect the remodeling and functions of the adolescent brain. These changes are significant as alcohol's effect on NMDARs could contribute to learning and memory dysfunction .

## **Inhibition of hippocampal neurogenesis**

Excessive alcohol intake (binge drinking) causes a decrease in hippocampal neurogenesis, via decreases in neural stem cell proliferation and newborn cell survival. Alcohol decreases the number of cells in S-phase of the cell cycle, and may arrest cells in the G1 phase, thus inhibiting their proliferation. Ethanol has different effects on different types of actively dividing hippocampal progenitors during their initial phases of neuronal development. Chronic alcohol exposure decreases the number of proliferating cells that are radial glia-like, preneuronal, and intermediate types, while not affecting early neuronal type cells; suggesting ethanol treatment alters the precursor cell pool. Furthermore, there is a greater decrease in differentiation and immature neurons than there is in proliferating progenitors, suggesting that the abnormal decrease in the percentage of actively dividing preneuronal progenitors results in a greater reduction in the maturation and survival of postmitotic cells.

Additionally, alcohol exposure increased several markers of cell death. In these studies neural degeneration seems to be mediated by non-apoptotic pathways. One of the proposed mechanisms for alcohol's neurotoxicity is the production of nitric oxide (NO), yet other studies have found alcohol-induced NO production to lead to apoptosis.

### **Cognition and dementia**

Excessive alcohol intake is associated with impaired prospective memory. This impaired cognitive ability leads to increased failure to carry out an intended task at a later date, for example, forgetting to lock the door or to post a letter on time. The higher the volume of alcohol consumed and the longer consumed, the more severe the impairments.<sup>[94]</sup> One of the organs most sensitive to the toxic effects of chronic alcohol consumption is the brain. In France approximately 20% of admissions to mental health facilities are related to alcohol related cognitive impairment, most notably alcohol related dementia. Chronic excessive alcohol intake is also associated with serious cognitive decline and a range of neuropsychiatric complications. The elderly are the most sensitive to the toxic effects of alcohol on the brain. There is some inconclusive evidence that small amounts of alcohol taken in earlier adult life is protective in later life against cognitive decline and dementia. However, a study concluded, "Our findings suggest that, despite previous suggestions, moderate alcohol consumption does not protect older people from cognitive decline."

Acetaldehyde is produced by the liver during breakdown of ethanol. People who have a genetic deficiency for the subsequent conversion of acetaldehyde into acetic acid (a trait more prevalent in those of East Asian descent may have a greater risk of Alzheimer's disease. "These results indicate that the ALDH2 deficiency is a risk factor for LOAD [late-onset Alzheimer's disease] ..."

Wernicke-Korsakoff syndrome is a manifestation of thiamine deficiency, usually as a secondary effect of alcohol abuse. The syndrome is a combined manifestation of two eponymous disorders, Korsakoff's Psychosis and Wernicke's encephalopathy, named after Drs. Sergei Korsakoff and Carl Wernicke. Wernicke's encephalopathy is the acute presentation of the syndrome and is characterised by a confusional state while Korsakoff's psychosis main symptoms are amnesia and executive dysfunction.

### **Essential tremor**

Essential tremors can be temporarily relieved in up to two-thirds of patients by drinking small amounts of alcohol.

Ethanol is known to activate aminobutyric acid type A (GABAA) and inhibit N-methyl-D-aspartate (NMDA) glutamate receptors, which are both implicated in essential tremor pathology and could underlie the ameliorative effects. Additionally, the effects of ethanol have been studied in different animal essential tremor models.

### **Sleep**

Chronic use of alcohol used to induce sleep can lead to insomnia. Frequent moving between sleep stages occurs, with awakenings due to headaches and diaphoresis.

Stopping chronic alcohol abuse can also lead to profound disturbances of sleep with vivid dreams. Chronic alcohol abuse is associated with NREM stage 3 and 4 sleep as well as suppression of REM sleep and REM sleep fragmentation. During withdrawal REM sleep is typically exaggerated as part of a rebound effect.

