

Antioxidant supplements for age-related macular degeneration

This is one of several bulletins supporting the implementation of [NHS England guidance on items which should not be routinely prescribed in primary care](#). The guidance classifies lutein and antioxidant supplements for age-related macular degeneration (AMD) as “items of low clinical effectiveness, where there is a lack of robust evidence of clinical effectiveness or significant safety concerns”.¹

In England, Wales, Northern Ireland, Isle of Man and Scotland £314,648 is spent annually (NHSBSA Dec 2024 – Feb 2025 and Public Health Scotland Dec 2024 – Feb 2025) on prescribing antioxidant supplements for AMD.

Recommendation

- Antioxidant supplements for AMD are not recommended for prescribing in line with [NHS England guidance on items which should not be routinely prescribed in primary care](#). Their benefits (and how any benefits balance with their potential risks) are not yet clearly established.
- Be aware that:
 - » The antioxidant supplements that have undergone the most study in AMD are the Age-Related Eye Disease Study (AREDS) and AREDS2 formulas (see table 1).
 - » There is no evidence that antioxidant vitamin and mineral supplements are useful in the primary prevention of AMD.
 - » NICE do not consider the clinical evidence for the use of antioxidants in established AMD to be sufficient to make a recommendation for or against their use.
- Discontinue prescribing antioxidant supplements for AMD on FP10 and do not initiate new prescriptions. To support this, a policy on the prescribing of these supplements and a process for deprescribing should be agreed locally by key stakeholders including GPs, ophthalmologists and other relevant healthcare professionals.
- Inform patients, provide them with information about the change and the reasons behind the change.
- Self-management support and advice for AMD should include a discussion about smoking cessation (where relevant), healthy diet rich in fresh fruit, vegetables, eggs, and oily fish, and sources of practical and emotional support.
- Advise people who wish to purchase antioxidants marketed for eye health to discuss them with their health care professional before taking them.
- Some antioxidant supplements marketed for eye health (including the AREDS formula) contain beta-carotene.
 - » Advise people who smoke, former-smokers, and those who have been exposed to asbestos to not take supplements, containing beta-carotene, which has been associated with an increased risk of lung cancer in these groups.
 - » Advise people that some experts no longer recommend beta-carotene containing antioxidant supplements for this indication at all. Experts now generally recommend the AREDS2 formula (which contains lutein 10mg, zeaxanthin 2mg, vitamin C 500mg, vitamin E 400 IU, zinc 80mg or 25mg, and copper 2mg).

Background

Age-related macular degeneration (AMD)

AMD is the term applied to changes, without any other obvious precipitating cause, which occur in the central area of the retina (macula) in people aged 50 years and above.²

The changes to the macula lead to problems with central, detailed vision, which can become distorted or blurry. Over time, a dark or missing area may appear.³ AMD is the most common cause of visual impairment in the older population. Advanced AMD is associated with increased likelihood of depression, falls and cognitive impairment.⁴

Most people with AMD have **dry AMD** (also called atrophic AMD). This is when the macula gets thinner with age.⁵ Drusen (yellow deposits made up of lipids and proteins) may be seen on examination of the retina.⁶ Dry AMD can range from early stage through to late stage. The early stages are generally asymptomatic and the condition usually progresses slowly over several years.⁵ As it progresses, breakdown of light-sensitive cells in the macula causes one or more sharply demarcated areas of partial or complete depigmentation of the retina to develop – this is called geographic atrophy.² Currently, there are no treatment options for late dry AMD.⁴

Wet AMD (also called advanced neovascular AMD) is a type of late AMD that usually causes faster vision loss. Any stage of dry AMD can turn into wet AMD - but wet AMD is always late stage.⁵ Abnormal blood vessels grow into the macula and leak blood or fluid⁷ (which is why it is described as 'wet').³ It can develop very suddenly,⁷ but can be treated with angiogenic therapies⁸ if caught quickly.⁷

Patients may have dry AMD, wet AMD, or both at the same time, in either one or both eyes.⁹

Antioxidant supplements

It has been proposed that antioxidants may prevent cellular damage in the retina by limiting the damaging effects of free radicals produced in the process of light absorption.¹⁰

The antioxidant nutritional supplements that have undergone the most study are the AREDS and AREDS2 formulas (see Table 1 below), named after the Age-Related Eye Disease Study (AREDS) investigating them.^{11,12} These formulas contain antioxidants in the form of vitamins C and E, carotenoids (either beta-carotene or lutein and zeaxanthin) and a mineral (zinc). Copper is included to prevent copper deficiency that can result from high dose zinc supplementation, which can lead to anaemia.¹³

Carotenoids are naturally occurring pigments in fruits and vegetables.¹⁴ In the body, beta-carotene is used to make vitamin A, which is required by the retina to detect light and convert it into electrical signals. Beta-carotene itself is not found in the eye. In contrast, lutein and zeaxanthin are found in the retina and lens, where they may act as natural antioxidants and help absorb damaging, high-energy blue and ultraviolet light.¹³

Table 1. AREDS and AREDS2 multivitamin and mineral formulations

	AREDS formula ¹¹	AREDS2 formula ¹²
Beta-carotene	15mg	-
Lutein	-	10mg
Zeaxanthin	-	2mg
Vitamin C	500mg	500mg
Vitamin E	400 International Units	400 International Units
Zinc	80mg	80mg or 25mg
Copper (Included to prevent copper deficiency with high dose zinc supplementation) ¹³	2mg	2mg

The AREDS2 study tested several supplement combinations.¹² However, 'AREDS2 formula' usually refers to the ingredients listed in table 1. It includes the same vitamin C, vitamin E and copper doses as the AREDS formula. A lower dose of zinc (25mg) may be included. Notably the carotenoid content differs, as beta-carotene is replaced with lutein and zeaxanthin.^{13,15}

A number of antioxidant supplements marketed for eye health are available to purchase. They are classed as food supplements, and are not licensed as medicines.

