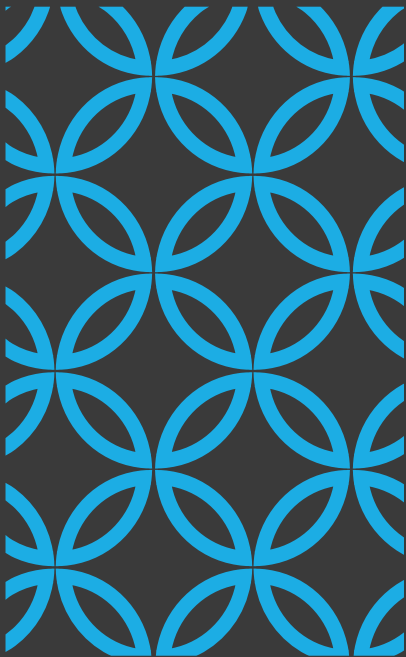




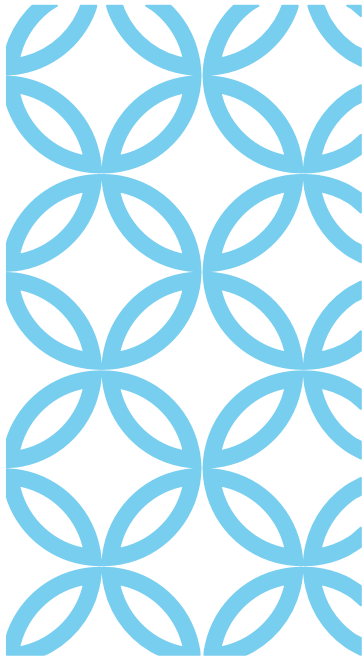
## INFANT NUTRITION

BRIGITTE CORCORAN, DIETITIAN  
HELEN ELGAR IBCLC



## TOPICS

- 
- Update on the Breastfeeding Trends in Australia
  - Understand the Enablers and Barriers to breastfeeding
  - Awareness of current Breastfeeding strategies
  - Understand Lactogenesis – development of human milk
  - Case discussion outlining common Breastfeeding issues
  - Nutritional and bioactive Components of breastmilk – What is formula trying to emulate?
  - Update on development and marketing of infant formula
  - Detail indications for use of specialised infant formulas
  - Outline the Dietetic role in infant feeding



Australian National Infant Feeding Survey 2010 (ANIFs) (29,000)

Queensland Infant Feeding Survey 2014 (1200)

National Health Survey 2017-2018

Australian Feeding infants and toddlers Study (OzFITS 2021 - 1140)

National Health Survey 2020-2021

## BREASTFEEDING PREVALENCE

National Health Survey

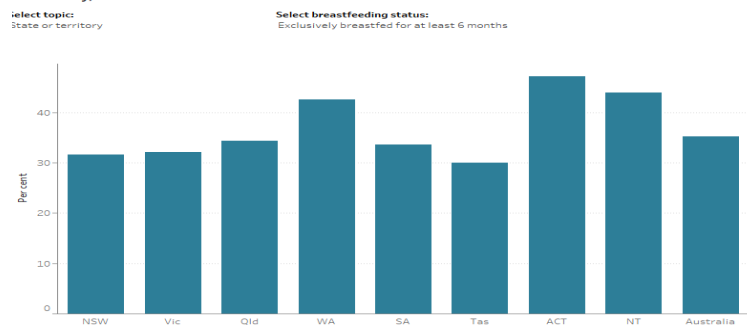
Aug 20-Jul 21

Online survey

Exclusive Breastfeeding

= no other food or fluid other than

Proportion of infants aged 0-3 years by exclusive breastfeeding status for at least 6 months and state or territory, 2020-21



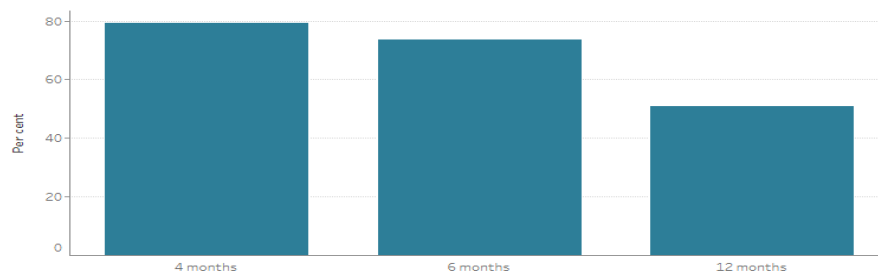
Notes:  
 1. Percentage calculated after excluding records that were 'aged less than 6 months'.  
 2. Data used to calculate percentage were randomly adjusted by the ABS to avoid the release of confidential data. There may be differences between the sum of the component items and totals. Care must be taken when interpreting percentages.  
 3. The percentages for 'exclusively breastfed for at least 6 months' category for South Australia, Tasmania and Northern Territory have a relative standard error between 25% to 50% and should be used with caution.  
 4. The percentage for 'exclusively breastfed for at least 6 months' category in Remote areas have a relative standard error between 25% to 50% and should be used with caution.