### **Mental health effects**

High rates of major depressive disorder occur in heavy drinkers and those who abuse alcohol. Whether it is more true that major depressive disorder causes self-medicating alcohol abuse, or the increased incidence of the disorder in alcohol abusers is caused by the drinking, is not known though some evidence suggests drinking causes the disorder. Alcohol misuse is associated with a number of mental health disorders and alcoholics have a very high suicide rate. A study of people hospitalised for suicide attempts found that those who were alcoholics were 75 times more likely to go on to successfully commit suicide than non-alcoholic suicide attempters. In the general alcoholic population the increased risk of suicide compared to the general public is 5 - 20 times greater. About 15 percent of alcoholics commit suicide. Abuse of other drugs is also associated with an increased risk of suicide. About 33 percent of suicides in the under 35s are due to alcohol or other substance misuse.

Social skills are significantly impaired in people suffering from alcoholism due to the neurotoxic effects of alcohol on the brain, especially the prefrontal cortex area of the brain. The social skills that are impaired by alcohol abuse include impairments in perceiving facial emotions, prosody perception problems and theory of mind deficits; the ability to understand humour is also impaired in alcohol abusers.

Studies have shown that alcohol dependence relates directly to cravings and irritability. Another study has shown that alcohol use is a significant predisposing factor towards antisocial behavior in children. Depression, anxiety and panic disorder are disorders commonly reported by alcohol dependent people. Alcoholism is associated with dampened activation in brain networks responsible for emotional processing (e.g. the amygdala and hippocampus). Evidence that the mental health disorders are often induced by alcohol misuse via distortion of brain neurochemistry is indicated by the improvement or disappearance of symptoms that occurs after prolonged abstinence, although problems may worsen in early withdrawal and recovery periods. Psychosis is secondary to several alcohol-related conditions including acute intoxication and withdrawal after significant exposure. Chronic alcohol misuse can cause psychotic type symptoms to develop, more so than with other drugs of abuse. Alcohol abuse has been shown to cause an 800% increased risk of psychotic disorders in men and a 300% increased risk of psychotic disorders in women which are not related to pre-existing psychiatric disorders. This is significantly higher than the increased risk of psychotic disorders seen from cannabis use making alcohol abuse a very significant cause of psychotic disorders.

Prominent hallucinations and/or delusions are usually present when a patient is intoxicated or recently withdrawn from alcohol.

While alcohol initially helps social phobia or panic symptoms, with longer term alcohol misuse can often worsen social phobia symptoms and can cause panic disorder to

develop or worsen, during alcohol intoxication and especially during the alcohol withdrawal syndrome. This effect is not unique to alcohol but can also occur with long term use of drugs which have a similar mechanism of action to alcohol such as the benzodiazepines which are sometimes prescribed as tranquillisers to people with alcohol problems. Approximately half of patients attending mental health services for conditions including anxiety disorders such as panic disorder or social phobia suffer from alcohol or benzodiazepine dependence. It was noted that every individual has an individual sensitivity level to alcohol or sedative hypnotic drugs and what one person can tolerate without ill health another will suffer very ill health and that even moderate drinking can cause rebound anxiety syndromes and sleep disorders. A person who is suffering the toxic effects of alcohol will not benefit from other therapies or medications as they do not address the root cause of the symptoms.

### **Digestive system and weight gain**

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The impact of alcohol on weight-gain is contentious: some studies find no effect, others find decreased or increased effect on weight gain.

Alcohol use increases the risk of chronic gastritis (stomach inflammation); it is one cause of cirrhosis, hepatitis, and pancreatitis in both its chronic and acute forms.

### **Metabolic syndrome**

A study concluded, "Mild to moderate alcohol consumption is associated with a lower prevalence of the metabolic syndrome, with a favorable influence on lipids, waist circumference, and fasting insulin. This association was strongest among whites and among beer and wine drinkers." This is also true for Asians. A J-curve association between alcohol intake and metabolic syndrome was found: "The results of the present study suggest that the metabolic syndrome is negatively associated with light alcohol consumption (1-15 g alcohol/d) in Korean adults". However, "odds ratios for the metabolic syndrome and its components tended to increase with increasing alcohol consumption."

