

**Diet can play a role in good eye health. Studies suggest that diet is important in reducing the risk of Macular Degeneration (MD) and in slowing its progression. Eating a healthy well-balanced diet, high in antioxidants, vitamins and other nutrients can help keep our eyes healthy. If you are concerned you are not getting enough nutrients in your diet, you may consider using a supplement in consultation with your doctor.**

## Nutrition

### Antioxidants

Antioxidants are important to our health and are found in the foods we eat. When your cells turn food and oxygen into energy they also produce free radicals. These are thought to be a contributing factor in the cause of MD and other diseases. If your system is operating at peak health the free radicals are neutralised by antioxidants before they can cause any damage.

### Lutein and Zeaxanthin

Lutein and zeaxanthin are particularly important antioxidants for eye health. They are present in high concentrations in a healthy macula and help to protect the eye. Lutein and zeaxanthin are found in dark green leafy vegetables such as spinach, silver beet and turnip greens as well as naturally yellow fruit and vegetables such as sweet corn and capsicum.

### Vitamin C

Vitamin C is necessary for the normal structure and function of connective tissue. It is found in citrus fruit, broccoli, capsicum and tomatoes.

### Vitamin E

Vitamin E has an important role in protecting cells from the damage caused by free radicals. It is found in nuts, wheat germ, whole grains and green leafy vegetables.

### Zinc

Zinc contributes to the structure of skin and wound healing and is necessary for the structure and function of cells. It is found in meat, seafood (especially oysters), seeds, nuts and whole grains.

### Selenium

Selenium is necessary for cell protection from some types of damage caused by free radicals. It enables the other antioxidants such as vitamin E and C to function more efficiently. It is found in nuts with especially high levels in Brazil nuts.



## Other Important Nutrients for Eye Health

### Omega-3 Fatty Acids

Omega-3 fatty acids are important to eye health. They are found in high levels in the retina and are involved in cell renewal and development. They can be found in high concentrations in oily varieties of fish such as salmon, tuna, anchovies and sardines.

Research suggests that eating fish 2-3 times a week can reduce your risk of developing MD and may help slow down the progression.

**Any changes to diet and lifestyle should be undertaken in consultation with your doctor**

## Key Eye Health Nutrients

Nutrient	Recommended Daily Intake (women-men)*	Examples of Food	Contains***
<b>Lutein and Zeaxanthin</b>	6mg**	75g cooked spinach	8.5mg
		1/2 cup peas	1.1mg
		1 small cob corn	0.7mg
<b>Vitamin C</b>	45mg	1 medium orange	69mg
		1/4 cup capsicum	47mg
<b>Vitamin E</b>	7-10mg	1 tablespoon wheat germ	2.2mg
<b>Zinc</b>	8-14mg	100g oysters	59mg
		1/2 cup rice bran	3.5mg
<b>Selenium</b>	60-70µg	30g Brazil nuts	543µg
		30g cashew nuts	5.6µg
<b>Omega-3</b>	0.9-1.6g	100g salmon	1.8g
		100g sardines	0.9g
		100g tuna	0.2g

\* National Health and Medical Research Council (NHMRC)

\*\* There is no standard intake for lutein; 6mg is the accepted amount in lutein supplements

\*\*\* [www.nal.usda.gov](http://www.nal.usda.gov)

**Note:** The Recommended Daily Intake (RDI) refers to the amount of a specific nutrient (vitamins, minerals, energy or protein) considered adequate to meet the nutritional requirements of healthy people. The RDI was formulated as a way to help prevent nutritional deficiency diseases in healthy people, and it should be remembered that the RDI does not address the extraordinary needs of people who smoke, suffer from ill health, or are on medication.

## Frequently Asked Questions

### My GP has recommended that I should not eat spinach due to my medications. Are there other sources of lutein?

Spinach contains the highest level of lutein but there are lots of other options if you have been advised not to eat spinach. Other examples of foods that contain lutein include peas, corn, broccoli and Cos lettuce. If you cannot get lutein from your natural diet you could consider taking a lutein supplement.

### I thought carrots were the best food for our eyes?

The best nutrient for our eyes is lutein which is found in dark green leafy vegetables, especially spinach. Carrots are not the best food for eye health, though they are a very good source of vitamin A which is good for eyes and general health.

### Should I cook vegetables or eat them raw?

Shredding your vegetables and cooking with a small amount of oil improves your body's ability to absorb the nutrients. Whether it's fresh, frozen or dried all vegetables and fruits are good for you.

### What if I have trouble eating nuts whole?

Consider crushing or grinding nuts and then sprinkle over food.

### What about seeds?

Seeds such as flax seeds (linseeds) are often recommended by nutritionists for their high essential fatty acid content. However their relationship to MD has not been studied.

### I heard margarine is bad for your eyes, is this true?

The Foundation recommends that you limit your intake of fats as part of a general healthy approach to diet. In Australia doctors disagree about the role of margarine and oils in relation to MD and more research is required.



## Supplements

Supplements are vitamins, minerals or other substances taken in addition to the diet. Supplements can play an important role in eye health, though it is important to speak to a health care professional about the most appropriate for your individual needs.

### The AREDS Study

A supplement based on the Age Related Eye Disease Study No. 8 (AREDS) is the most appropriate to take for those diagnosed with MD. AREDS was a major clinical trial conducted by the National Eye Institute in the USA. The results were published in October 2001 in the journal, *Archives of Ophthalmology*.