National guidance

In 2018 [NICE published guidance on AMD \[NG82\]](#). No recommendation for or against the use of antioxidant supplements is made in the guideline. The evidence review NICE undertook suggested a positive effect of antioxidant supplements on slowing progression from early AMD to late AMD. However, the Guideline Committee had reservations about the studies that created a lack of certainty about the treatment effects (see 'Clinical effectiveness'). Furthermore, they noted the association of beta-carotene (included in the AREDS formula) with a possible risk of lung cancer amongst smokers.¹⁶

NICE make a research recommendation to investigate the effectiveness of antioxidant supplements (specifically the AREDS2 formula compared with no treatment) on AMD disease progression for people with early AMD at high risk of progression in the context of a randomised controlled trial (RCT).⁸

[NHS England guidance on items which should not be routinely prescribed in primary care](#) includes lutein and antioxidants. They are classified as items of low clinical effectiveness, where there is a lack of robust evidence of clinical effectiveness or significant safety concerns. The guidance recommendations are:

- Do not initiate.
- Deprescribe in patients currently prescribed this medicine.
- Only prescribe if no item or intervention is clinically appropriate.
- Only prescribe if no item or intervention is available.¹

The latter two recommendations are included for some of the items in the NHS England guidance, where prescribing may be appropriate in some exceptional circumstances. NHS England state that, where no other item is clinically appropriate or available it may be appropriate to prescribe following a [shared decision-making](#) conversation between the prescriber and patient, based on evidence-based good quality information, clinical judgement and the patient's values and preferences.¹

NHS England do not give any additional prescribing guidance for lutein and antioxidants (as is provided for some items, including alternatives and where a multidisciplinary approach is required). It is therefore not possible to define particular groups that could be considered as exceptions, based on this guidance.¹

Whilst there is a lack of alternative treatments for dry AMD, there is self management advice that people should be made aware of including smoking cessation (where relevant) and following a healthy diet (see the 'Self-management support' section below).¹⁵

Antioxidant supplements for AMD are not included in NHS Wales guidance on items identified as low value for prescribing (papers 1, 2 and 3).¹⁷⁻¹⁹

The [Royal College of Ophthalmologists updated their Commissioning Guide for AMD Services](#) in 2024. Its general recommendations for all AMD patients include the following information about nutrition and supplements:

A healthy diet, rich in fresh fruit, vegetables, eggs, and oily fish is recommended. Licensed formulations of multivitamin supplements containing the AREDS2 formulation are not available on prescription within the NHS. Patients may choose to source these over-the-counter supplements independently. The original AREDS formulation consisting of vitamins C, E, beta-carotene, and zinc reduced the 5-year risk of developing late AMD in persons at risk by an estimated 25%. These include those with either

bilateral large drusen or large drusen in one eye and late AMD in the fellow eye. The AREDS2 study corroborated these findings and recommended switching beta-carotene to lutein and zeaxanthin in former smokers.⁴

The Strategic Planning and Performance Group in Northern Ireland (formerly the Health and Social Care Board) includes supplements for AMD in their [Prescribing Stop List](#). Prescribing of these products is not supported by the Northern Ireland Department of Health.²⁰

A [Clinical Knowledge Summary on AMD](#) states that, when a person has been advised to take this type of antioxidant supplement, the AREDS2 formula is normally recommended. It states that previously recommended supplements containing beta-carotene are not now recommended.¹⁵

The [American Academy of Ophthalmology published an AMD Preferred Practice Pattern](#) in 2019. It recommends considering antioxidant supplements (AREDS2) in patients with intermediate or advanced AMD. They advise that there is no evidence to support the use of these supplements for patients who have less than intermediate AMD and no evidence of any prophylactic value for family members without signs of AMD.²¹ The American Academy of Ophthalmology website includes patient information about [vitamins for AMD](#).

Clinical effectiveness

Slowing progression of AMD

The National Eye Institute in the United States has sponsored two RCTs investigating the effect of antioxidant supplements on AMD.²² They are known as the Age-Related Eye Disease Study (AREDS, published in 2001)¹¹ and AREDS2 (published in 2013).¹²

AREDS was a double-blind, placebo-controlled RCT that investigated the use of high-dose antioxidant vitamin and zinc supplements in 3,640 people with AMD.¹¹ Participants were randomised to one of four arms:

- Placebo.
- Antioxidants (vitamin C 500g, vitamin E 400 IU, beta-carotene 15mg).
- Zinc 80mg (with copper 2mg).
- Antioxidants plus zinc.

Results were reported for 3,609 people with AMD features ranging from borderline through to advanced AMD or vision loss due to AMD in one eye only, see categorisation in Table 2. Thirty one people had no photographic assessment of AMD during annual follow visits, so the intervention could not be assessed.

Table 2. AMD categories used in AREDS study

AMD category	Features
Category 2	Mild or borderline age-related macular features: multiple small drusen, single or non-extensive intermediate drusen, pigment abnormalities, or any combination of these in 1 or both eyes.
Category 3	Absence of advanced AMD in both eyes and at least one eye with visual acuity of 20/32 or better with at least one large druse, extensive intermediate drusen, or geographic atrophy that did not involve the centre of the macula, or any combination of these.
Category 4	Study eye: Visual acuity of 20/32 or better and no advanced AMD (geographic atrophy involving the centre of the macula or features of choroidal neovascularization). Fellow eye: Either lesions of advanced AMD or visual acuity less than 20/32 and AMD abnormalities sufficient to explain reduced visual acuity.