### **Gallbladder effects**

Research has found that drinking reduces the risk of developing gallstones. Compared with alcohol abstainers, the relative risk of gallstone disease, controlling for age, sex, education, smoking, and body mass index, is 0.83 for occasional and regular moderate drinkers (< 25 ml of ethanol per day), 0.67 for intermediate drinkers (25-50 ml per day), and 0.58 for heavy drinkers. This inverse association was consistent across strata of age, sex, and body mass index." Frequency of drinking also appears to be a factor. "An increase in frequency of alcohol consumption also was related to decreased risk. Combining the reports of quantity and frequency of alcohol intake, a consumption pattern that reflected frequent intake (5-7 days/week) of any given amount of alcohol was associated with a decreased risk, as compared with nondrinkers. In contrast, infrequent alcohol intake (1-2 days/week) showed no significant association with risk."

Consumption of alcohol is unrelated to gallbladder disease. However one study suggested that drinkers who take vitamin C (ascorbic acid) might reduce their risk of gallbladder disease.

### **Liver disease**

Alcoholic liver disease is a major public health problem. For example in the United States up to two million people have alcohol related liver disorders. Chronic alcohol abuse can cause fatty liver, cirrhosis and alcoholic hepatitis. Treatment options are limited and consist of most importantly discontinuing alcohol consumption. In cases of severe liver disease, the only treatment option may be a liver transplant in alcohol abstinent patients. Research is being conducted into the effectiveness of anti-TNFs. Certain complementary medications, e.g., milk thistle and silymarin, appear to offer some benefit. Alcohol is a leading cause of liver cancer in the Western world, accounting for 32-45% of hepatic cancers. Up to half a million people in the United States develop alcohol related liver cancer. Moderate alcohol consumption also increases the risk of liver disease.

### **Pancreatitis**

Alcohol misuse is a leading cause of both acute pancreatitis and chronic pancreatitis. Chronic excessive intake of alcohol can cause destruction of the pancreas resulting in severe chronic pain, which may progress to pancreatic cancer. Chronic pancreatitis often results in malabsorption problems and diabetes.

### **Other systems**

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#### **Alcoholic lung disease**

Chronic alcohol ingestion impairs multiple critical cellular functions in the lung. These cellular impairments lead to increased susceptibility to serious complications from lung disease. Recent research cites alcoholic lung disease as comparable to liver disease in alcohol related mortality. Alcoholics have a higher risk of developing acute respiratory distress syndrome (ARDS) and experience higher rates of mortality from ARDS when compared to non-alcoholics.

#### **Kidney stones**

Research indicates that drinking alcohol is associated with a lower risk of developing kidney stones. One study concludes, "Since beer seemed to be protective against kidney stones, the physiologic effects of other substances besides ethanol, especially those of hops, should also be examined." "...consumption of coffee, alcohol, and vitamin C supplements were negatively associated with stones." "After mutually adjusting for the intake of other beverages, the risk of stone formation decreased by the following amount for each 240-ml (8-oz) serving consumed daily: caffeinated coffee, 10%; decaffeinated coffee, 10%; tea, 14%; beer, 21%; and wine, 39%." "...stone formation decreased by the following amount for each 240-mL (8-oz) serving consumed daily: 10% for caffeinated coffee, 9% for decaffeinated coffee, 8% for tea, and 59% for wine." (CI data excised from last two quotes.).

## **Sexual dysfunction**

Long term excessive intake of alcohol can lead to damage to the central nervous system and the peripheral nervous system resulting in loss of sexual desire and impotence in men. This can result due to a reduction of testosterone from ethanol-induced testicular atrophy, resulting in increased feminisation of males and is a clinical feature of alcohol abusing males who have cirrhosis of the liver.

## **Hormonal Imbalance**

Excessive alcohol intake can result in hyperoestrogenisation. It has been speculated that alcohol beverages may contain estrogen like compounds. In men, high levels of estrogen can lead to testicular failure and the development of feminine traits including development of male breasts, called gynecomastia. In women, increased levels of estrogen due to excessive alcohol intake have been related to an increased risk of breast cancer.

## **Diabetes mellitus**

Moderate drinkers may have a lower risk of diabetes than non-drinkers. On the other hand, binge drinking and high alcohol consumption may increase the risk of type 2 diabetes in women." Alcohol consumption promotes insulin sensitivity.

