

# Child and Antenatal Nutrition Bulletin

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## Marine oils supplements for pregnant women: the current knowledge and recommendations.

*A summary of "Time to go fishing. Marine oil supplements good for children?" Maria Makrides and Robert Gibson in Paediatric Basics number 117 Volume 2007. Written by Anne Rae with the authors' consent.*

The suggestion that an increased supply of docosahexaenoic acid (DHA) during the last trimester of pregnancy may be important to the development of the fetal brain has resulted in the addition of n-3 (or omega-3) fatty acids to prenatal vitamins and minerals, as well as to food products specifically designed for pregnant women.

DHA is a key n-3 long chain polyunsaturated fatty acid (LCPUFA) predominantly found in marine or fish oil. Eicosapentaenoic acid (EPA) is the immediate precursor of DHA.

### Marine oils and pregnancy

Population studies have shown that higher intakes of marine foods during pregnancy are associated with longer gestations, higher infant birth weights and a low incidence of pre-eclampsia.

The authors conducted a Cochrane Systematic Review to estimate the effects of marine oils on pregnancy outcomes.<sup>1</sup> A total of 2,755 women from six trials were included. All six trials had a randomized design and compared a supplement or food that contained marine fatty acids with either a placebo or no treatment.

The allocated dose of EPA and DHA ranged from 133 mg/day to over 3 g/day, given as food supplements or capsules. The most commonly used dose was 2.7 g of EPA and DHA per day, and these trials also included the majority of women (2,242). Most trials commenced supplementation after 16 weeks gestation. Three of the six trials included women with complications of pregnancy such as hypertension and intrauterine growth retardation.

Women allocated a marine oil supplement had a mean gestation that was 2.6 days longer and a slightly higher infant birth weight and length than women allocated



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to placebo or no treatment. There were no overall differences in the proportion of low birth weight or small-for gestational age babies. There was also no clear difference in the relative risk of pre-eclampsia.

Together with another systematic review published in 2006, these data suggest that routine use of marine oil supplements in pregnancy is likely to have little benefit in preventing pre-eclampsia, pre-term birth and low birth weight.

## Marine oils and childhood development

DHA accretion into the brain and nervous system is at its greatest velocity during the last trimester of pregnancy. DHA is selectively enriched in synaptosomal membranes so that diets deficient in n-3 fatty acids are associated with reductions in brain DHA concentrations, decreased dopamine and serotonin, and reduced neuronal cell size as well as decreased visual function, impaired visual recognition memory, and compromised learning behaviour.<sup>2</sup>



The fetus is supplied with its DHA from the maternal circulation. The estimated level of DHA accumulation required by the fetus exceeds the intake of many pregnant women from industrialized countries with Western-style diets (e.g. women in the U.S., Australia and some parts of Europe), highlighting a potential dietary insufficiency for both mother and baby.

Emerging evidence suggests that an increased dietary supply of n-3 LCPUFA in pregnancy is associated with improved developmental outcomes for children. Data from cohort studies indicate that an increased supply of DHA to the fetus in late pregnancy (measured as maternal DHA status at the end of pregnancy or as the DHA levels in cord blood) is associated with more organized sleep patterns in early infancy<sup>3</sup> and improvements in attention and less distractibility through to two years of age<sup>4</sup> relative to children with a lower supply of DHA in late pregnancy. Concordant data are also available from over 7,000 British children who were part of the Avon Longitudinal Study of Parents and Children (ALSPAC) where maternal fish intake during pregnancy was positively associated with mean developmental scores at 15 and 18 months of age<sup>5</sup> as well as at eight years<sup>6</sup>.

Such findings from observational studies have fuelled the need for intervention studies to specifically address the question of whether an increased DHA supply to the fetus (through maternal supplementation) improves neurological development. To the best of our knowledge, at least three such trials are currently in progress in Australia, Mexico and the U.S., with initial reports expected in late 2009.



## To supplement or not to supplement?

A challenge for nutritionists is to make dietary recommendations that will improve n-3 LCPUFA status. Although an obvious strategy is to eat more fish, seafood or consume marine oil capsules, there is confusion in the minds of the public concerning appropriate doses and the safety of some sources of fish in pregnancy. To further complicate things, Western diets are rich in n-6 fats, particularly linoleic acid (LA, 18:2n-6) which is a major inhibitor of n-3 LCPUFA incorporation. Small amounts of fish eaten in the context of diets rich in n-6 rich oils and spreads will result in little improvement in n-3 LCPUFA status.

