EXECUTIVE SUMMARY

Review of literature and resources relating to the health benefit of regular consumption of seafood as part of a healthy diet

CESSH
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SCIENCE SEAFOOD HEALTH

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Executive Summary

1.0
Evidence relating to health conditions and seafood consumption

The following provides an overview of evidence from studies published in peer-reviewed journals associated with seafood consumption and health. The level of evidence around each health issue was estimated using the following criteria:

A	High	■ Further research is very unlikely to change our confidence in the estimate of effect ■ Several high-quality studies with consistent results ■ In special cases: one large, high-quality multi-centre study
B	Moderate	■ Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate ■ One high-quality study ■ Several studies with some limitations
C	Low	■ Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate ■ One or more studies with significant limitations ■ Any estimate of effect is very uncertain
D	Very low	■ Expert opinion ■ No direct research evidence ■ One or more studies with very significant limitations

1.1 All cause mortality

- Regular fish consumption is associated with a significantly reduced risk of total mortality. (A)
- There is strong evidence that increased consumption of n-3 polyunsaturated fatty acids (PUFA) reduces the risk of all cause mortality. (B).
- 1-2 serves fish/wk (esp. those ⇧ in n-3 PUFA's) ⇩risk total mortality by 17% (A).

1.2 Arthritis

- Evidence that fish consumption is protective against rheumatoid arthritis, and ulcerative colitis in males. (A)
- Ingestion of n-3 fatty acid supplements has consistently shown improvement in joint tenderness and the amount of morning stiffness in those with rheumatoid arthritis.(B)
- Evidence that regular fish intake is beneficial in the management of inflammatory diseases.(B)
- Moderate to high intake of fish appears to be protective against rheumatoid arthritis.(B)

1.3 Asthma and allergies

- Fish consumption in the first year of life ⇩risk asthma and allergic rhinitis in childhood. (B)
- Risk of allergic rhinitis substantially ⇩ in children who had fish during the first year of life (Relative Risk (RR) 0.025) compared with children who had fish later in life (RR 0.060). (B)
- Early introduction to fish shows a consistent negative assoc. with the risk of allergic rhinitis. (B)
- Results suggest that early intake of fish protects against airway disease in early life. (B)
- For children born to mothers with a history of asthma, Odds Ratio (OR) for asthma was 0.20 when mothers ate oily fish at least once month during pregnancy compared with no consumption. (B)
- In contrast, fish sticks (source of trans fats) consumption during pregnancy increased asthma risk in children (OR 2.04). (B)

1.4 Cardiovascular disease (CVD) - overall

- 2-3 fish meals/wk is protective against CVD. (A)
- Adequate intake of Omega-3 fatty acids ⇩ incidence of CVD. (A)
- Fish is more beneficial than fish oil in combating CVD and all cause mortality. (C)
- Traditional fish-based diets appear to be protective against CVD. (B)

1.4.1 CVD - Cardiac conditions

- Fish intake is beneficial to heart health. (A)
- 1 serve fish/wk (20gm/day) ⇩risk of coronary heart disease (CHD). (A)
- 1-2 serves/wk (esp species high in n-3 PUFA's) reduces the risk of:
  - coronary death by 36% (A)
  - coronary heart failure by 20% (A)
  - arterial fibrillation (28% ⇩risk 1-4 /wk, 31% ⇩risk ≥5 /wk (A) and
  - myocardial infarction. (A)
- The risk of CHD is ⇩by 31% if 3-4 fish meals/wk and by 32% ⇩risk if consumed ≥ 5 /wk (A).
- Fish oil acids may reduce potentially fatal arrhythmias in people at high risk. (C)

1.4.2 CVD - Stroke

- 1 serve fish/wk (white or oily fish) ⇩risk of stoke. (A)
- 1-4 serves fish/wk ⇩risk ischemic stroke by 27% (A)
- ≥ 5 serves fish/wk ⇩risk ischemic stroke by 30% (A)
- 44% ⇧ risk of ischemic stroke if > 1serve/wk of fried or sandwich fish. (A)
- Oily fish intake significantly ⇩ in women who subsequently had a stroke. (A)