The primary outcomes were based on progression to advanced AMD and reduction in visual acuity (at least a 15 letter decrease). Average follow up was 6.3 years. Only combined treatment with antioxidant vitamins plus zinc gave a statistically significant odds reduction for the progression to advanced AMD compared with placebo; odds ratio (OR) 0.72, 99% confidence interval (CI) 0.52–0.98; $p=0.007$.

Very few people in category 2 at baseline actually progressed to advanced AMD. The investigators felt that this made it impossible to assess treatment effects on AMD for this category, and less likely that treatment would be recommended. They therefore also presented sub-group analyses for those most likely to benefit from treatment (Categories 3 and 4).¹¹ Both zinc supplements and antioxidants plus zinc significantly reduced the odds of intermediate AMD progressing to advanced AMD compared with placebo in this higher-risk group over a 5-year period:

- Antioxidant plus zinc OR 0.66 (99% CI 0.47 - 0.91), 25% risk reduction.
- Zinc OR 0.71 (99% CI, 0.52 - 0.99), 21% risk reduction.²²

It was only in the higher-risk sub-group that a statistically significant reduction in rates of at least moderate visual acuity loss was observed with the antioxidant plus zinc supplement. The investigators acknowledge that the treatment benefit seen in AREDS is modest and that participants in all treatment arms continued to progress to advanced AMD and lose vision over time.¹¹

AREDS2 ($n=4,203$) was designed to test whether adding carotenoids, lutein and zeaxanthin, or omega-3 fatty acids, or both, to the original AREDS formulation might further reduce the risk of progression to advanced AMD and to evaluate the effect of eliminating beta carotene, lowering zinc doses, or both in the AREDS formulation. There was no true placebo group as all participants were also asked to take the original AREDS formulation or accept a secondary randomisation to four variations of the AREDS formulation, including elimination of beta carotene, lowering of zinc dose, or both.¹²

The study recruited people at high risk of progression to advanced AMD. It concluded that the addition of lutein and zeaxanthin, omega-3 fatty acids, or both to the AREDS formulation in primary analyses did not further reduce risk of progression to advanced AMD.¹²

AREDS2 also showed that lowering the zinc dose and eliminating the beta-carotene had no statistically significant effect on progression to advanced AMD. A post-hoc subgroup analysis suggested a benefit of lutein and zeaxanthin given as part of a supplement without beta-carotene. This is of particular interest considering the apparent risks of beta-carotene, which may increase the risk of lung cancer in smokers. The authors concluded that, based on apparent risks of beta-carotene and possible benefits that are only evident within exploratory subgroup analyses, lutein and zeaxanthin requires further investigation for potential inclusion in the AREDS supplements.¹²

A number of systematic reviews have investigated the effect of antioxidant supplements on the progression of AMD. They include one undertaken by NICE for NG82,¹⁶ a Health Technology Assessment (HTA) funded as part of the HTA programme of the National Institute for Health Research (NIHR)²³ and a Cochrane review.¹⁰ The NICE review and Cochrane review included a meta-analysis. The AREDS and AREDS2 studies are highly influential in all three reviews.

The evidence review undertaken by NICE suggested a positive effect of antioxidant vitamin and zinc supplements on slowing progression from early AMD to late AMD, a finding based largely on the AREDS study.¹⁶

The NICE Guideline Committee expressed some reservations in relation to the AREDS study. They noted that the analysis of AMD progression was based on a higher-risk subgroup, so the true effect may have been affected by selection bias. They questioned the generalisability of the findings, as 20% of participants had been taking multivitamins containing a supplement supplied via the study protocol prior to enrolment in the study (meaning that participants were unlikely to be representative of the general population). Furthermore, the treatment effects reported in AREDS were not confirmed by the other AMD prevention trials included in NICE's analysis.¹⁶

The guideline committee also noted the association of beta-carotene with a possible risk of lung cancer among smokers. They agreed that it was not possible to conclude whether the treatment benefits of such a formula outweigh the potential risks that could be caused by individual components of the antioxidant supplements.¹⁶

Regarding the AREDS2 formulation, NICE state that its effect on AMD progression is unknown because of a complicated study design involving secondary randomisation and no placebo control. The guideline committee agreed that the clinical evidence was not sufficient to make a strong recommendation for or against the use of antioxidant supplements, and a research recommendation was made.¹⁶

A 2023 Cochrane review assessed the effects of antioxidant supplements on the progression of AMD in people with AMD. The review found moderate-certainty evidence suggesting that antioxidant supplementation with the AREDS formula probably slows down progression to late AMD. People with intermediate AMD have a higher chance of benefiting from antioxidant supplements because their risk of progression is higher than people with early AMD.¹⁰

Regarding lutein/zeaxanthin, the authors conclude that, although low-certainty evidence suggested little effect with lutein/zeaxanthin alone compared with placebo, exploratory subgroup analyses from the AREDS2 study support the view that lutein/zeaxanthin may be a suitable replacement for the beta-carotene used in the original AREDS formula. They describe this evidence for lutein/zeaxanthin as 'rather indirect', and note that is not currently supported by other studies (although they recognise that such studies are small and of poorer quality and of shorter duration).¹⁰ However they are aware that other systematic reviews, such as that undertaken as part of the NIHR HTA programme²³ consider this to be high-quality evidence.¹⁰

