# Antioxidant vitamins for age-related macular degeneration

There is evidence that taking a specific combination of antioxidant vitamins and minerals may help to slow down the progression (worsening) of age-related macular degeneration (AMD).

The potential benefit of taking such a supplement depends on your risk of AMD worsening, and whether it is affecting one or both of your eyes. The group of people most likely to benefit from taking a supplement are those who have a high risk of progression of their AMD. Some people might feel it may be worthwhile to take something that could help reduce the risk of sight loss from AMD, however, people with early AMD with a low risk of progression are generally less likely to benefit.

## What is AMD?

AMD affects a tiny part of the retina, a light sensitive layer at the back of your eye, called the macula. AMD causes changes to the macula, which lead to problems with your central vision, the vision you use when you’re looking straight at something; for example, when you’re reading, looking at photos or watching television. The macula is also responsible for your colour vision.

## What are the different types of AMD?

There are two main types of AMD – “dry” AMD and “wet” AMD. This is not because of how your eye feels or whether you have a watery or dry eye. They are called “dry” and “wet” because of what happens inside your eye and what the optometrist (optician) or ophthalmologist (hospital eye doctor) sees when they examine the back of your eye.

### Dry AMD

Dry AMD is the more common type of AMD. It develops very slowly and causes a gradual change in your central vision. Dry AMD usually takes a long time – often years, to get to its final stage. At its final stage, dry AMD causes a dark or missing area (blank patch) in the centre of your vision in both of your eyes. It does not affect your peripheral (side) vision, so it never leads to total blindness.

### Early stage AMD

The different stages of AMD can be classified by the changes an optometrist or ophthalmologist sees at the macula, as well as how much AMD is affecting someone’s vision.

In the early stages of AMD, it is possible to have changes at the macula, that can be seen when your eye is examined, but not have any problems with your sight.

An optometrist or ophthalmologist may see 'drusen' when they examine your retina. Drusen are small deposits made up of cellular waste materials that collect under the retina, which are seen as yellow dots. Drusen can be present as a normal part of ageing and are not always a sign that someone has AMD, however they can be an early sign of AMD in some people.

Your optometrist or ophthalmologist might say you have early AMD if you have larger drusen in one or both your eyes. Other changes at the macula, as well as drusen, will indicate whether your early AMD has a low, medium, or high risk of progression.

Some people with early AMD are considered to be more at risk of progression of the condition. An optometrist or ophthalmologist will be able to see an increased number of larger drusen when examining your macula or other changes that might indicate you are at higher risk of progression.

Early stage AMD is always dry AMD. Late stage AMD is when you have wet AMD or dry AMD which has caused extensive scarring to the macula and significant changes to your sight.

### Wet AMD

About 10 to 15 per cent of people who develop AMD have wet AMD, often having had dry AMD to begin with. You develop wet AMD when the cells of the macula stop working correctly and your body starts growing new blood vessels to fix the problem. These blood vessels are very weak and grow in the wrong place, so they cause swelling, leaking and bleeding underneath the macula. These changes are why the condition is described as “wet” AMD.

This new blood vessel growth is medically known as “neovascularisation”. It causes more damage to your macula and eventually leads to scarring. Both the new blood vessels and the scarring can damage your central vision. Wet AMD is classified as late AMD.

Wet AMD can develop very quickly, causing serious changes to your central vision in a short period of time, over days or weeks.

Treatment is available for wet AMD, which aims to stop new blood vessels from growing and damaging your macula to prevent a worsening of your sight.

You can find more information about AMD in our Understanding Age-Related Macular Degeneration booklet, on our website **rnib.org.uk/eyehealth** or by calling our Helpline **0303 123 9999**.

## What vitamins are used for AMD?

The nutritional supplements concerned with AMD contain vitamins or minerals that are known to have antioxidant properties. Oxidants are thought to be involved in the ageing process and may therefore contribute to the development of AMD by speeding up cell degeneration. Antioxidants reduce this harmful effect.

It is thought that antioxidants are helpful in AMD because of the “free radical” theory of cell damage. During cell ‘oxidation’ (chemical processes that maintain cells), potentially harmful waste substances known as ‘free radicals’ are released. Free radicals are thought to be partly responsible for the “wear and tear” we call ageing.