The n-3 LCPUFA dose in the few current pregnancy intervention studies available on trial registers ranges from 500-1,000 mg/day. Such doses are of the right order of magnitude to be biologically significant, but are difficult to obtain from the typical Western diet where it is uncommon to frequently consume foods—such as fish, other seafood and offal meats—which are among the richest dietary sources of n-3 LCPUFA.

For pregnant women, this issue is magnified by recommendations to limit their consumption of long-lived predatory, and thus high mercury, fish such as shark, swordfish and marlin because of the possible negative impact of mercury on fetal and early childhood development, although new studies are suggesting that this risk may have been overestimated<sup>6</sup>. Other food avoidances in pregnancy related to the risk of listeriosis may further conspire to limit pregnant women's intake of n-3 LCPUFA. Raw seafoods such as oysters, smoked salmon, sashimi and pate are good sources of DHA. Offal meats are a rich source of omega 3 oils, however a single serving of liver exceeds the maximum recommended level of retinol (vitamin A) in pregnancy by about 10 times.

## Conclusion

Based on the best available evidence to date, there is little justification for pregnant women to consume supplements containing n-3 LCPUFA during pregnancy to reduce the risk of pre-eclampsia, pre-term birth or low birth weight. However, ongoing trials should provide answers to whether prenatal n-3 LCPUFA supplementation improves early childhood development.

Given the popularity of supplements, pregnant women should be counselled to choose supplements that contain oils derived from the body of the fish rather than organ oils (such as cod liver oil) and those that have been tested and labelled as containing low levels of heavy metals (such as mercury) and lipid soluble contaminants (such as dioxins and polychlorinated biphenyls).

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# No Alcohol In Pregnancy Is The Safest Choice

## Alcohol and Pregnancy Project

Jan Payne and Kathryn France, Telethon Institute for Child Health Research

Recent Western Australian (WA) data on alcohol consumption during pregnancy<sup>1</sup> showed that 59% of women drank alcohol in at least one trimester of pregnancy; 4% consumed five or more standard drinks on a typical occasion in at least one trimester of pregnancy; and 15% drank in excess of the 2001 Australian Alcohol Guideline for pregnant women.<sup>2</sup>

Alcohol is a teratogenic substance. Its consumption during pregnancy can result in poor pregnancy outcomes such as miscarriage, stillbirth and preterm birth, and consequences for the unborn child such as brain damage, growth deficiency, birth defects, developmental delay, low IQ and social and behavioural problems.

Fetal Alcohol Spectrum Disorder (FASD) is an umbrella term which describes the range of effects that may occur if a woman consumes alcohol during pregnancy. FASD includes conditions such as Fetal Alcohol Syndrome (FAS), partial FAS (pFAS), Alcohol Related Birth Defects

(ARBD) and Alcohol Related Neurodevelopmental Disorder (ARND). These conditions are said to be the most common preventable causes of intellectual disability in the western world and are lifelong conditions for which there is no cure.

The WA Birth Defects Registry reported the rate of FAS as 0.18/1000 live births (0.02/1000 non-Aboriginal; 2.76/1000 Aboriginal).<sup>3</sup> But it is likely that the rate of FAS is under-estimated in this data and there has been no attempt to estimate the rate of the other conditions (pFAS, ARBD and ARND) that comprise FASD in Australia.

## Alcohol and Pregnancy Resources for Health Professionals

The *Alcohol and Pregnancy Project* developed evidence-based resources for health professionals to use when advising women on alcohol use during pregnancy and of its effects on the fetus.

This project was developed following research in WA which reported the need for resources on alcohol during pregnancy. One study established that women of childbearing age wanted to have: information on the effects of drinking alcohol during pregnancy on the fetus; health professionals to ask pregnant women how much and how often they drink alcohol; and health professionals to advise women who are pregnant or who are thinking of becoming pregnant to give up drinking alcohol.<sup>4</sup>

Another study of WA health professionals found that 45% of health professionals enquired about their patients' alcohol consumption during pregnancy and 25% provided women with information on the consequences of alcohol consumption during pregnancy.<sup>5</sup> Most of these health professionals reported the need to have resources on alcohol use during pregnancy to raise awareness among patients and to reinforce the need to avoid alcohol during pregnancy.