## **Rheumatoid arthritis**

Regular consumption of alcohol is associated with an increased risk of gouty arthritis and a decreased risk of rheumatoid arthritis. Two recent studies report that the more alcohol consumed, the lower the risk of developing rheumatoid arthritis. Among those who drank regularly, the one-quarter who drank the most were up to 50% less likely to develop the disease compared to the half who drank the least.

The researchers noted that moderate alcohol consumption also reduces the risk of other inflammatory processes such as cardiovascular disease. Some of the biological mechanisms by which ethanol reduces the risk of destructive arthritis and prevents the loss of bone mineral density (BMD), which is part of the disease process.

A study concluded, "Alcohol either protects from RA or, subjects with RA curtail their drinking after the manifestation of RA". Another study found, "Postmenopausal women who averaged more than 14 alcoholic drinks per week had a reduced risk of rheumatoid arthritis..."

## **Osteoporosis**

Moderate alcohol consumption is associated with higher bone mineral density in postmenopausal women. "...Alcohol consumption significantly decreased the likelihood [ofosteoporosis]." "Moderate alcohol intake was associated with higher BMD in postmenopausal elderly women. "Social drinking is associated with higher bone mineral density in men and women [over 45]." However, alcohol abuse is associated with bone loss.

## **Skin**

Chronic excessive alcohol abuse is associated with a wide range of skin disorders including urticaria, porphyria cutanea tarda, flushing, cutaneous stigmata of cirrhosis, psoriasis, pruritus, seborrheic dermatitis and rosacea.

A 2010 study concluded, "Nonlight beer intake is associated with an increased risk of developing psoriasis among women. Other alcoholic beverages did not increase the risk of psoriasis in this study."

*Immune system, bacterial contamination, viral infections, and cancer*

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## **Bacterial infection**

There is a protective effect of alcohol consumption against active infection with *H. pylori*. In contrast, alcohol intake (comparing those who drink > 30g of alcohol per day to non-drinkers) is not associated with higher risk of duodenal ulcer. Excessive alcohol consumption seen in alcoholics is a known risk factor for pneumonia.

## **Common cold**

A study on the common cold found that "Greater numbers of alcoholic drinks (up to three or four per day) were associated with decreased risk for developing colds because drinking was associated with decreased illness following infection. However, the benefits of drinking occurred only among nonsmokers. Although alcohol consumption did not influence risk of clinical illness for smokers, moderate alcohol consumption was associated with decreased risk for nonsmokers.

Another study concluded, "Findings suggest that wine intake, especially red wine, may have a protective effect against common cold. Beer, spirits, and total alcohol intakes do not seem to affect the incidence of common cold."

## **Cancer**

*Alcohol and cancer*

The International Agency for Research on Cancer (Centre International de Recherche sur le Cancer) of the World Health Organization has classified alcohol as a Group 1 carcinogen. Its evaluation states, "There is sufficient evidence for the carcinogenicity of alcoholic beverages in humans.... Alcoholic beverages are carcinogenic to humans (Group 1)."

The U.S. Department of Health & Human Services' National Toxicology Program listed alcohol as a *known carcinogen* in 2000.