Antioxidants are thought to help by “mopping up” these free radicals, to delay or prevent them from damaging your cells. Research into vitamins for AMD has looked at whether antioxidants can help to protect the macula from these age-related changes. Research has looked into the following antioxidants:

* Vitamins A, C and E.
* Carotenoids are naturally occurring pigments in fruits and vegetables that give them a red, green or yellow colour, and are also effective against oxidants. Beta-carotene gives yellow and orange fruit and vegetables their colour and is turned into vitamin A in the body.
* Lutein and zeaxanthin are important carotenoids found in high concentrations in the macula. They are thought to play an important role in absorbing damaging blue wavelengths of light, acting as a natural sunblock for the macula and reducing the effects of free radicals.
* Zinc.

## The Age-Related Eye Disease Studies (AREDS)

The strongest evidence about which supplement formula to take comes from two large-scale clinical trials carried out in the United States, known as AREDS (2001) & AREDS2 (2012). Other studies that have tested the benefits of supplements are typically very small and participants take the supplements for a short period of time.

The aim of these studies was to find out whether taking a vitamin formula could help slow down the development of AMD. People on these trials were given high levels of antioxidant vitamins and zinc to see if these could slow down the progression of AMD so that it does not reach the stage where vision is severely affected (“late” AMD).

### Results of AREDS in 2001

The group of people found to benefit most from taking a supplement were those who have a high risk of progression of their AMD. Research from AREDS showed that for every 1000 people in this group who take a supplement, 78 people have slower progression of their AMD.

People with early AMD with a low risk of progression were found to be less likely to benefit. Research shows that for every 1000 people in this group who take a supplement, only 4 people have slower progression for their AMD.

The AREDS formula which gave these results, taken as a single tablet every day was:

* 500 milligrams (mg) of vitamin C
* 400 international units of vitamin E
* 15 mg beta-carotene
* 80 mg zinc as zinc oxide
* 2 mg copper as cupric oxide (added because high levels of zinc can reduce the amount of copper in the body)

**Concern for smokers**

Beta-carotene supplements have been found to increase the risk of lung cancer in smokers and people who have previously smoked.

### Results of AREDS2 in 2012

The second AREDS trial, AREDS2, looked at replacing beta-carotene with different antioxidants, lutein and zeaxanthin. No link has been found between lung cancer and lutein and zeaxanthin for either current smokers or ex-smokers.

AREDS 2 had a complicated study design and no placebo control. However, AREDS2 participants who took antioxidants minus beta-carotene but with lutein and zeaxanthin (AREDS2 formula) had a similar benefit, compared to those who took the original AREDS formula.

Based on the results of AREDS and AREDS2 and concerns about the risk of beta-carotene for smokers, the current suggested daily formula to slow down the progression of AMD in people already diagnosed is:

* 500 milligrams (mg) of vitamin C
* 400 international units (equivalent to about 270 mg) of vitamin E
* 10 mg lutein
* 2 mg zeaxanthin
* 25 mg or 80 mg zinc as zinc oxide (as recommended by your doctor)
* 2 mg copper as cupric oxide

## How good is the evidence?

In the UK, the National Institute for Health and Care Excellence (NICE) is the organisation that considers the evidence behind treatments for all general health conditions and provides patients, health professionals and the public with reliable guidance on current best medical practice. NICE has not approved the use of antioxidant vitamins and minerals in the management of AMD.

They reviewed the evidence around the use of these supplements, which includes the two large scale studies, AREDS and AREDS 2. They found that the evidence these supplements benefit people with AMD was not strong enough to recommend that people take these supplements. NICE have recommended further large-scale studies are needed before they can be confident the AREDS2 formula is effective at preventing worsening of AMD.

So far there’s no other research of the same quality to compare these results to, so this is the only information we have regarding vitamin and mineral supplements and AMD, at present.

This means, currently, these supplements cannot be clearly recommended to everyone with AMD. More research is needed to determine if supplements marketed for AMD are worth taking.