n.a. = not available

Source: AIHW and ABS analysis of National Health Survey 2020-21.

# CURRENT PREVALENCE BREASTFEEDING AUSTRALIA

**Proportion of infants aged 0-3 years who received breast milk for at least 4, 6, and 12 months, 2020-21**



**Notes:**

1. Includes all infants aged 0-3 years who had previously received breast milk but were not currently receiving breast milk.
2. Data used to calculate percentage were randomly adjusted by the ABS to avoid the release of confidential data. There may be differences between the sum of the component items and totals. Care must be taken when interpreting percentages.

Source: AIHW and ABS analysis of National Health Survey 2020-21.

## PROPORTION AUSTRALIAN INFANTS 0-3 RECEIVING ANY BREASTMILK 2021-2021

## AUSTRALIAN FEEDING INFANTS AND TODDLERS STUDY (OZFITs 2021)

1 150 infants

Telephone interviews

**Table 2**

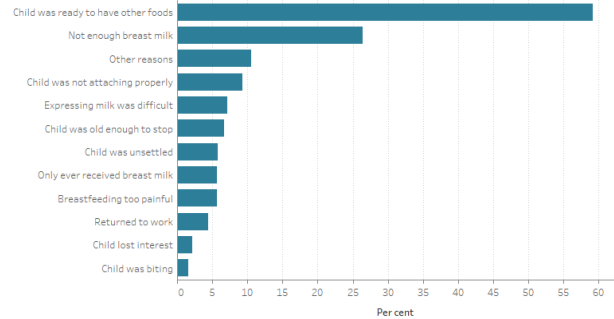
Cumulative proportion of children exclusively breastfed, predominately breastfed, or receiving any breastmilk by month of age.

Age (to Month)	Equivalent Duration	Exclusively Breastfed <sup>1</sup>	Predominantly Breastfed <sup>2</sup>	Receiving Any Breastmilk
% (95% CI)				
0 to <1	Less than 1 month	59 (56, 62)	60 (57, 63)	98 (97, 99)
1	Less than 2 months	57 (54, 60)	58 (55, 60)	95 (94, 96)
2	Less than 3 months	54 (51, 57)	55 (52, 58)	91 (90, 93)
3	Less than 4 months	51 (48, 54)	52 (50, 55)	87 (85, 89)
4	Less than 5 months	39 (36, 42)	40 (37, 43)	82 (79, 84)
5	Less than 6 months	22 (19, 24)	23 (20, 26)	75 (72, 77)
6	Less than 7 months	1 (0, 1)	1 (0, 2)	68 (65, 71)
7	Less than 8 months	0 (0, 1)	0 (0, 1)	63 (60, 66)
8	Less than 9 months	0 (0, 0)	0 (0, 1)	60 (57, 63)
9	etc.	-	-	54 (51, 57)
10		-	-	50 (46, 53)
11		-	-	47 (44, 51)
12		-	-	44 (40, 47)

# REASONS FOR CEASING EXCLUSIVE BREASTFEEDING

NHS 2020-2021

Reasons for starting child on any food or drink other than breastmilk, 2020-21



Notes:

1. 'Food or drink other than breastmilk' includes infant formula products, water, other types of milk (e.g. cow, goat, soy and coconut milk), other cereal based milks (e.g. oat, rice and almond milks), yogurt based foods and drinks, water based drinks (e.g. fruit juices, fruit drinks, cordials and soft drinks), tea or coffee.

2. 'Other reasons' could refer to any reason that the parent started the child on food and drink other than breast milk than the ones that were provided to them in the survey.

Source: AIHW and ABS analysis of National Health Survey 2020-21.

