A considerable proportion of older people take fish oil supplements for a variety of reasons. Fish oil supplements have anti-inflammatory and antioxidant properties, and are marketed for a wide range of conditions, including general well-being, heart disease, stroke prevention, cognitive decline, mental health and temporary relief of symptoms of inflammatory conditions, including arthritis and eczema.

Polyunsaturated fatty acids (PUFAs) are essential fatty acids that cannot be synthesized in the body and must be obtained from the diet. There are two main subclasses:

- N-3 or omega-3 PUFAs
- N-6 or omega-6 PUFAs

The omega-3 PUFA group includes:

- Alpha-linolenic acid (ALA)
- Eicosapentaenoic acid (EPA)
- Docosahexaenoic acid (DHA)

The n-6 PUFA group includes linoleic acid, gamma-linolenic acid (GLA), dihomo-gamma-linolenic acid, and arachidonic acid.

The ideal balance of omega-3/omega-6 fatty acids is 1:2.3; however many people have a higher intake of omega-6 fatty acids from their diet.

**Dietary sources**

Guidelines recommend eating fish (fresh or canned) 2 or 3 times a week as part of an overall healthy eating plan. Fish oil supplements may be useful for people who do not meet the dietary requirements for fish intake.

Cold-water oily fish such as salmon, mackerel, halibut and herring are some of the best sources of fish oil, followed by crab, squid, octopus, oysters and mussels. ALA is derived from vegetable oils such as flaxseed and walnut oil.

**Cardiovascular disease**

The evidence of benefit of fish oil in the prevention and treatment of cardiovascular disease is inconsistent. The Heart Foundation suggests that people with cardiovascular disease consume a total of 1000 mg daily of EPA/DHA by eating 2 to 3 serves of fish a week or by using fish oil supplements.

Fish oil supplements may be useful for people with high triglyceride levels (hypertriglyceridaemia) if unable to tolerate or have a sub-optimal response to fibrates (fenofibrate, gemfibrozil). Fish oil supplements can be used in combination with fibrates. Doses of 1.2 to 3.6 g daily of total EPA/DHA are recommended to lower triglyceride levels. Fasting triglyceride concentrations are decreased by 20-50% with appropriate doses of fish oil.

In cases of mixed hyperlipidaemia in which a lipid abnormality is persistent or more severe, the Therapeutic Guidelines recommends a combination of a cholesterol-lowering drug and a triglyceride-lowering drug is necessary. Safe and effective combinations include statin plus fish oil, and fibrate plus ezetimibe. In numerous large trials of patients with multiple cardiovascular risk factors, daily treatment with omega-3 fatty acids did not reduce cardiovascular mortality and morbidity.

A recent trial using high-dose fish oil, 4G daily (1600 mg EPA/800 mg DHA), did not reduce atrial fibrillation (AF) recurrence in patients with a history of AF, compared to placebo.

**Arthritis**

Evidence suggests that fish oil supplements containing EPA and DHA are beneficial in arthritis; however in order to have a therapeutic effect, the correct dose must be administered. The Australian Therapeutic Guidelines recommends 2.7g of EPA and/or DHA daily to reduce joint inflammation associated with arthritis. Fish oil may take up to 3 months for maximal effectiveness in treating mild to moderate inflammatory joint pain.

A large meta-analysis of the analgesic effects of omega-3 fatty acid supplements for inflammatory joint pain showed a reduction in:

- Patient-reported joint pain
Duration of morning stiffness  
Number of painful/tender joints  
NSAID use

Many fish oil products are labelled as containing 1000mg; however the amount of DHA/EPA is usually only 300mg. Therefore 9 capsules are needed to be administered daily to meet the recommended intake of 2.7g. High-strength capsules and liquid are available, reducing the amount administered to 4 capsules and 5mL daily, respectively.

Dry eyes
A recent meta-analysis of high quality published studies suggests that fish oil supplementation can play a beneficial role in dry eye syndrome treatment, especially for the improvement of dry eye symptoms and ocular inflammation.

Even short-term consumption has a benefit. Omega-3 fatty acids (180 mg EPA/120 mg DHA twice daily for 30 days) is associated with a decrease in the rate of tear evaporation, an improvement in dry eye symptoms, and an increase in tear secretion.

A therapeutic trial of fish oil for one month is worth considering for residents with dry eyes, and quality of life may be improved.

Side effects and drug interactions
Fish oil supplements in doses of less than 2G daily are unlikely to cause major adverse events. Adverse effects have included burping, belching, dyspepsia, and an unpleasant aftertaste. Worsening blood glucose control has been reported in patients with diabetes taking large doses of fish oil.

High doses may increase the risk of bleeding and increase bleeding time by inhibiting platelet aggregation, especially if taken in conjunction with antiplatelets and anticoagulants.

Allergies
People with documented seafood allergy should avoid fish oil supplements. Reactions ranging from chest tightness, shortness of breath, tingling of upper extremities, flushing, and pruritus have been reported.

Other products
Numerous other products are available, often compared to fish oil e.g. krill oil, calamari oil and recently aquamin or red algae.

Krill oil contains about two-thirds the amount of EPA and DHA as fish oil, small amount of omega-6 fatty acids and significant amounts of omega-9 fatty acids.

Krill oil in appropriate doses probably has an anti-inflammatory effect but no proven cardiac effect.

Aquamin is calcium and magnesium-rich multi-mineral supplement from red algae seaweed with concentrated omega-3 DHA. It is marketed alone and in combination with krill oil. A small preliminary study suggests Aquamin may increase range of motion and walking distances in subjects with osteoarthritis of the knee and may allow partial withdrawal of NSAIDs over 12 weeks of treatment.

Summary
There is no question that omega-3 fatty acids are an important part of a healthy diet. There is no convincing evidence that fish oil supplements either prevent cardiovascular disease or improve outcomes in patients who already have it. The evidence supports a place in treating high triglyceride levels, mild inflammatory pain and dry eyes.

Further information

References
Nutrition Journal 2009;8:7