Alcohol-related brain damage (ARBD) is a brain disorder caused by regularly drinking too much alcohol over several years. The term ARBD covers several different conditions including Wernicke-Korsakoff syndrome and alcoholic dementia. None of these is actually a dementia, but they may share similar symptoms. However, in contrast to common causes of dementia such as Alzheimer’s disease, most people with ARBD who receive good support and remain alcohol-free make a full or partial recovery. In addition, there is a good possibility that their condition will not worsen.

This factsheet outlines the causes, symptoms, diagnosis and treatment of ARBD. It also gives practical tips for carers on supporting someone with the condition.

Contents
- Alcohol as a risk factor for dementia
- Alcohol-related brain damage
  - Causes
  - Who develops ARBD?
  - Korsakoff’s syndrome
  - Alcoholic dementia
  - Diagnosis
  - Treatment and support
  - Tips for supporting a person with ARBD
- Other useful organisations.
What is alcohol-related brain damage?

Alcohol as a risk factor for dementia

Patterns of drinking in Great Britain have changed over the past 10 years. Middle-aged people are now the age group which consumes the most alcohol and they are drinking more than in the past, especially middle-aged women. In contrast, younger people (aged 16–24) are now drinking less, particularly when it comes to binge drinking. Against this background, ARBD is an under-recognised and growing problem.

Drinking more than the recommended limit for alcohol increases a person’s risk of developing common types of dementia such as Alzheimer’s disease and vascular dementia. The NHS recommended limits are now a maximum of 14 units each week for men and women, spread over 3 or more days – although lower limits have been suggested for older people because their bodies handle alcohol differently. A small 125ml glass of wine is typically about 1.5 units and a pint of beer, lager or cider is usually 2–2.5 units.

It seems that repeated binge drinking – heavy drinking in one session, often leading to drunkenness – is particularly harmful. Binge drinking is dangerous because it raises the amount of alcohol in the blood to a high level very quickly.

This increased risk of dementia is greatest at higher levels of alcohol consumption – the more you drink, the higher your risk. But you do not need to be an alcoholic or get drunk often to be at increased risk of developing dementia. Regularly drinking even a little above recommended levels probably increases your risk. It also increases your risk of other conditions such as stroke, heart and liver disease, and cancer.
What is alcohol-related brain damage?

Regularly drinking above recommended limits is seen as one risk factor that contributes towards dementia, rather than being a direct cause. Other lifestyle risk factors that raise a person’s chances of developing dementia include smoking, lack of exercise and unhealthy diet. For more information see factsheet 450, Risk factors for dementia.

As explained below, regularly drinking at much higher levels than recommended can directly cause problems similar to dementia and so is different.

If you are concerned that you or someone you know is drinking too much alcohol and might need help, see the GP for advice. There are other organisations and charities that also provide support and advice for people with alcohol problems and their families (see ‘Other useful organisations’).

Alcohol-related brain damage

Some people regularly drink much higher levels than the recommended limits of alcohol. For men, such excessive drinking could mean more than 50 units per week, and for women, more than 35 units per week. Drinking at these high levels not only poses a particularly high risk to someone’s health but it also increases the risk of the person becoming addicted. (Alcohol addiction is where someone has become dependent on alcohol. They have an excessive desire to drink and their drinking is causing problems in their daily life.) Alcohol intake at such high levels over several years directly damages the brain, causing alcohol-related brain damage (ARBD) in some people.

Alcohol-related brain damage leads to slightly different symptoms in different people and causes a range of conditions. The most common form of ARBD is alcoholic dementia which may also be called alcohol-related dementia. ARBD also includes Korsakoff’s syndrome, which is also called Korsakoff’s psychosis.
**Causes**

ARBD is defined as long-term decline in memory or thinking caused by excessive alcohol use and a lack of vitamin B1 (thiamine). Thiamine is needed to provide energy to the body. It is especially important for brain and nerve cells because they use so much energy.

Alcohol misuse causes ARBD in a range of ways. Regular heavy drinking over time damages nerve cells because alcohol is a toxin. It also causes chemical changes in the brain and the shrinkage of brain tissue.

The second way that alcohol misuse leads to ARBD is by causing thiamine deficiency. This is partly because heavy drinkers tend to not look after themselves and have poor diet. Alcohol also irritates the stomach lining, leading to vomiting and poor absorption of nutrients. Thiamine deficiency also happens because alcohol interferes with the way the body stores and handles the vitamin.

Alcohol can also cause ARBD through repeated head injuries. People who misuse alcohol are more prone to falls and getting into fights.

Finally, heavy drinking damages blood vessels and is linked to high blood pressure, raised cholesterol levels and an increased risk of heart attacks and strokes. All of these conditions can damage the brain.

It is important to note that not all of these factors are equally important in all forms of ARBD or in everyone with the condition.