Although generally regarded as safe, vitamin supplements may have harmful effects for some people. Therefore, it is always important to get medical advice before starting to take any supplement.

## I have some problems with my vision due to AMD, could taking a supplement help me?

If you have AMD, whether it would be worth taking a supplement will depend on the stage your AMD is at and the risk of it worsening.

Evidence from the AREDS trials shows that supplements may help if you are at high or medium risk of developing late AMD. This is if:

* You have early stage AMD with a high or medium risk of it worsening in one or both eyes. Taking a supplement may help to prevent your sight from worsening.

Or:

* You have wet AMD in one eye and your other eye has early dry AMD. Taking a supplement will not help the eye with wet AMD but may help prevent wet AMD developing in the other eye.

However, there are no guarantees that the recommended formula will definitely prevent a worsening of your vision, when you’re at high risk of developing late stage AMD. The evidence does not suggest that these supplements will help everyone.

If you are not sure how advanced your condition is, then you should ask your ophthalmologist or optometrist whether taking a supplement could help.

## I have early stage low risk AMD, should I take a supplement?

If your optometrist or ophthalmologist has said you have drusen or early AMD with low risk of progression, and your sight is not affected, there is no evidence that taking a supplement will help to slow down the development of AMD.

## I have wet AMD in both eyes or late stage dry AMD in both eyes could taking a supplement help me?

If you have wet AMD in both eyes or have late stage dry AMD in both eyes (your vision is very poor in both eyes), unfortunately there is no evidence that taking a supplement will be helpful.

## Are there any risks to taking supplements?

Although nutritional supplements are generally regarded as safe, they may have harmful effects in certain people.

If you are thinking about taking a supplement for AMD, it would be important to discuss this with your GP. Taking larger amounts of vitamins and minerals than those found in an everyday diet may not be suitable for you, depending on other medications or supplements you may be taking.

If you are a smoker or have ever smoked in the past, it’s important to make sure any supplement you take does not contain beta-carotene. This is because there is evidence that beta-carotene increases the risk of lung cancer in smokers and ex-smokers. The recommended AREDS2 supplement does not contain beta-carotene for this reason.

Additionally, an optometrist or ophthalmologist can advise if taking a supplement for AMD is the right option for you based on the stage your AMD is at.

## There are many supplements on the market for people with AMD, which one is the best?

Unfortunately, we cannot recommend that someone should take a supplement for AMD, or which one they should take.

There are several brands of supplements marketed as containing the “AREDS2” formula. If you are considering taking a supplement for AMD, you should choose the ones marked as containing the AREDS2 formula, as these conform to the best evidence currently available.

If you are not sure if a brand of supplement contains the AREDS2 formula, your GP or a pharmacist should be able to check this for you.

## Can I get supplements on NHS prescription?

The NHS does not usually fund supplements for AMD so it is unlikely that you will be able to get them on NHS prescription.

## Buying online

Sometimes it can be cheaper to buy supplements on the internet (online). It is important if you are considering buying online to buy from a reputable source.

The UK Governmental body called the Medicines and Healthcare products Regulatory Agency (MHRA) has a register which you can use to check if a website is legally allowed to sell medicines and nutritional supplements to the public. This can be found by visiting **medicine-seller-register.mhra.gov.uk**

## I am worried that I might develop AMD, can supplements prevent it?

Several studies have looked at the role of antioxidant supplements in the prevention of AMD. At present there is no evidence to suggest that people who do not have AMD should take supplements to prevent them from developing AMD in the future. This includes lutein and zeaxanthin, antioxidant supplements such as the AREDS2 formula or any other multivitamins marketed for eye health.

## What can I do to keep my eyes healthy if I have AMD or to prevent AMD?

### Your diet

A healthy diet full of fruits and vegetables is thought to be beneficial in keeping our eyes as heathy as possible. Fruit and vegetables are an important source of vitamins and minerals. The NHS advises we should eat at least 5 portions of a variety of fruit and vegetables every day.

If you have difficulty digesting food, your GP may recommend a supplement so that you can get the right amount, but most people can get all the vitamins and minerals they need through diet alone.