The resources, called *Alcohol and Pregnancy: Health Professionals Making a Difference*, have been developed through consultation with health professionals and women in WA. They comprise of a booklet, a fact sheet and *No Alcohol in Pregnancy is the Safest Choice*





wallet cards. The resources provide information on the consequences of drinking alcohol in pregnancy and on Fetal Alcohol Spectrum Disorder, and the role that health professionals can play in supporting women to prevent alcohol use during pregnancy.

The key recommendation for health professionals addressing alcohol use during pregnancy is summarized by the '5As': Ask, Assess, Advise and Assist and Arrange.

**ASK** all women of childbearing age and pregnant women about their alcohol use.

**ASSESS** and record the level of risk of women's alcohol consumption.

**ADVISE** women of childbearing age including pregnant women:

- that no alcohol is the safest choice if a woman is pregnant or trying to get pregnant
- that the amount of alcohol that is safe for the fetus has not been determined
- that alcohol reaches concentrations in the fetus that are as high as those in the mother
- of the consequences of alcohol exposure to the fetus.

Women who have consumed alcohol in pregnancy should be advised that:

- the level of risk to the fetus is hard to predict
- stopping drinking at any time in the pregnancy will reduce the risk to the fetus
- the risk of harm to the fetus is low if only small amounts of alcohol were consumed before they knew they were pregnant
- any concerns about the child's development should be raised with a health professional.

**ASSIST** women to stop or reduce consumption through:

- positive reinforcement for those already abstaining
- advising on the consequences of alcohol exposure to the fetus
- conducting brief intervention or motivational interviewing with the aim of supporting them to abstain, and where this is not possible, to reduce alcohol intake and avoid intoxication.

**ARRANGE** for further support for women by planning additional consultations or by referral to specialist services and support groups.

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For more information and ordering resources Telethon Institute for Child Health Research

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Website: [www.ichr.uwa.edu.au/alcoholandpregnancy](http://www.ichr.uwa.edu.au/alcoholandpregnancy)

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# A brief overview of feeding development and difficulties

*Dr Lynda Chadwick, Paediatrician*

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Feeding issues encompass a wide range of capacities, including the neurophysiological regulation of dependent feeding behaviours, such as breast and bottle feeding, as well as more volitional acts of eating and appetite regulation. This article gives a brief overview of the development of these feeding skills and problems that can arise.

Early feeding behaviours such as sucking and swallowing are largely regulated by reflexes. These are coordinated by areas of the brain located around the brainstem, and include brain centres that regulate breathing and heart rate. For example, the act of swallowing requires brief periods of apnea to allow swallowing to occur. The brainstem also controls the infant's tongue movements and neurological conditions such as hypotonia and brain injury can affect these movements.



## Stages of feeding development

Over the first few weeks and months of dependent feeding, the infant's oral-motor skills continue to improve, so that sucking and swallowing become more coordinated and effective. Primitive reflexes such as the tongue extrusion reflex and rooting reflex are gradually replaced by more volitional movements of the tongue and mouth. During this stage, the infant is particularly attuned to the emotional and physiological state of the mother. Thus, anxieties experienced by the mother may be directly communicated to the infant, and may contribute to the onset of feeding difficulties, or feed refusal.

The transition to more independent feeding behaviour commences with the introduction of solid foods at around six months of age. The gag reflex protects the airway as it allows closure of the epiglottis over the upper end of the trachea while a bolus of food is passing. Infants that have significant hypotonia and weak gag or cough reflexes may be at an increased risk of inhaling foods.

At approximately eight months infants are introduced to more textured foods. At this stage, the infant develops biting and chewing skills, and increasingly complex tongue actions that allow for the movement of a bolus of food around the mouth and/or stored in the buccal cavity prior to swallowing. The concept of 'critical period' is important at this time. 'Critical period' refers to a period in the child's life when a particular developmentally appropriate task must be experienced and rehearsed in order to allow the progression of this and subsequent skills. Critical periods have neurological correlations to the networks of neurones or brain cells in particular areas of the brain. These neurones or brain cells are particularly responsive to certain experiences at certain times, and if they do not receive this exposure then a critical opportunity to enhance certain developmental skills is lost. The critical period seems particularly relevant in the exposure of solid and textured foods to the infant.



