# Marine oil supplementation to improve pregnancy outcomes

## Biological, behavioural and contextual rationale

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**Corresponding intervention**

– Long chain polyunsaturated fatty acid supplementation during pregnancy

Omega-3 fatty acids are long-chain polyunsaturated essential fatty acids that are necessary for good health and development. Unlike omega-3 fatty acids from plant sources such as flaxseed and canola oils, fish oils and algae-derived marine oils contain the longer-chain docosahexaenoic (DHA) and eicosapentaenoic (EPA) acids. These are called essential fatty acids because the body cannot produce them independently, so they must be consumed in adequate amounts.

The prenatal period is a time of increased risk for omega-3 deficiency as maternal tissue stores tend to decline (1) as they are used for the developing fetus (2,3). Marine oil supplements are often recommended to pregnant women to fulfil their omega-3 requirements.

The use of marine oil supplements during pregnancy has been studied as a possible strategy to prevent preterm birth (or increase gestational age) and prevent eclampsia, as well as to increase birth weight along with other potential benefits such as improving fetal brain development, and reducing the risk of cerebral palsy and postpartum depression (4–7). The theories behind the studies on birth outcomes were originally developed based on the observations of high birth weight and long gestation in communities with high fish consumption (8–10).

The fatty acids DHA and EPA that are contained in marine oils are the precursors of prostaglandins, which have been shown to influence the constriction of blood vessels. Among pregnant women and non-pregnant adults, marine oils have been promoted as a treatment for hypertension, or high blood pressure (11). These same components of marine oil may also delay labour and thus potentially increase the length of pregnancy and increase birth weight by preventing the production of prostaglandins that encourage the cervix to ripen

(12).

Studies that have investigated these mechanisms and their potential health benefits for mothers and children have, however, been inconsistent in their results (4,5,10,13,14). The most encouraging conclusions from a recent systematic review suggest that although there is not yet enough evidence to support the routine supplementation with marine oil during pregnancy to reduce the risk of pre-eclampsia, preterm birth or low birth weight, pregnant women could benefit from marine oil supplementation as a means to increase the length of gestation (12).

Nutritional advice for pregnant women regarding marine oil consumption may be complicated with warnings that suggest limiting overall fish consumption. Fish are an important source of omega-3 fatty acids, however many types of fish may be potentially contaminated with methyl mercury or polychlorinated biphenyls (PCBs), which can be harmful to fetal development (15,16). These potentially harmful contaminants can accumulate more in fish meat than in fish oil. However, there may still be safety concerns if unrefined fish oil preparations are consumed, as they may contain pesticides and PCB residues (17).

Dosages of DHA and EPA from marine oils also vary in terms of the amount required to achieve any potential benefit for the mother and child. Dosages in research trials range from 133 milligrams to 3 grams per day, with most women receiving a dose of approximately 2.7 grams of both EPA and DHA per day (12). Translating this amount into food sources would require a pregnant woman to eat 300 grams of cooked salmon, which would not necessarily correspond to possible fish consumption restrictions because of contaminants for women during pregnancy. Fish oil supplements do not appear, however, to cause any serious side effects such as bleeding complications or discomfort that would influence compliance issues other than the rather minor complaint of unpleasant taste (12,18,19).

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