## ENABLERS AND BARRIERS TO BREASTFEEDING

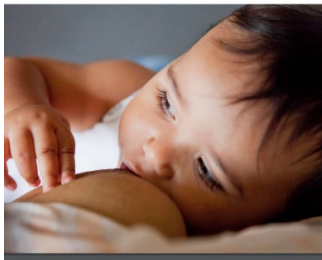
	Enablers	Barriers
Socio Demographic	Maternal SES Higher Maternal Age Higher Maternal Education Level Maternal Occupation	Lower Maternal SES
Psychosocial and cultural	Social support, knowledge and attitudes of the maternal partner, family and friends Prenatal breastfeeding intention Availability of facilities for breast feeding in public places	Ethnic background Maternal lack of confidence Return to employment
Biomedical	Infant health problems	Breastfeeding problems Caesarean birth Parity Infant health problems Maternal smoking
Health service related	Rooming-in Early mother-infant contact Demand feeding Staff practices and breastfeeding guidance Hospital policies (BFHI) Availability and promotion of mother's support groups Dissemination of information re the benefits of breastfeeding	Complementary feeds Hospital policies *

AIHW 2011, AIHW 2023

# AUSTRALIAN NATIONAL BREASTFEEDING STRATEGY



**Australian National  
Breastfeeding Strategy**  
2019 and beyond



## PRIORITY AREAS

### 1. Structural enablers

- 1.1—Community education and awareness
- 1.2—Prevent inappropriate marketing of breastmilk substitutes
- 1.3—Policy coordination, monitoring, research and evaluation
- 1.4—Dietary guidelines and growth charts

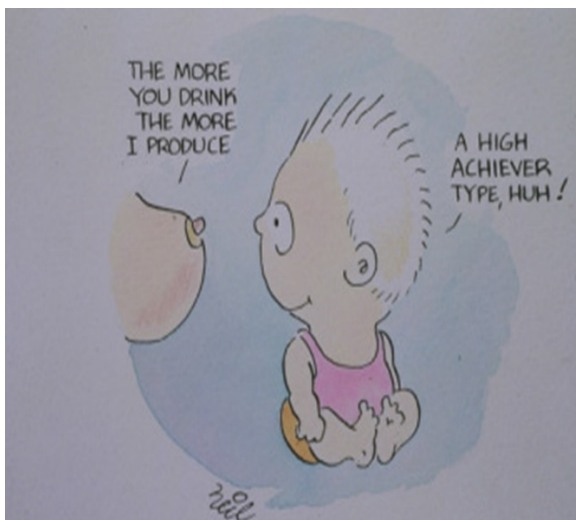
### 2. Settings that enable breastfeeding

- 2.1—Baby Friendly Health Initiative
- 2.2—Health professionals' education and training
- 2.3—Breastfeeding-friendly environments
- 2.4—Milk banks

### 3. Individual enablers

- 3.1—Universal access to breastfeeding support services
- 3.2—Breastfeeding support for priority groups

## BASICS OF HUMAN MILK PRODUCTION



Milk supply doesn't start out as a demand and supply process

During pregnancy and the first few days postpartum milk supply is under Endocrine control then there is a switch to 'local control' or Autocrine control

Milk removal is the primary control mechanism for supply

## SECRETORY DIFFERENTIATION (LACTOGENESIS 1)

### ENDOCRINE CONTROL

Breasts are capable of full lactation from around 15-20 weeks in pregnancy

Milk production is under endocrine or hormone control

While the mother is still pregnant, the placenta produces hormones, such as progesterone, that inhibit abundant milk production, until after the infant is born (Sriraman, 2017)



## SECRETORY ACTIVATION (LACTOGENESIS 2)

### ENDOCRINE CONTROL

- Once the infant is born and the placenta has been removed, there is a sharp decline in progesterone
- Progesterone is thought to inhibit prolactin
- Prolactin is the main hormone involved with milk production
- This is the stage where milk production rapidly increases
- Although biomarkers indicate this occurs 30-40 hours after birth, most mothers will not notice the breasts feeling fuller for 2-3 days
- Prolactin release occurs in response to stimulation of the nipple (by breastfeeding or expressing)
- This endocrine control is responsible for the next stage of milk production – **Galactopoiesis** (Sriraman, 2017)