The NIHR HTA review considers the evidence to be strongest for the AREDS2 formula. It states that the AREDS2 trial showed that beta-carotene should be replaced by lutein and zeaxanthin, and that the dose of zinc could be reduced. The reviewers consider there to be good evidence that the AREDS2 supplement should be used for patients meeting the AREDS study categories 3 and 4 categories (see table 2 above).²³ This is a similar stance to that of the American Academy of Ophthalmologists, who recommend considering AREDS2 supplements in patients with intermediate or advanced AMD.²¹

Primary prevention of AMD

A 2017 Cochrane review has assessed antioxidant supplements for the prevention of AMD. It concluded that taking vitamin E or beta-carotene supplements will not prevent or delay the onset of AMD. The same probably applies to vitamin C and the multivitamin (Centrum Silver) investigated in the one trial reported to date. No evidence was found with respect to other antioxidant supplements, such as lutein and zeaxanthin.²⁴

The Clinical Knowledge Summary on AMD states that there is no evidence to support the use of antioxidant vitamin and mineral supplements for people with less than intermediate AMD, and there is no evidence that these supplements are useful in primary prevention (to prevent AMD from developing in the first place).¹⁵

Safety

There is concern that the high doses of vitamins and minerals contained in many supplements marketed for eye health may cause harm in some people.

- In the AREDS study, zinc supplementation was associated with an increase in the risk of hospitalisation due to genitourinary conditions (e.g. unspecified urinary tract infection and prostatic hyperplasia in men and stress incontinence in women).¹¹
- Vitamin E supplementation has been linked with an increased risk of heart failure in people with diabetes or vascular disease.²⁵

- Beta-carotene supplementation has been found to increase the risk of lung cancer in people who smoke or have been exposed to asbestos and should be avoided in these groups.²⁶
- The AREDS formula (containing beta-carotene) should also be avoided by former smokers.¹³ In the AREDS2 trial, current smokers or those who had quit smoking less than a year before enrolment were excluded from receiving beta-carotene. Despite this precaution, more lung cancers were noted in the beta-carotene group than the no beta-carotene group, mostly in former smokers.¹²
- Sustained high intake of beta-carotene can cause yellowing of the skin.²⁶

The NICE Guideline on acute coronary syndromes (NG185) includes advice on antioxidant supplements when discussing lifestyle changes after a myocardial infarction. It states 'Advise people not to take supplements containing beta-carotene. Do not recommend antioxidant supplements (vitamin E and/or vitamin C) or folic acid to reduce cardiovascular risk'.²⁷ The evidence base included data showing that beta-carotene supplementation may increase cardiovascular deaths in those that have had a myocardial infarction.²⁸

A Cochrane review that investigated antioxidant supplements for preventing all cause mortality found no evidence to support their use for primary or secondary prevention. The authors reported that beta-carotene and vitamin E seem to increase mortality, and so may higher doses of vitamin A.²⁹

Self-management support

NICE recommend discussing lifestyle advice with people with AMD.⁸ Smoking is the main modifiable risk factor. It is a risk factor for new-onset AMD and for progression of existing AMD to advanced disease. Current smokers have a two to three-fold increased risk of developing AMD, and those with a genetic susceptibility are also more likely to develop AMD if they smoke.³⁰ Advise smokers to stop smoking as this reduces the risk of AMD progression.¹⁵ There is likely to be value in smoking cessation interventions to reduce the risk of AMD progression.¹⁶

Encourage the person to eat a healthy, balanced diet - one that has a low glycaemic index and is rich in fruits, green leafy vegetables, and fish high in omega-3 fatty acids.¹⁵

Also advise the person to modify cardiovascular risk factors, including lowering cholesterol and saturated fat intake and controlling hypertension. Although there is no firm evidence that this helps to slow the progression of AMD, it is sensible and is unlikely to do any harm.¹⁵

People with AMD should be made aware of sources of practical and emotional support.⁸ Although it is anticipated that people diagnosed with AMD will receive information about their condition from secondary care, if necessary, consider offering supporting information and signposting to further resources.¹⁵ This might include information about:

- Lifestyle interventions, as discussed above.
- Driving - people with AMD may still be able to drive. It is the person's legal responsibility to check whether their eyesight is good enough to drive. If in doubt, consult [Assessing fitness to drive - a guide for medical professionals](#) from the DVLA. If AMD affects both eyes the person must inform DVLA.
- When, where, and how to seek help with vision changes - advise people with late AMD (dry), or people with AMD who have been discharged from hospital eye services to:
 - » Self-monitor their AMD (e.g. using an [Amsler grid](#))
 - » Consult their eye-care professional as soon as possible if their vision changes. If the person develops a sudden change in vision or develops symptoms in the second eye, they should present as soon as possible to Eye Casualty, or obtain an urgent appointment in a specialist eye clinic.
 - » Continue to attend routine sight tests with their community optometrist.¹⁵

- In addition to any locally available services, ensure that people are aware of:
 - » The Macular Society (www.macularsociety.org 0300 3030111), who offer information resources, a helpline, signposting, local support groups and counselling.
 - » The Royal National Institute of Blind People, who have information about AMD on their website and run a helpline (www.rnib.org.uk 0303 123 9999).

Advice for people that want to take an antioxidant supplement for AMD

Antioxidant supplements for AMD are not recommended for prescribing.¹ This is because their benefits (and how any benefits balance with their potential risks) are not yet clearly established.