**Who develops ARBD?**

Reliable figures of the number of people with ARBD are not available and the condition is likely to be under-diagnosed. This is partly because having problems with alcohol still carries a stigma within society, so people may not seek help. Awareness of ARBD even among professionals also varies widely. Alcohol-related brain damage may therefore go undiagnosed or unrecorded in a patient’s notes.

Evidence from post mortem studies in the UK shows that ARBD affects about 1 in 200 of the general adult population. Among those with alcoholic addiction, this figure rises to as high as one in three. It is not clear why some people develop ARBD while others do not.
People with ARBD tend to be middle-aged, typically in their 40s or 50s, although they can be younger or older. This is younger than the age at which people most often develop common dementias such as Alzheimer’s disease.

Alcohol-related brain damage is more common among people in poorer communities. It also affects men much more often than women. However, where women are affected, they tend to develop ARBD at a younger age than men and after fewer years of alcohol misuse. Women are more vulnerable to the effects of alcohol.

**Korsakoff’s syndrome**

Korsakoff’s syndrome is a form of ARBD in which the main cause is a clear lack of thiamine. Korsakoff’s syndrome is the most well-known form of ARBD and many people think that it is the most common or even only form. However, Korsakoff’s syndrome is much less common than other forms of ARBD such as alcoholic dementia.

Korsakoff’s syndrome often develops as part of a condition known as Wernicke-Korsakoff syndrome. This consists of two separate but related stages: Wernicke’s encephalopathy followed by Korsakoff’s syndrome. Wernicke-Korsakoff syndrome is diagnosed in about one in eight people with alcoholism. However, not everyone has a clear case of Wernicke’s encephalopathy before Korsakoff’s syndrome develops.

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How does Wernicke’s encephalopathy develop?

An encephalopathy is a disorder that affects the function of the brain. Wernicke’s encephalopathy usually develops suddenly, often after abrupt and untreated withdrawal from alcohol. It has a range of different symptoms, but they may not be obvious and it can be difficult to make a diagnosis.
Symptoms of Wernicke's encephalopathy can include:

- disorientation, confusion or mild memory loss
- undernutrition – for example, the person is very underweight
- involuntary, jerky eye movements or paralysis of the muscles that move the eyes
- poor balance or unsteadiness, or other signs of damage to a part of the brain called the cerebellum (a region involved in co-ordinating movement).

If Wernicke’s encephalopathy is suspected, immediate medical treatment is essential. The person will need high doses of thiamine (and other B vitamins) injected slowly into a vein. If treatment is done in time, most symptoms will be reversed in a few days. However, permanent brain damage may result if Wernicke’s encephalopathy is left untreated or is not treated properly or in time. In some severe cases the person may die.

How does Korsakoff’s syndrome develop?
Where Wernicke’s encephalopathy is untreated, or is not treated soon enough, Korsakoff’s syndrome usually develops, though often gradually. Damage occurs in several regions of the brain – particularly in important small areas deep within the brain, resulting in severe loss of short-term day-to-day memory. Many other abilities may remain intact, such as working memory (information held in our head for a short time before using it – for example, working out how much something costs).

Symptoms
The main symptom of Korsakoff’s syndrome is loss of day-to-day memory – particularly of events that occur after the onset of the condition. This means that the person may repeat the same question many times. It may also mean they do not recognise someone they have met many times since the start of their condition. In some instances, memories of the more distant past can also be affected. Other symptoms of Korsakoff’s syndrome may include:

- difficulty in acquiring new information or learning new skills
changes in personality – at one extreme the person may show apathy (unconcern, lack of emotional reaction), or at the other, talkative and repetitive behaviour

lack of insight into the condition – even a person with large gaps in their memory may believe that their memory is functioning normally

confabulation – where a person creates events to fill the gaps in day-to-day memory. For example, a person who has been in hospital for several weeks may talk convincingly about having just visited their aunt earlier that day. This is more common in the early stages of the condition.

Recent studies show that a person with Korsakoff’s syndrome may also have problems with concentration, planning, making decisions or solving problems. These symptoms are all linked to shrinkage of the front of the brain.

**Alcoholic dementia**

Most people with ARBD do not have the typical symptoms of Korsakoff’s syndrome. Instead, they are much more likely to develop alcoholic dementia. This is similar to Korsakoff’s syndrome in some ways but different in others. One difference is that alcoholic dementia tends to develop gradually, rather than coming after Wernicke’s encephalopathy.

The term ‘alcoholic dementia’ is widely used because people have problems with memory or reasoning which affect daily life, as in dementia. But calling this form of ARBD ‘alcoholic dementia’ is not helpful. This is because, if a person with the condition – or any other form of ARBD – remains alcohol-free and gets the right treatment, they have a good chance of improvement over time. (This is unfortunately not the case with progressive dementias such as Alzheimer’s disease and vascular dementia.)