### Your lifestyle

High blood pressure and lack of exercise have been identified as possible risk factors for AMD. Therefore, maintaining a healthy weight and living an active lifestyle with regular exercise is recommended.

### Quit smoking

Smoking dramatically increases the risk of developing AMD and is linked to the development of cataract and other eye conditions. Your GP can give you details of your local stop smoking service and you can also get help and advice on quitting from the NHS website Smokefree - **nhs.uk/smokefree**.

### Sunlight

Some studies have suggested that exposure to high levels of sunlight, particularly ultraviolet (UV) light, throughout your life may increase your risk of developing AMD, but this has not been proven. However, wearing sunglasses to protect your eyes from the UV light in sunlight is a good idea for everyone throughout their life.

### Monitoring vision and regular eye examinations

It is important if you are diagnosed with early AMD to monitor your vision for changes. Your optometrist can advise you on how you can do this.

Having regular eye examinations are an important health check for your eyes and will also allow your optometrist to monitor for any changes if you have AMD. Your optometrist will be able to tell you how often you need an eye examination.

## Coping

If you’ve been diagnosed with AMD, it’s normal to find yourself worrying about the future and how you will manage if your sight changes.

It can sometimes be helpful to talk about these feelings with someone outside of your circle of friends or family. At RNIB, we can help with our telephone Helpline and our Counselling and Wellbeing team. Your GP or social worker may also find a counsellor for you if you feel this might help.

Your eye clinic may also have an Eye Care Liaison Officer (ECLO) who can be on hand to provide you with further practical and emotional support about your eye condition.

## Can I get help to see things better?

If your AMD has caused reduced vision, then there is much that can be done to help you make the most of your remaining vision and adapt to any changes.

This may mean making things bigger, using brighter lighting or using colour to make things easier to see. We have a series of leaflets with helpful information on living with sight loss, including how to make the most of your sight. You can find out more about our range of titles by calling our Helpline.

You can also ask your ophthalmologist, optometrist or GP about low vision aids and having a low vision assessment. During this assessment, you’ll be able to discuss the use of magnifiers and aids to see things more clearly.

Local social services should also be able to offer you information on staying safe in your home and getting out and about safely. They should also be able to offer you some practical mobility training to give you more confidence when you are out.

Our Helpline can also give you information about the low vision services available, support with education and employment, and our website offers lots of practical information about adapting to changes in your vision and products that make everyday tasks easier.

## Further help and support

### Other useful contacts

#### Macular Society

PO Box 1870

Andover SP10 9AD

Helpline: **0300 3030 111**

**macularsociety.org**

#### RNIB Helpline

If you need someone who understands sight loss, call our Helpline on **0303 123 9999**, say **"Alexa, call RNIB Helpline"** to an Alexa-enabled device, or email **helpline@rnib.org.uk**. Our opening hours are weekdays from 8am-8pm and Saturdays from 9am – 1pm

You can also get in touch by post or by visiting our website:

**RNIB**

Grimaldi Building

154a Pentonville Rd

London N1 9JE

**rnib.org.uk**

#### Sight Advice FAQ

Ask the Sight Advice FAQ website your questions about sight loss and get helpful answers: **sightadvicefaq.org.uk**

#### Connect with others

You can meet or connect with others who are blind or partially sighted online, by phone or in your community to share interests, experiences and support for each other. From book clubs and social groups to sport and volunteering, our friendly, helpful and knowledgeable team can link you up with opportunities to suit you. Visit **rnib.org.uk/connect** or call our Helpline.

### We value your feedback

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Send your comments to us by emailing us at **eyehealth@rnib.org.uk** or by writing to the Eye Health Information Service, RNIB, Grimaldi Building,154a Pentonville Road, London N1 9JE.

### Information sources

This factsheet has been written by the RNIB Eye Health Information service. Our factsheets have been produced with the assistance of patient and carer input and up-to-date reliable sources of evidence. The accuracy of medical information has been checked by medical specialists. If you would like a list of references for any of our factsheets, please contact us at **eyehealth@rnib.org.uk**.

Our factsheets are available in a range of formats including print, audio and braille.

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