Antioxidant supplements marketed for eye health are available for purchase. People that wish to purchase them should discuss the pro and cons of taking them their health care professional before they do so. They should be made aware of the following:

- The current evidence (which has some important limitations) suggests a benefit of antioxidant supplements in slowing the progression of AMD in those that already have the condition with:
 - » Intermediate AMD in at least one eye, or
 - » Advanced AMD in one eye (but not the other).^{11,15}

Be aware that people in these groups may have been advised to take an antioxidant supplement by their consultant ophthalmologist.¹⁵

- Even in these groups any treatment benefit is likely to be modest.¹¹
- The evidence does not support antioxidant supplement use for:
 - » People with less than intermediate AMD^{11,15} or
 - » Preventing AMD from developing in the first place (primary prevention).^{15,24}
- The ingredients of antioxidant supplements marketed for eye health vary and should be checked carefully. The two supplement combinations that have been studied the most are known as the AREDS and AREDS2 formulas.
 - » The AREDS formula contains beta-carotene 15mg, vitamin C 500mg, vitamin E 400 IU, zinc 80mg and copper 2mg.¹¹
 - » The AREDS2 formula contains the same amounts of vitamin C, vitamin E and copper. However beta-carotene is replaced with lutein 10mg and zeaxanthin 2mg. A lower dose of zinc (25mg) may be included.^{13,15}
 - » Some information sources no longer recommend beta-carotene containing antioxidant supplements for this indication at all. Experts now generally recommend the AREDS2 formula.^{15,21}
- Taking supplements is not risk-free. For example:
 - » Beta-carotene has been found to increase the risk of lung cancer in people who smoke or have been exposed to asbestos, and should be avoided in these groups.²⁶
 - » Former smokers should also avoid the beta-carotene containing AREDS formula, as a higher incidence of lung cancer has been observed in this group.¹²
 - » Zinc supplementation has been associated with a small increase in the risk of admission to hospital due to bladder problems such as urinary tract infection, prostatic hyperplasia (enlargement of the prostate in men) and stress incontinence in women.^{11,15}
 - » Vitamin E has been linked with an increased risk of heart failure in people with diabetes or vascular disease.²⁵
 - » Supplements can sometimes interact with other medication, which the person's health care professional will need to consider.

PrescQIPP resources include [patient leaflets](#) that explain why certain medicines (including antioxidant supplements for AMD) are included in the NHS England Items which should not routinely be prescribed in primary care guidance.

Costs and savings

Data from (NHSBSA Dec 2024 – Feb 2025) and Public Health Scotland Dec 2024 – Feb 2025)

A number of antioxidant supplements marketed for eye health are available. Some have formulas that match or closely resemble the AREDS formula (e.g. Preservision tablets, Preservision Original capsules) and the AREDS2 formula (e.g. Viteyes 2 Formula capsules, Viteyes 2 softgel capsules). There are various other marketed products that contain some of the same constituents but in different doses and/or with additional ingredients.

Example costs for some of the more frequently prescribed products are given in table 3. It should be noted that even if the cost per person is perceived to be small, use across the large potential population could have a significant resource impact.¹⁶

Table 3: Example eye health antioxidant supplements and prices

Product		Recommended daily dose (RDD)	Content in RDD	Resembles AREDS/AREDS2 formula	NHS indicative price per 28 days ³¹	Retail price per 30 days ³²
Products containing Beta-carotene	Preservision Original capsules	1 capsule in the morning and 1 capsule in the evening ³³	Vitamin C 452mg, Vitamin E 268mg alpha-tocopherol (equivalent to 400 IU Vitamin E), Zinc 69.6 mg, Vitamin A 2864 micrograms RE (equivalent to approximately 6mg beta-carotene), copper 1.6mg ³³	Resemble AREDS formula	£9.23	£16.03 ³³
	Visionace tablets	1 tablet daily ³⁴	Ingredients include Beta-carotene 3mg, Lutein esters 4mg, Vitamin E 60mg alpha-tocopherol, Vitamin C 150mg, Zinc 15mg, Copper 1000 micrograms. Product also contains multiple other ingredients including Vitamin D and various B vitamins. See product nutritional information for details. ³⁴	No	£4.62	£8.25 ³⁴
Products that do not contain beta-carotene	ICaps one a day tablets	1 tablet daily ³⁵	Vitamin A 800 micrograms, Vitamin E 50mg, Vitamin C 125mg, Vitamin B2 (Riboflavin) 1.4mg, Zinc 20mg, Copper 1,000 micrograms, Manganese 2mg, Selenium 55 micrograms, Lutein/Zeaxanthin 10mg ³⁵	No	£11.96	£19.50 ³⁵
	MacuShield Original+ capsules	1 capsule daily ³⁶	Marigold extract 157mg, Meso-zeaxanthin 10mg, Lutein 10mg, Zeaxanthin 2mg, Vitamin B2 (Riboflavin) 0.3mg ³⁶	No	£10.22 (30 pack) £8.36 (90 pack)	£18.33 (30 pack) £45.91 (90 pack)
	Macushield Gold capsules	3 capsules daily ³⁷	Marigold extract 157mg, Meso-zeaxanthin 10mg, Lutein 10mg, Zeaxanthin 2mg, Zinc 25mg, Vitamin C (L-ascorbic acid) 500mg, Vitamin E (d-alpha tocophreol) 268mg, Copper 2mg ³⁷	Resemble AREDS2 formula (may include additional ingredients)	£16.32	£29.99