**Causes**

In alcoholic dementia the main cause of ARBD is loss of brain tissue, caused by the toxic effects of alcohol misuse over several years. Thiamine deficiency seems to be a less important factor than it is in Korsakoff’s syndrome. More areas of the brain are damaged in alcoholic dementia than in many people with Korsakoff’s syndrome. A brain scan of someone
with alcoholic dementia often shows general brain shrinkage but particular damage to the front of the brain. This area deals with solving problems, setting goals and making decisions, as well as with starting, carrying out and finishing tasks. The front of the brain also controls our motivation, empathy and social behaviour.

As well as shrinkage at the front, the brain of a person with alcoholic dementia also often has shrinkage of the cerebellum. This is the part of the brain at the back of the head that controls balance and posture. For more information see factsheet 456, *Dementia and the brain*.

**Symptoms**

As with Korsakoff’s syndrome, the symptoms of alcoholic dementia largely reflect the areas in the person’s brain that are damaged. Overall, the symptoms of alcoholic dementia are more varied than those of Korsakoff’s.

A person with alcoholic dementia often has:

- poor planning and organisational skills, and problems with decision-making, judgement and risk assessment
- problems with impulsivity (for example, rash financial decisions) and difficulty controlling emotions (for example, irritability or outbursts)
- problems with attention and slower reasoning
- lack of sensitivity to the feelings of other people
- behaviour which is socially inappropriate.
- Unlike Korsakoff’s syndrome, however, not everyone with alcoholic dementia has loss of day-to-day memory.

**Diagnosis**

Alcohol-related brain damage cannot be reliably diagnosed unless the person has stopped drinking alcohol for several weeks, to enable the symptoms of alcohol intoxication and withdrawal to resolve.

A person’s assessment for suspected ARBD follows broadly the same steps as for dementia. The doctor will carry out a full physical examination and take a detailed history from the person and someone who knows
them well if possible. This history will include how their symptoms started and how they are currently affecting the person’s life. It will also cover the person’s history of alcohol use (how much, how often, and for how long). Tests of the person’s mental abilities (for example, memory, thinking) will also be carried out, as will tests for depression. For more see factsheet 426, Assessment and diagnosis.

A brain scan may also be required. This may rule out other possible causes of symptoms (for example, stroke, bleed, tumour). Alternatively, it may show changes such as shrinkage of the cerebellum at the back of the brain, which supports a diagnosis of ARBD rather than dementia.

ARBD should be diagnosed if the person has impaired memory, thinking or reasoning which is bad enough to affect daily life, together with a recent history of several years of alcohol misuse. The person will also be monitored to see whether their condition stabilises or worsens once they are alcohol-free. If their condition continues to worsen, they may be diagnosed with a form of dementia, such as Alzheimer’s disease. If they stabilise or improve with abstinence, ARBD is a more likely diagnosis.

Someone will not usually be given a diagnosis of just ARBD but rather a specific form of it. According to the symptoms, the doctor may diagnose Wernicke-Korsakoff syndrome, Korsakoff’s alcoholic psychosis, alcoholic dementia, alcohol amnestic syndrome, chronic alcoholic brain syndrome or another condition.

**Treatment and support**

Unlike Alzheimer’s disease or vascular dementia, ARBD is not certain to worsen over time. There is a good chance of stabilisation or improvement if the person is given high doses of thiamine, remains free from alcohol and adopts a healthy diet with vitamin supplements. Brain scans show that, with abstinence, some of the damage caused by excessive drinking can be reversed. However, if the person continues to drink and eats poorly, ARBD is likely to continue to progress.

Treatment and support of a person with ARBD is given in two phases: the initial stabilisation phase and longer term rehabilitative care.
Alcohol-related brain damage cannot be reliably diagnosed unless the person has stopped drinking alcohol for several weeks, to enable the symptoms of alcohol intoxication and withdrawal to resolve.

Initial stabilisation
During the initial phase of treatment, which usually lasts up to several weeks, the aim is to withdraw alcohol and stabilise the person’s medical condition. Most patients with ARBD will need to stay in hospital for this phase.

Withdrawal of alcohol usually causes the person to have delirium (disorientation which varies over time) as well as intense sweating. They will also often have behavioural problems such as agitation and hallucinations. Treatment will include sedation, replacement of lost fluids and salts, and high doses of thiamine by injection.

Unfortunately, many people with ARBD have a lengthy wait in hospital before gaining access to specialist care. Depending on how serious the ARBD, a person could be discharged to residential care, sheltered accommodation or their usual home with support in the community.

After initial stabilisation, a person with ARBD will need ongoing support from two different kinds of services. Professionals in these services should work closely together to ensure the best care for the person.