1.5 Cancer

- 30yr follow-up, men who ate no fish had a 2-3 fold higher frequency of prostate cancer than those who ate moderate or high amounts of fish. (A)
- ≥ 4 serves fish/wk associated with ⇩risk of prostate cancer (strongest assoc with metastatic cancer (RR=0.56) (A).
- Daily intake of marine fatty acids associated with 24% ⇩risk in metastatic cancer. (B)
- Slightly ⇩risk of colorectal cancer in fish consumers, more pronounced in women (B)
- Fish consumption assoc with ⇩risk of lung cancer mortality in males (independent of cigarettes, animal fat minus fish fat, vegetable and fruit consumption). (A)

1.6 Diabetes

- ⇧ consumption of fish assoc with ⇩risk of CHD in diabetic women. (A)
- ⇧ consumption of fish assoc with ⇩risk of islet autoimmunity precursor for Type 1 diabetes in children at increased risk of Type1 diabetes. (A)

1.7 Gender

1.7.1 Men

- 20% ⇩risk in total mortality assoc with ≥ 1 serve fish/wk in men. (A)
- Evidence fish consumption protective against CVD and chronic respiratory disease in males. (A)
- 30yr follow-up, men who ate no fish had a 2-3 fold higher frequency of prostate cancer than those who ate moderate or high amounts of fish. (A)
- Fish consumption assoc with ⇩risk of lung cancer mortality in males (independent of cigarettes, animal fat minus fish fat, vegetable and fruit consumption). (A)
- Men who consumed ≥ 1 serve fish/wk RR of sudden death of 0.48. (B)
- The influence of dominant male within the family unit should be considered in any intervention to increase regular seafood consumption. (C)

1.7.2 Women

- ⇧ consumption of fish assoc with ⇩risk of CVD (A) and colorectal cancer. (B)
- Women of childbearing age should consume ≥ 2 serves of fish /wk. (A)

1.8 Maternal

- Pregnant and lactating mothers should consume up to 12oz of a variety of fish each week (incl. shellfish low in mercury). (A)
- Fish consumption does not adversely affect infant gestation and birth size at a population level. (A)
- ≥ 340 g/wk maternal seafood intake beneficial to child cognitive development. (A)
- Low seafood intake during pregnancy could lead to adverse effects on neurodevelopment. (A)
- Occurrence of preterm delivery varied from 7.1% in group never consumed fish to 1.9% in those consuming fish at least once/wk. (A)
- Low consumption of fish was a strong risk factor for preterm delivery and low birth weight. (A)
- Small amounts of n-3 FA's (provided as fish or fish oil) protective against preterm delivery and low birth weight. (A)
- Fish sticks (source of trans fats) consumption during pregnancy ⇧ asthma risk in children (OR 2.04).(B)
- Nutritional education for pregnant women required. (C)
- Fish consumption assoc. with increased length of gestation in women with a low risk of adverse pregnancy outcomes. (C)
- High shellfish intake assoc. with ⇧ risk of small for gestational age births. (C)
- ⇧ intake maternal fish during pregnancy assoc with longer gestation, increased birth weight, reduced risk of intrauterine growth retardation and lower prevalence of pregnancy-induced hypertension. (C)

1.9 Mental health (including cognitive development)

- ≥ 340 g/wk maternal seafood intakes beneficial to child cognitive development. (A)
- Maternal intake of very-long-chain-fatty-acids during pregnancy and lactation may be favourable for mental development of children. (B)
- Compared with low intake (21mg/d), high intake (407mg/d) of n-3 fatty acids was assoc with fewer depressive symptoms in adults (OR 0.46). (B)
- An average intake of 400 mg/d of n-3 FA's may reduce depression. (C)
- Fish consumption may be associated with slower cognitive decline with age (C)
- Greater seafood consumption predicted lower lifetime rates of bipolar disorders. (C)
- There is limited evidence around seafood, fish oil or supplements in the management of attention disorders such as ADHD. However the evidence that is available is promising.1-6
- Brains of Alzheimer patients have lower DHA in gray matter. N-3 fatty acids retard the decline in cognition over time. (C)