## AUTOCRINE CONTROL GALACTOPOESIS (LACTOGENESIS 3)

Maintenance of milk secretion

Local autocrine control at the breast

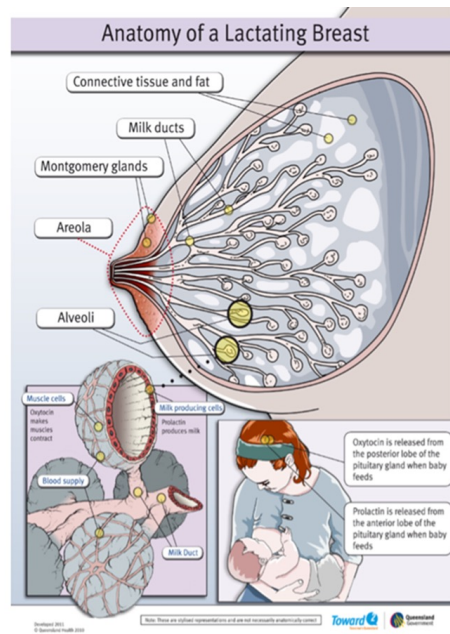
Feedback inhibitor of lactation

Fullness of the breast determines rate of milk secretion

Prolactin receptors—prolactin transfer more important than serum prolactin levels

Serum prolactin does not control milk synthesis

(Sriraman, 2017)



## KEY HORMONES INVOLVED

### Oxytocin

Produced by the hypothalamus

Secreted by the posterior pituitary gland

Responsible for the milk ejection reflex (let-down)

### Prolactin

Synthesised by lactotrophs in the anterior lobe of the pituitary

Responsible for ongoing milk secretion

The surges of prolactin during a feed, rather than prolactin baseline levels that influence continued lactation



## MEET SARAH AND BABY JACK

Sarah brings baby Jack to emergency on the advice of her midwife.

Jack is 5 days old, born at 37 weeks.

BW: 2.860kgs CW: 2.500kgs

BGL of 2.2mmols/l

Jaundice – SBR 280

### CASE REVIEWS

### BABY JACK

Jack is admitted

NGT inserted for feeding

55mls 3/24 EBM or formula

For Lactation Consultant review



## INFANT 'RED FLAGS' FOR LOW SUPPLY:

Poor weight gain

Reduced wet or dirty nappies

Dark, strong-smelling nappies

Often hungry or unsettled

Short, frequent feeds

Very long, continuous feeds

Sleepy, difficult to wake

Jaundice

(Brodribb, 2019)

- Image: pexels



## LOW BREAST MILK PRODUCTION

### Primary:

Occurs when there is insufficient mammary tissue; disturbed neurological pathways or inappropriate concentrations of hormones required for milk production

Also consider the possibility of retained placental fragments and ask about previous breast surgery

# LOW BREAST MILK PRODUCTION

## Secondary:

Failed secretory activation as a result of improper breastfeeding management and/ or infant related problems

Incorrect latching to the breast

Timed or scheduled feeding

Overuse of pacifiers

Medications such as cold and flu preparations containing pseudoephedrine and use of oral contraceptives before six weeks

BRODRIBB, 2019

# MATERNAL 'RED FLAGS' FOR LOW SUPPLY

Image: Researchgate



## BREASTFEED REVIEW

LC takes feeding history and observes direct BF

Breast growth and glandular tissue discussed with Sarah

Sarah would like to continue BF

## BREASTFEED REVIEW

Supply line with formula suggested  
– referral to dietitian

BGL and SBR monitored and stable

Sarah and Jack discharged home  
BF with supply line and formula

Image:wikimedia commons



# MEET MUM EMMA AND BABY LUCY

Image: pexels



Dad is letting Emma sleep overnight to get some rest and will bottle feed Lucy formula.

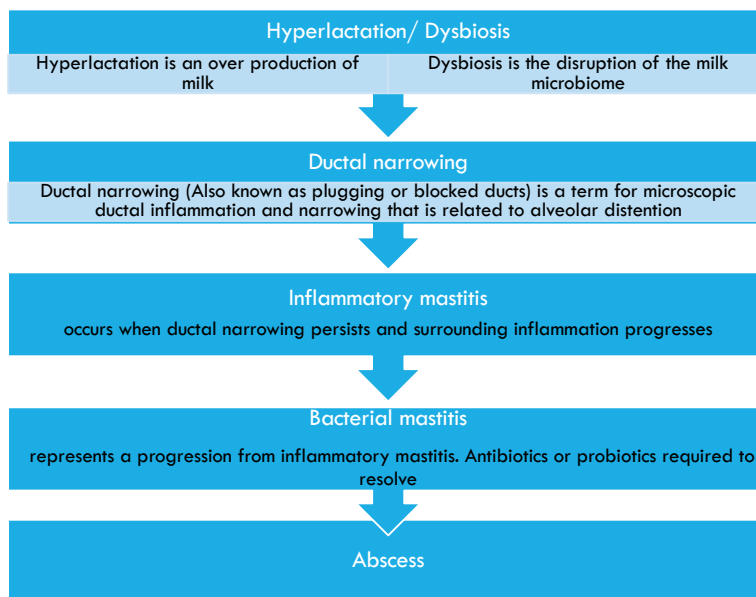
Emma does not get up overnight to express.