Product		Recommended daily dose (RDD)	Content in RDD	Resembles AREDS/AREDS2 formula	NHS indicative price per 28 days ³¹	Retail price per 30 days ³²
Products that do not contain beta-carotene	Nutrof Total capsules	1 capsule daily ³⁸	Lutein 10mg, Zeaxanthin 2mg, Resveratrol 1mg, Vitamin C 60mg, Vitamin D3 5 micrograms, Vitamin E 10mg, Zinc 10mg, Copper 500 micrograms, Selenium 25 micrograms, Omega 3 fatty acids quantity not stated (see patient information leaflet for further information) ³⁸	No	£10.89	£16.99 ³⁸
	Ocuvite Complete capsules	1 capsule twice daily ³⁹	Lutein 10mg, Zeaxanthin 2mg, Vitamin C 180mg, Vitamin E 30mg, Zinc 15mg, Fish oil (providing omega 3) 843mg ³⁹	No	£8.79	£14.95 ³⁹
	Ocuvite Lutein capsules	1 capsule daily ⁴⁰	Vitamin C 60mg, Vitamin E 20mg, Zinc 15mg, Copper 2,000 micrograms, Lutein 6mg ⁴⁰	No	£5.13	£9.00 ⁴⁰
	Preservision Lutein capsules	2 capsules daily ⁴¹	Lutein 10mg, Vitamin C 452mg, Vitamin E 268mg, Zinc 69.6mg, Copper 1,600 micrograms ⁴¹	Resemble AREDS2 formula	£9.23	£16.00 ⁴¹
	Viteyes 2 softgel capsules	2 capsules daily ⁴²	Vitamin C 500mg, Vitamin E (as dl-Alpha Tocopheryl Acetate) 400 IU (268mg α-TE), Zinc 25mg, Lutein 10mg, Zeaxanthin 2mg, Copper (as Copper Oxide) quantity not stated ⁴²	Resemble AREDS2 formula (may include additional ingredients)	£12.24*	£18.33 ^{*42}
	Viteyes 2 capsules	2 capsules daily ⁴³	Vitamin C 500mg, Vitamin E (as d-Alpha Tocopheryl Succinate) 400 IU (268mg α-TE), Zinc 25mg, Lutein 10mg, Zeaxanthin 2mg, Copper (as Copper Oxide) quantity not stated ⁴³	Resemble AREDS2 formula (may include additional ingredients)	£13.35*	£20.00 ^{*43}
	Viteyes 2 Advanced capsules	2 capsules daily ⁴⁴	Vitamin C 500mg, Vitamin E (as d-Alpha Tocopheryl Succinate) 400 IU (268mg α-TE), Zinc 25mg, Lutein 10mg, Zeaxanthin 3.5mg, Bilberry Extract 40mg, Grape Seed Extract 50mg, Alpha Lipoic Acid 50mg, Selenium 200 micrograms, Copper (as Copper Oxide) quantity not stated ⁴⁴	Resemble AREDS2 formula (may include additional ingredients)	£15.35*	£23.00 ^{*44}

***Only available in three month pack**

Tables 4 and 5 illustrate the three month spend on antioxidant supplements for AMD, potential annual savings and savings per 100,000 population by 100% deprescribing of antioxidant supplements.

Table 4. Latest 3 month spend on antioxidant supplements for AMD by country

	Latest 3 months spend
England	£64,576
Wales	£7,108
Northern Ireland	£1,913
Isle of Man	£65
Scotland	£5,000
Total	£78,662

A 100% reduction in the prescribing of antioxidant vitamins marketed for eye health could release savings of approximately £314,648 annually across England, Wales, Northern Ireland, Isle of Man and Scotland. **This equates to £418 per 100,000 population.** Table 5 outlines these potential savings by country and savings per 100,000 population.

Table 5. Potential 12 month cost avoidance on antioxidants supplements for AMD by country

	12 months cost avoidance (100% reduction in spend)	12 months cost avoidance per 100,000 population
England	£258,304	£405
Wales	£28,430	£861
Northern Ireland	£7,653	£371
Isle of Man	£261	£291
Scotland	£20,000	£332
Total	£314,648	£418

Organisations considering a review of prescribing of these products should ensure that a process for deprescribing is agreed locally with key stakeholders including GPs, ophthalmologists and other relevant healthcare professionals. The process should include a discussion with the patient about the reasons for discontinuing the prescribing of antioxidant vitamins for AMD. The points included in the 'Advice for people that want to take an antioxidant supplement for AMD' above may be useful for such discussions. Those intending to continue taking supplements by purchasing them should be advised to ensure that the product they purchase matches the AREDS2 formula.^{15,21} Organisations should ensure that their medicines formularies are up to date and do not recommend the prescribing of these supplements.

Summary

Evidence supporting antioxidant supplements in slowing AMD progression comes primarily from two studies, AREDS and AREDS2.^{11,12} Whilst some of the data suggests a modest benefit, NICE do not consider the evidence to be definitive because of reservations about these studies. There is also concern that the high doses of vitamins and minerals contained in these supplements may potentially cause harm in some people. Further study into antioxidant supplements in AMD is required before they can be recommended for prescribing.⁸ People that wish to purchase these supplements should discuss which products to purchase, the risks and potential benefits of treatment with their health care professional before taking them.