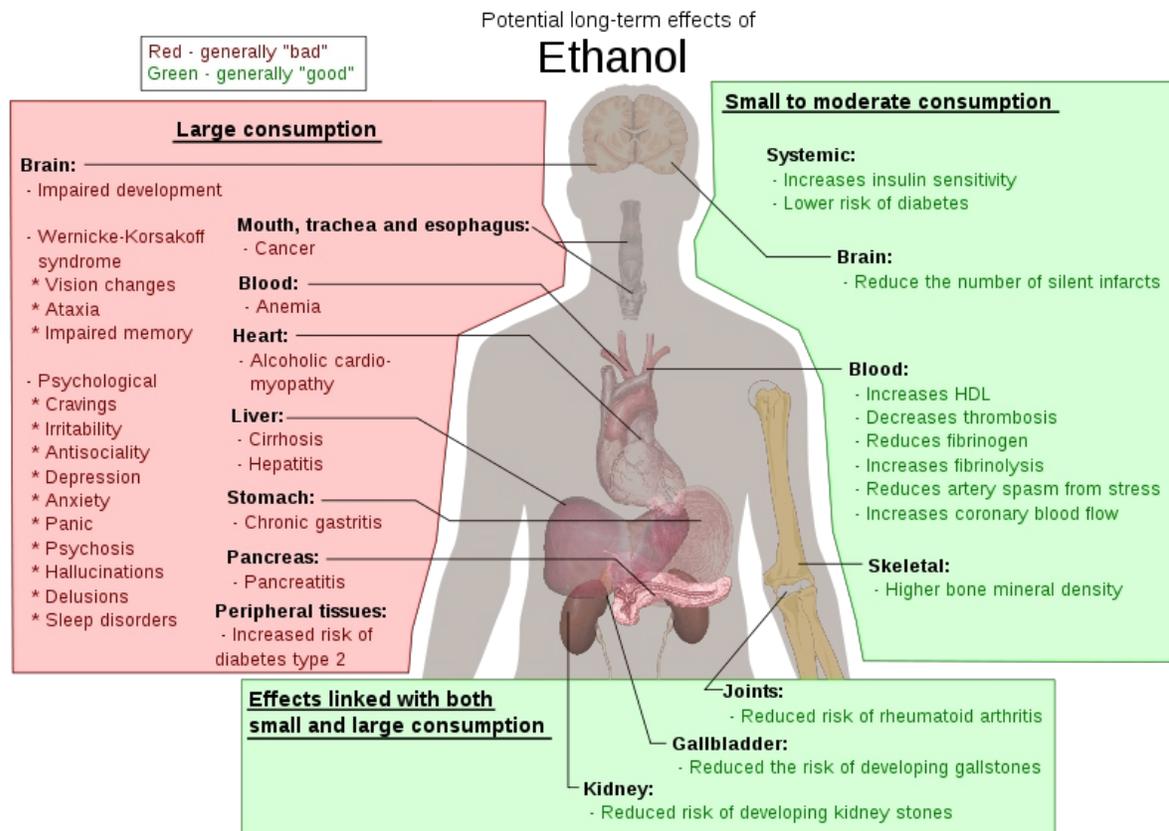
One study determined that "3.6% of all cancer cases worldwide are related to alcohol drinking, resulting in 3.5% of all cancer deaths." A 2011 study found that one in 10 of all cancers in men and one in 33 in women were caused by past or current alcohol intake.

The World Cancer Research Fund panel report *Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective* finds the evidence "convincing" that alcoholic drinks increase the risk of the following cancers: mouth, pharynx and larynx, oesophagus, colorectum (men), breast (pre- and postmenopause).

High concentrations of acetaldehyde, which is produced as the body breaks down ethanol, may damage DNA in healthy cells. The National Institute on Alcohol Abuse and Alcoholism have shown that acetaldehyde reacts with polyamines which are naturally occurring compounds essential for cell growth – to create a particularly dangerous type of mutagenic DNA base called a Cr-Pdg adduct. Even moderate levels of alcohol consumption are associated with an increased risk of certain forms of cancer.

*Alcohol's effect on the fetus*

Fetal alcohol syndrome or FAS is a disorder of permanent birth defects that occurs in the offspring of women who drink alcohol during pregnancy. Drinking heavily or during the early stages of prenatal development has been conclusively linked to FAS; moderate consumption is associated with fetal damage. Alcohol crosses the placental barrier and can stunt fetal growth or weight, create distinctive facial stigmata, damaged neurons and brain structures, and cause other physical, mental, or behavioural problems. Fetal alcohol exposure is the leading known cause of mental retardation in the Western world. Alcohol consumption during pregnancy is associated with brain insulin and insulin-like growth factor resistance.



## **The physical effects of alcohol**

From the second you take your first sip, [alcohol](#) starts affecting your body and mind. After one or two drinks you may start feeling more sociable, but drink too much and basic human functions, such as walking and talking become much harder. You might also start saying things you don't mean and behaving out of character. Some of alcohol's effects disappear overnight – while others can stay with you a lot longer, or indeed become permanent.