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Alcohol treatment services
To stay alcohol-free the person will need support from alcohol treatment services (see ‘Other useful organisations’), which also help people with alcohol problems who do not have ARBD. Special drugs will sometimes be prescribed which either reduce the craving for alcohol or make the person feel unwell (or vomit) if they do drink. They will also need to take thiamine tablets and eat well generally.
As well as medication, the person will need non-drug support to stay alcohol-free. This often includes counselling or a ‘talking therapy’ such as cognitive behavioural therapy focused on their drinking. Support here will also look at a person’s social networks and encourage them to attend self-help groups. See ‘Other useful organisations’ for examples.

Some of the common symptoms of ARBD make it harder for a person with the condition to engage with an alcohol treatment programme. These can include denial, lack of insight and impulsivity. Staying alcohol-free is also more challenging if the person has a complex social setting (for example homelessness, being isolated from family due to alcohol misuse). Other medical problems such as drug misuse, poor physical health or depression can also add to the challenge. Addressing these broader aspects is important in helping the person stay alcohol-free.

**Rehabilitation**

As well as staying alcohol-free, a person with ARBD will also need rehabilitation to give them the best chance of returning to independent daily living. Rehabilitation is a specialised kind of support that is matched to the person’s needs and works towards goals which the person agrees with the professional. It could include practising repetitive strategies to help improve memory, and learning to use memory aids or other supportive technology. For more on these see Alzheimer’s Society publication 1540, *The memory handbook* and factsheet 437, *Assistive technology – devices to help with everyday living*.

Rehabilitation may come from a dementia service, community mental health team or rehabilitation service for people with acquired brain injury (for example following an accident or stroke). What is available and offered locally – if anything – varies widely across the country.

Any improvement in the person’s abilities is usually greatest in the first three months of abstinence but can continue for two to three years. It has been estimated that about a quarter of those affected by ARBD make a very good recovery. About half make a partial recovery and need support to manage their lives, but may still be able to live in their own homes or in sheltered housing. A further quarter make no recovery and generally require long-term residential care.
Other support for someone with ARBD will depend on their individual needs and may be similar to that available for a person with dementia. However, a person with ARBD is usually younger and physically more active than most people with dementia. They may therefore be better suited to services designed for people with young-onset dementia (where these are available) rather than to general dementia day care or residential care. These are generally intended mainly for older people.

It is vital that a professional with experience of supporting people with ARBD is involved in the person’s care, regardless of where they live.

Supporting a person with ARBD can be challenging, because of the need for different kinds of support, together with widespread variation in what is available and no clear care ‘pathway’. It can mean that the person and any family or friends supporting them experience great frustration in getting the right help. If appropriate support is not available, the person risks falling back into alcohol misuse and going through another cycle of hospitalisation and withdrawal. It is important for the person and anyone supporting them to remain positive and optimistic about the future.

**Tips for supporting a person with ARBD**

- Ask professionals involved in the person’s care how you can best help them. Professionals should see you as a key partner in their recovery.
- The person needs to be supported to remain completely alcohol-free. By doing so they give themselves the best chance to recover.
- Be positive and help the person to do things to retain and improve their skills. Do things with them, not for them.
- Encourage the person to keep a diary. They will benefit from structure and a daily routine.
- Break down complex tasks (for example, cooking a meal) into smaller steps to make them easier to follow.
- When talking to the person, remember that they may not keep information for very long afterwards. Give the person more time and encouragement when they are speaking. Be patient, use short phrases and recap at the end.
Place clues (for example, pictures or labels) around the person’s environment to help support them. For information see factsheet 526, *Coping with memory loss*.

Encourage the person to eat a balanced diet. Many foods contain thiamine, either naturally or added. These include avocados, baked potatoes (skin on), leafy green vegetables, fish (for example, mackerel and sardines) and wholegrains. The alcohol treatment service should also be able to make suggestions.

Help the person to look after themselves generally, such as getting enough sleep.

Support the person to attend a self-help group. If you are a family member, consider joining one too (see ‘Other useful organisations’).

**Other useful organisations**

*Alcohol Concern*

25 Corsham Street
London N1 6DR

0300 123 1110 (Drinkline)
contact@alcoholconcern.org.uk
www.alcoholconcern.org.uk

Alcohol Concern is the national charity working on alcohol issues in England and Wales, campaigning for effective alcohol policy and improved services for people whose lives are affected by alcohol-related problems.
Alcoholics Anonymous is a fellowship of men and women who share their experience, strength and hope with each other that they may solve their common problem and help others to recover from alcoholism. You can use the website to find a meeting in your area.

Al-Anon is a fellowship of relatives and friends of alcoholics who share their experience to solve their common problems. Al-Anon Family Groups hold regular meetings where members share their own experience of living with alcoholism.
This factsheet has also been reviewed by people affected by dementia.
A list of sources is available on request.