1.10 Other issues

- Negative assoc between diet rich in fruit, veg and fish and the risk of Congestive Obstructive Pulmonary Disease (COPD) (A)
- Mercury levels in Alaskan women who had a ⇧ fish intake were well below World Health Organization effect levels. (C)
- National fish advisories overemphasis risks and undervalue the benefits of fish consumption. (C)
- Interventions seeking to promote seafood as an integral part of a healthy diet should address existing negative attitudes and beliefs around the storage and preparation of seafood. (C)
- The influence of dominant males within the family unit (whether child or adult) should be considered. (C)
- Strategies directed at parents and children should include experimental hands on components to encourage experimentation, particularly focussing on use of, preparation and the variety of lower cost seafood available. (C)
- Food involvement correlated positively with fish consumption intention and frequency. (C)
- Dietary fish and weight loss had significant independent and additive effects on 24 hour ambulatory blood pressure and heart rate in overweight persons. (C)

2.0
What are the health risks associated with eating fish and seafood?

- The level of pollutants in seafood, in general, was very low. (B)
- The benefits of seafood consumption far outweigh the risks associated with possible pollutants. (B)
- Fish low in mercury and high in omega-3 fatty acids are recommended. (B)
- Consumption of omega-3 fatty acids during pregnancy is essential for optimum foetus neural development. (A)

3.0
Consumer behaviour in relation to fish and seafood consumption

- Fish low in mercury and high in omega-3 fatty acids are recommended. (B)
- Consumption of omega-3 fatty acids during pregnancy is essential for optimum foetus neural development. (A)
- Perceived cost, freshness, quality, availability, taste and easy preparation were considered to be the main influences in consumer choice of fish and seafood products. (B)
- The lowest income households had the lowest fish consumption frequency. (B)
- The highly processed product varieties (battered and crumbed fish and fish in sauce dishes) were often popular among the families and perceived as easy and convenient to cook. (B)
- Odours common to fish and seafood often a deterrent to consumption. (B)
- Fresh fish and seafood preferred to alternative products (processed, smoked, canned and frozen products). (C)
- Bones and price influence purchase type but not intention to purchase. (C)
- The presence of children in the households led to lower fish consumption. (C)

4.0
Marketing and advertising

- Food advertising to children predominantly featured snack foods/fast foods and confectionary. (A)
- Modern marketing techniques had a strong influence on food choice. (B)
- Changing the food advertising environment within children's television viewing time to an environment where nutritious foods are promoted and less healthful foods unrepresented would lead to the normalisation and reinforcement of healthy eating.

5.0
A critical review of the current resources for General Practitioners (GPs) and Allied Health Professionals to use with patients on the health benefits of regular consumption of seafood as part of a healthy diet.

This component of the review focused on the collection and critical review of relevant resources that were available to General Practitioners (GPs) and Allied Health Professionals to use with patients as either a prevention or treatment measure for common lifestyle or medical conditions. All resources reviewed are designed to be used during a five to ten minute consultation.

The identification process realised 120 current resources associated with the health benefits of regular consumption of seafood as part of a healthy diet that could be used by GPs and Allied Health Professionals. The resource topics included arthritis (seven), cancer (six), dementia (one), dental health (two), diabetes (three), heart health (30), nutrition (40), osteoporosis (six) and preconception, pregnancy and breastfeeding (25).

The critical review of resources revealed information about the format, target group, reference to seafood, credibility and suitability of the identified resources. The majority (88.4%, n=106) of identified resources were available electronically as either PDF files or webpages, a preferable, quick and easy mode of access for GPs and Allied Health Professionals. Just over half (57.5%, n=69) of the identified resources were targeted at specific audiences. All of the resources made reference to the health benefits of regular consumption of fish (100%, n=120), 22.5% (n=27) made reference to seafood and 5% (n=6%) made reference to fish oil as part of a healthy diet.

Only 15% (n=18) of the identified resources were suitable for use with the general Australian population at or below the recommended reading level of Year Eight. The majority (87.5%, n=105) of the critically reviewed resources were found to be 'credible' or 'highly credible' based on the credibility criteria used in this research project. Resources that were found to be 'definitely not credible', 'not credible' or 'somewhat credible' (12.5%, n=15) were primarily due to information sources being commercial sources with competing interests.

In summary, the most pertinent outcome from this research was that only 15% (n=18) of the resources critically reviewed were suitable for use with the general Australian population at the recommended reading level of Year Eight or lower.

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