References

1. NHS England. Items which should not routinely be prescribed in primary care: policy guidance. Published: 3 August 2023, last updated 30 August 2024. <https://www.england.nhs.uk/long-read/items-which-should-not-routinely-be-prescribed-in-primary-care-policy-guidance/>
2. Clinical Knowledge Summary. Macular degeneration - age-related. Summary section. Last revised in August 2022. <https://cks.nice.org.uk/topics/macular-degeneration-age-related/>
3. RNIB website. Eye conditions, Age-related macular degeneration (AMD) section. Accessed 18/04/2024. <https://www.rnib.org.uk/your-eyes/eye-conditions-az/age-related-macular-degeneration-amd/>
4. The Royal College of Ophthalmologists. Commissioning Guidance. Age Related Macular Degeneration Services. Published May 2024. <https://www.rcophth.ac.uk/resources-listing/commissioning-guidance-age-related-macular-degeneration-services/>
5. National Eye Institute website. Age-Related Macular Degeneration (AMD) section. Last updated 22 June 2021. <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/age-related-macular-degeneration>
6. BMJ Best Practice. Age-related macular degeneration. Last updated 29 May 2024. <https://bestpractice.bmj.com/topics/en-gb/554>
7. Macular Society website. Wet age-related macular degeneration (AMD) section. Last reviewed March 2022. <https://www.macularsociety.org/macular-disease/macular-conditions/wet-age-related-macular-degeneration/>
8. NICE. Age-related macular degeneration. NICE guideline [NG82]. Published: 23 January 2018. <https://www.nice.org.uk/guidance/ng82>
9. Macular Disease Foundation Australia. Stages of AMD. Accessed 10/04/2024. <https://www.mdfoundation.com.au/about-macular-disease/age-related-macular-degeneration/stages-of-amd/>
10. Evans JR, Lawrenson JG. Antioxidant vitamin and mineral supplements for slowing the progression of age-related macular degeneration. Cochrane Database of Systematic Reviews 2023, Issue 9. Art. No.: CD000254. <https://doi.org/10.1002/14651858.CD000254.pub5>
11. Age-Related Eye Disease Study Research Group. A Randomized, Placebo-Controlled, Clinical Trial of High-Dose Supplementation With Vitamins C and E, Beta Carotene, and Zinc for Age-Related Macular Degeneration and Vision Loss: AREDS Report No. 8. Arch Ophthalmol 2001;119(10):1417-1436. <https://doi.org/10.1001/archophth.119.10.1417>
12. The Age-Related Eye Disease Study 2 (AREDS2) Research Group. Lutein + Zeaxanthin and Omega-3 Fatty Acids for Age-Related Macular Degeneration: The Age-Related Eye Disease Study 2 (AREDS2) Randomized Clinical Trial. JAMA 2013;309(19):2005-2015. <https://doi.org/10.1001/jama.2013.4997>
13. National Eye Institute website. AREDS/AREDS2 Frequently Asked Questions section. Last updated 19 November 2020. <https://www.nei.nih.gov/research/clinical-trials/age-related-eye-disease-studies-aredsareds2/aredsareds2-frequently-asked-questions>
14. RNIB website. Antioxidant vitamins for age-related macular degeneration section. Last reviewed 01/09/2022. <https://www.rnib.org.uk/your-eyes/eye-conditions-az/antioxidant-vitamins-for-age-related-macular-degeneration/>
15. Clinical Knowledge Summary. Macular degeneration - age-related. Scenario: Confirmed age-related macular degeneration section. Last revised in August 2022. <https://cks.nice.org.uk/topics/macular-degeneration-age-related/management/confirmed-amd/>
16. NICE. Age-related macular degeneration: diagnosis and management (full NICE guideline) [NG82]. Published 23 January 2018. <https://www.nice.org.uk/guidance/ng82/evidence>
17. All Wales Medicines Strategy Group. Medicines Identified as Low Priority for Funding in NHS Wales – Paper 1. Published October 2017. Last updated November 2019. <https://awttc.nhs.wales/files/guidelines-and-pils/medicines-identified-as-low-priority-for-funding-in-nhs-wales-november-2019-update-pdf>