## Factors influencing eating behaviours

- The act of eating in a child is more involved than the capacity to chew and swallow food. The cognitive development of the child, including language and non-verbal problem solving skills, plays an important role in the development of eating behaviours. Eating and appetite are embedded within the cultural practices, and influenced by the caregiver and family patterns.
- A child acquires eating skills in the context of a responsive environment. This environment can be created with different types of reinforcements provided at meal times including: social and verbal praise from the caregiver, the pleasant feeling of satiety, and the interesting and appetizing tastes of food.
- Communication around meals becomes increasingly important as the child grows older. Comprehension of verbal and non-verbal hunger-satiety cues as well as food and behavioural cues are vital for the caregiver. A caregiver's response to feeding behaviours and explorations is important to the child's development of feeding competence. Parental anxiety around mealtimes or misinterpretation of a child's cues can create conflict and confusion for both the caregiver and the child, and the eating experience can become a very negative experience for the child.

- Medical conditions such as food allergies, recurrent upper airway or ear problems, or gastro-oesophageal reflux may also exacerbate eating issues.
- Children learn to associate certain events or experiences with eating and can generalize these to all feeding experiences. Eating difficulties may also represent more entrenched relationship difficulties between the carer and child.

## Conclusion

Managing feeding difficulties that present at each of these developmental stages can be challenging and frustrating. It is important to clarify with the parents the nature and extent of the feeding issues.

- Request the parents to keep an eating diary with a record of the child's behaviours around mealtimes and the parent's response to these behaviours. This may help start the psychological process of identifying and addressing the eating issue.
- Clarify what the eating difficulties represent to the parent/caregiver as many entrenched eating issues can be perpetuated by the caregivers experiences or importance associated with certain eating behaviours.
- Stress the importance of feeding milestones and encourage parents to persist with appropriate foods, even if they are rejected by the child.
- Simple mealtime routines are vital. The child should have a calm and regular place to eat meals in the company of the parents or other family members.
- Mealtimes should be no longer than 20 minutes, depending on the child's age. At the end of the set time, the meal should be removed and alternative food, such as dessert should be offered. If a child has not eaten an appropriate amount of the main food, the alternative food should not be offered.
- Resolve eating conflicts after the meal and away from the table.
- Finally, eating difficulties can have an impact on the relationship between the child and caregiver and may require therapy as well as some psychological intervention.

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## Nutrition Workforce Profiles

Many people provide various services in the area of nutrition across Western Australia. They work day to day in a team, group or as individuals. They are connected through the common bond to improve the nutritional health of the population by delivering a range of services from clinical, community, education, consultancies, policy, through to research.

This section of the bulletin showcases people working in various nutrition fields across Western Australia in order to establish links, share personal perspectives, promote services and extend opportunities for collaboration.

### Ana Gowrea



Policy Officer (Nutrition), Child and Adolescent Community Health Policy (Statewide), Child and Adolescent Health Service

#### Role

With over eight years experience in nutrition policies and programs for the WA Department of Health, I continue to work in my area of passion. I provide expert policy advice to government on statewide community and public health nutrition issues; develop infant feeding and child nutrition policies and guidelines for community health services, including the Child and Antenatal Nutrition manual and this bulletin; and coordinate relevant workforce development initiatives.

#### Topics of interest

I know for many the words 'policy' and 'passion' are usually mutually exclusive but my interest lies in synthesizing the scientific research, political constraints, current programs and community needs into practical

guidelines that aim to improve the health of families. This job allows me to 'pick the brains' of a lot of experts and practitioners, and share practical, innovative and evidence-informed practice with others.

#### People you work with & services

Collaboration is the operative word with policy work. I participate in various committees and work in partnership with policy officers, clinical researchers, epidemiologists, clinical staff, child and school health nurses, directors and managers from WA and interstate to get the best available information. Current work address issues related to breastfeeding, early feeding, anaphylaxis prevention in school and childcare, CALD and Aboriginal nutrition, growth assessment, and obesity prevention and management.

#### Current and emerging trends in your field

I welcome the re-invigorated commitment to breastfeeding promotion and addressing the desire for health professionals in various settings to sing from the same songbook, with reliable sources of consistent, evidence-based information and training opportunities. I think we've come a long way in the last 2 years particularly.

The ongoing challenge is finding ways to link services across the continuum of care that support families and integrate initiatives that improve their food literacy and skills. The social and physical factors impacting on nutritional health are complex and 'evidence-based practice' is a continually moving target, however, innovative partnerships within and outside of health are emerging in an effort to join forces to systematically address them.

The Bulletin provides information for health professionals working with families. Three issues are produced annually, since 1987.

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