If you've drunk heavily the night before, you'll almost certainly wake up with a hangover. Alcohol irritates the stomach, so heavy drinking can cause sickness and nausea and sometimes diarrhoea. Alcohol also has a dehydrating effect, which is one reason why excessive drinking can lead to a thumping headache the morning after.

On the Drinkaware website you'll find useful clinically approved facts and information about the effects of alcohol on your life and lifestyle designed to help you make positive decisions about your drinking.

### **Appearance**

If you're trying to watch your waistline, drinking too much alcohol can be disastrous! Research from the Department of Health reveals that a man drinking five pints a week consumes the same number of calories as someone getting through 221 doughnuts a year.

Drinking too much alcohol isn't great news for your skin either. As well as causing bloating and dark circles under your eyes, alcohol dries out your skin and can lead to wrinkles and premature aging. If you drink heavily you may develop acne rosacea, a skin disorder that starts with a tendency to blush and flush easily and can progress to facial disfiguration, a condition known as rhinophyma.

### **Alcohol poisoning**

Between 2007 and 2008 more than 30,000 people were admitted to hospital with alcohol poisoning. In the worst cases alcohol poisoning can cause lung damage (as you inhale your own vomit) and even lead to a heart attack.

Many traditional 'cures', such as drinking black coffee; just don't work – or even make things worse.

### **Diseases and cancers**

#### **Liver disease**

Experts estimate alcohol is responsible for at least 33,000 deaths in the UK each year. While rates of liver disease are falling in the rest of Europe, they are rising in the UK. A 2006 Lancet study found that liver cirrhosis death rates are already around twice as high in Scotland as they are in other European countries.

Liver disease used to affect mainly drinkers in middle age, but now sufferers are getting younger. Up to one in three adults in the UK drinks enough alcohol to be at risk of developing alcohol-related liver disease.

### **Cancer**

Alcohol misuse is an important factor in a number of cancers, including liver cancer and mouth cancer, both of which are on the increase. Alcohol is second only to smoking as a risk factor for oral and digestive tract cancers.

Evidence suggests that this is because alcohol breaks down into a substance called acetaldehyde, which can bind to proteins in the mouth. This can trigger an inflammatory response from the body – in the most severe cases, cancerous cells can develop.

### **Pancreatitis and diabetes**

Chronic pancreatitis is another disease associated with heavy drinking. It's caused when your pancreas becomes inflamed and cells become damaged. Diabetes is a common side effect of chronic pancreatitis. There's evidence that heavy drinking can reduce the body's sensitivity to insulin, which can trigger type 2 diabetes.

### **Heart disease**

While studies suggesting that alcohol can help heart disease often hit the headlines, the reality is that the jury's still out on the extent of any benefits. And it is clear that any benefits which there may be are limited to very low levels of consumption – probably no more than 1 unit alcohol per day.

### **Mental health**

Alcohol alters the brain's chemistry and increases the risk of depression. It is often associated with a range of mental health problems. A recent British survey found that people suffering from anxiety or depression were twice as likely to be heavy or problem drinkers.

Extreme levels of drinking (defined as more than 30 units per day for several weeks) can occasionally cause 'psychosis', a severe mental illness where hallucinations and delusions of persecution develop. Psychotic symptoms can also occur when very heavy drinkers suddenly stop drinking and develop a condition known as 'delirium tremens'.

Heavy drinking often leads to work and family problems, which in turn can lead to isolation and depression. For heavy drinkers who drink daily and become dependent on alcohol, there can be withdrawal symptoms (nervousness, tremors, palpitations) which resemble severe anxiety, and may even cause phobias, such as a fear of going out.

### **Dependence**

If you drink large quantities of alcohol on a regular basis you run the risk of becoming addicted. Experts estimate that one in 17 people (6.4%) in Great Britain depend on

alcohol to get through the day. This can have serious effects on their families, friends and partners, as well as their mental health.

### **Cost of Navchetana Darumukti**

- Rs. 25.00 per pouch
- One course is of 60 Pouches
- To provide the same to patient 1 (Pouch) packet each x 60 days
- Cost of one course 60 (Pouch) packets is Rs. 1500/=
- Postage & Handling Charge Rs.150/ -Extra in India & Rs.1050 for outside India.