18. All Wales Medicines Strategy Group. Medicines Identified as Low Priority for Funding in NHS Wales – Paper 2. Published December 2018. Last updated September 2022. <https://awttc.nhs.wales/files/guidelines-and-pils/medicines-identified-as-low-priority-for-funding-in-nhs-wales-paper-2/>
19. All Wales Medicines Strategy Group. Items Identified as Low Value for Prescribing in NHS Wales – Paper 3. Published February 2020. Last updated March 2022. <https://awttc.nhs.wales/files/guidelines-and-pils/items-identified-as-low-value-for-prescribing-in-nhs-wales-paper-3-v4-pdf/>
20. Department of Health, Northern Ireland. Strategic Planning and Performance Group. Deprescribing: Limited Evidence List and Stop List. Published February 2025. <https://niformulary.hscni.net/deprescribing/prescribing-stop-list/>
21. Flaxel CJ, Adelman RA, Bailey ST, et al. Age-Related Macular Degeneration Preferred Practice Pattern. *Ophthalmology* 2020;127(1):P1-P65. <https://doi.org/10.1016/j.ophtha.2019.09.024>
22. National Eye Institute website. Age-Related Eye Disease Studies (AREDS/AREDS2) section. Last updated 27 December 2024. <https://www.nei.nih.gov/research/clinical-trials/age-related-eye-disease-studies-aredsareds2>
23. Waugh N, Loveman E, Colquitt J et al. Treatments for dry age-related macular degeneration and Stargardt disease: a systematic review. *Health Technol Assess* 2018;22(27):1-168. <https://doi.org/10.3310/hta22270>
24. Evans JR, Lawrenson JG. Antioxidant vitamin and mineral supplements for preventing age-related macular degeneration. *Cochrane Database of Systematic Reviews* 2017, Issue 7. Art. No.: CD000253. <https://doi.org/10.1002/14651858.CD000253.pub4>
25. Lonn E, Bosch J, Yusuf S et al, HOPE and HOPE-TOO Trial Investigators. Effects of long-term vitamin E supplementation on cardiovascular events and cancer: a randomized controlled trial. *JAMA* 2005;293(11):1338-47. <https://doi.org/10.1001/jama.293.11.1338>
26. Expert Group on Vitamins and Minerals. Safe Upper Levels for Vitamins and Minerals. Issued May 2003. <https://cot.food.gov.uk/sites/default/files/vitmin2003.pdf> Accessed 18/04/2024.
27. NICE. Acute coronary syndromes. NICE guideline [NG185] Published: 18 November 2020. <https://www.nice.org.uk/guidance/ng185>
28. NICE. NG185 Appendix J (2013 evidence reviews): MI - Secondary prevention in primary and secondary care for patients following a myocardial infarction. Partial update of NICE CG48. Methods, evidence and recommendations. November 2013. <https://www.nice.org.uk/guidance/ng185/evidence>
29. Bjelakovic G, Nikolova D, Gluud LL et al. Antioxidant supplements for prevention of mortality in healthy participants and patients with various diseases. *Cochrane Database of Systematic Reviews* 2012, Issue 3. Art. No.: CD007176. <https://doi.org/10.1002/14651858.CD007176.pub2>
30. Clinical Knowledge Summary. Macular degeneration - age-related. Risk factors section. Last revised in August 2022. <https://cks.nice.org.uk/topics/macular-degeneration-age-related/background-information/risk-factors/>
31. NHS Prescription Services. dm&d browser, accessed 31/05/2025. <https://services.nhsbsa.nhs.uk/dmd-browser/>
32. C&D data. Accessed 21 November 2024. <https://www.cddata.co.uk/>
33. 365 Pharmacist. Preservision original soft gels. <https://www.365pharmacist.co.uk/products/preservision-original-soft-gels> Accessed 17/06/2025.
34. Vitabiotics website, Visionace Original. https://www.vitabiotics.com/products/visionace-original-tablets?_gl=1*b872wk*_up*MQ..*_gs*MQ..&gclid=EAlalQobChMI5ZXjno76igMVqZVQBh0sgwiTEAAYASAAEgJzvfD_BwE Accessed 17/06/2025.
35. Butterflies Eyecare website, ICaps. https://www.butterflies-eyecare.co.uk/products/icaps?srsId=A_fmBOor2JDnksSsGrV4jqZOMyPAQKK2pZpviJKWubmeg-cuB-xrO16w7&variant=48719637315888 Accessed 17/06/2025.

36. MacuShield website, MacuShield Original+. <https://uk.macushield.com/products/macushield-original/> Accessed 17/06/2025.
37. MacuShield website, MacuShield Gold. <https://uk.macushield.com/products/macushield-gold/#> Accessed 17/06/2025.
38. Thea website, Nutrof Total. <https://www.youreyehealth.co.uk/products/nutrof-total?srsId=AfmBOosZmlOIVAsAG3d1PjT55p3MM6jzbVFQ5Z9AotirwckXHUv7IT&variant=42110306910359> Accessed 17/06/2025.
39. Butterflies eyecare website, OcuVite Complete. https://www.butterflies-eyecare.co.uk/products/ocuvite-complete?_pos=7&_sid=358ae09a6&_ss=r&variant=48719643738416 Accessed 17/06/2025.
40. Butterflies eyecare website, OcuVite Lutein. https://www.butterflies-eyecare.co.uk/products/ocuvite-lutein?_pos=1&_sid=1d3656fbd&_ss=r&variant=48719644066096 Accessed 17/06/2025.
41. Butterflies eyecare website, Preservision Lutein. https://www.butterflies-eyecare.co.uk/products/preservision-lutein-softgels?_pos=1&_sid=22057e97b&_ss=r&variant=48719645245744 Accessed 17/06/2025.
42. Butterflies eyecare website, Viteyes 2 softgels. https://www.butterflies-eyecare.co.uk/products/viteyes-2-softgels?_pos=1&_sid=a81005145&_ss=r&variant=48719647768880 Accessed 17/06/2025.
43. Butterflies eyecare website, Viteyes 2 capsules. <https://www.butterflies-eyecare.co.uk/products/viteyes-2-capsules?variant=48719647899952> Accessed 17/06/2025.
44. Butterflies eyecare website, Viteyes 2 Advanced. https://www.butterflies-eyecare.co.uk/products/viteyes-2-advanced?_pos=3&_sid=a81005145&_ss=r Accessed 17/06/2025.

Additional PrescQIPP resources

Including
implementations
resources and data

<https://www.prescqipp.info/our-resources/bulletins/bulletin-368-antioxidant-vitamins-for-AMD/>

Information updated by Lindsay Wilson, PrescQIPP C.I.C. June 2025, and reviewed by Katie Smith, PrescQIPP CIC, June 2025. Non-subscriber publication July 2026.

Contact <https://prescqipp.info/help/> with any queries or comments related to the content of this document.

This document represents the view of PrescQIPP CIC at the time of publication, which was arrived at after careful consideration of the referenced evidence, and in accordance with PrescQIPP's quality assurance framework. The use and application of this guidance does not override the individual responsibility of health and social care professionals to make decisions appropriate to local need and the circumstances of individual patients (in consultation with the patient and/or guardian or carer).

[Terms and conditions](#)