The study evaluated the effects of antioxidants and zinc on the progression of age-related MD and identified a specific formula that produced the best outcomes.

#### What is the AREDS Formula?

The specific daily amounts of antioxidants and minerals used by the AREDS study researchers were:

- Vitamin C 500mg
- Vitamin E 400iu
- Beta-carotene 15mg\*
- Zinc 80mg
- Copper 2mg

#### \* Important note on beta-carotene:

People who smoke, suffer from lung cancer or asbestosis should not take a supplement that contains beta-carotene. This is the reason it has been omitted from some products.

#### What were the Results?

The study showed that for those in the intermediate stage of MD in one or both eyes or the late stage of MD in one eye, taking supplements containing high levels of antioxidants and zinc significantly reduced the risk of progression of the disease and delayed visual loss:

- Those with intermediate stage MD reduced their risk of progression by approximately 25%
- Those with late stage MD reduced their risk of progression by approximately 20%

The study was not designed to answer whether high dose antioxidants and zinc are of benefit for those with **no** signs of MD or those with advanced disease in both eyes. In addition to the study formulation most people also took a daily multi-vitamin.

Please remember supplements are not a cure for MD. The AREDS study shows taking the AREDS formula may slow the rate of degeneration; it does not stop or reverse damage caused by the disease. The impact of taking a high dose antioxidant and zinc combination supplement for greater than six years is not known.

### AREDS II

The Age-Related Eye Disease Study II (AREDS II) clinical trial has commenced in the USA and will be conducted over seven years. The objective of AREDS II is to evaluate the effect of lutein/zeaxanthin and/or omega-3 on the progression of MD to advanced stages. The trial will also look at removing beta-carotene and decreasing the original levels of zinc in the AREDS I formula.

### Lutein Supplements

Lutein is a particularly important antioxidant for eye health. If your diet is low in lutein-rich foods such as dark green leafy vegetables, a supplement may be appropriate. For those who do not have MD but are over 50 or with a family history of the disease; a lutein supplement is appropriate.





## Frequently Asked Questions

### Why take the AREDS formula as a supplement and not through diet?

In general, eating a balanced diet is the best way to obtain your nutrients. However, where high dose antioxidants are used to treat disease, supplements may be the only way to get the right amounts. For example, to get the same quantities as the AREDS formula you would need to eat around 135g of oysters, 7 oranges and 123 tablespoons of wheat germ every day.

### Are there reasons people should be cautious when considering the AREDS formula?

Yes. There are reasons to be cautious in using high dose vitamins and minerals. They can interfere with medications and other nutrients so it is important to follow the advice of your doctor.

### Which product should I buy?

There are many supplement products on the market containing the AREDS formula. The most important thing is to check the label and make sure that the product you buy contains the exact AREDS formula from the study, either in taking one or two capsules daily. Remember that beta-carotene has been removed from some products and this is supported by the Foundation.

It is also important to check the labels of any lutein supplement products to ensure that you are aware of all the ingredients it contains. Your optometrist or your ophthalmologist can recommend a specific product.

### I have not been diagnosed with MD; what is the best supplement for me?

If your diet is low in lutein-rich foods, such as green and yellow vegetables; a lutein supplement should be considered.

### I don't like fish, is taking a fish oil supplement just as good?

Most of the research has studied actual fish consumption rather than fish oil (omega-3) supplements. However, it is commonly accepted that fish oil supplements would offer similar benefits.

### Can bilberry supplements reduce my risk of MD?

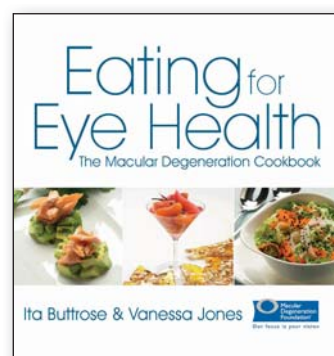
At this stage, no studies have been conducted into the benefits of bilberry.

## Eye Health Checklist\*

- Have your eyes tested and make sure the macula is checked.
- Don't smoke.
- Keep a healthy lifestyle, control your weight and exercise regularly.
- Eat fish two to three times per week, dark green leafy vegetables and fresh fruit daily and a handful of nuts per week. Limit your intake of fats.
- In consultation with your doctor, consider taking an appropriate supplement.
- Protect your eyes from the sun, especially when young.

\* Any changes in diet or lifestyle should be undertaken in consultation with your doctor

**The MD Foundation's *Eating for Eye Health* cookbook shows you how to include eye health-friendly foods in your diet – it features over 80 delicious recipes for every meal occasion.**



## Important Notes on Diet and Supplements

Before taking a supplement consult your doctor. Be sure to inform them of your medical condition(s) and if you are taking any other medications, or vitamin or mineral supplements. They will determine which formulation and dosages are best for you. When you purchase a supplement check the label and make sure it contains the correct formula you have been advised to take.

Remember that people who smoke, suffer from lung cancer or asbestosis should not take a supplement with beta-carotene. This is the reason it is not in all supplement products.



Our focus is your vision

For further information and support call the MD Foundation's helpline **1800 111 709** or visit **[www.mdfoundation.com.au](http://www.mdfoundation.com.au)**

**DISCLAIMER:** The Macular Degeneration Foundation Ltd cannot be liable for any error or omission in this publication or for damages arising from its supply, performance or use, and makes no warranty of any kind, either expressed or implied in relation to this publication. May 2009