Emma wakes in the morning with engorged breasts and a red, lumpy area on her left breast.

Emma breastfeeds Lucy her morning feed but is worried she has mastitis.

## MASTITIS SPECTRUM CONDITIONS

(MITCHELL ET AL., 2022)



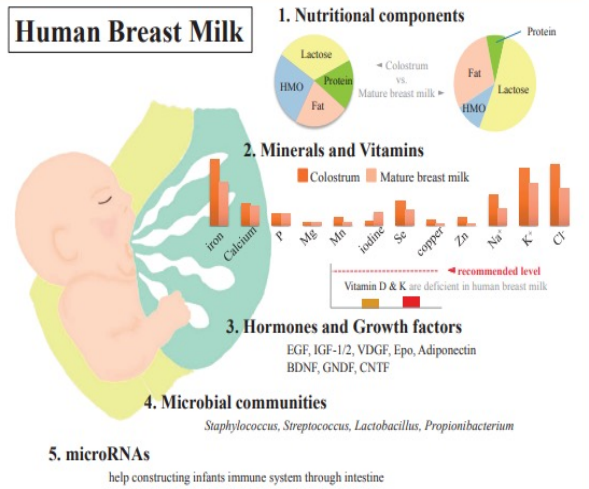
# BREASTMILK COMPOSITION

Biologically dynamic

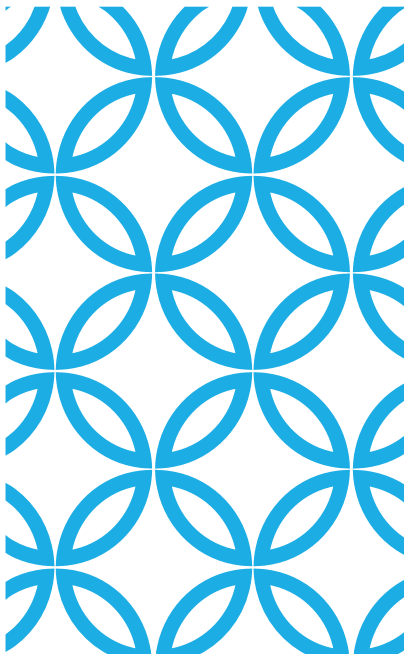
Changes with

Maternal diet	Mammary gland physiology	Stage of feed	Age of infant
---------------	--------------------------	---------------	---------------

## Human Breast Milk



**Graphical abstract.** Human breast milk (HBM) contains macronutrients and micronutrients, and its composition varies according to environmental factors. Colostrum is low in fat but high in protein and relatively rich in immunoprotective components. Micronutrients, hormones, and growth factors in HBM also play various roles in infant development. Microbial communities and microRNAs help construct the



## INFANT FORMULA

- Standards for production
- Evidence for additives
- Current recommendations
- Specialised products
- Practice tips

## WHY DO WE NEED TO KNOW ABOUT INFANT FORMULA?

~ 65% of infants under 6 months are likely to have had some formula (NHS 2020-2021)

~40-50% infants introduced to IF under 4mths of age (OzFITS 2022)

**Table 3.** Use of breastmilk substitutes and first exposure to solids foods reported as a cumulative proportion by age in months.

Age (Months)	Introduced to Breastmilk Substitute	Introduced to Solid Foods	
		% (95% CI)	
<1 month	40 (37, 43)	0 (0, 1)	
1 to <2 months	42 (40, 45)	0 (0, 1)	
2	45 (42, 48)	0 (0, 1)	
3	48 (45, 51)	1 (1, 2)	
4	51 (48, 54)	25 (23, 28)	
5	53 (50, 56)	58 (55, 61)	
6	56 (53, 60)	97 (95, 98)	
7	57 (54, 60)	98 (97, 99)	
8	60 (57, 63)	99 (99, 100)	
9	61 (58, 65)	99 (99, 100)	
10	64 (61, 67)	100 (99, 100)	
11	65 (62, 68)	100 (99, 100)	
12	66 (63, 70)	100 (99, 100)	
>12	67 (64, 71)	100 (99, 100)	

NETTING, ET AL 2022

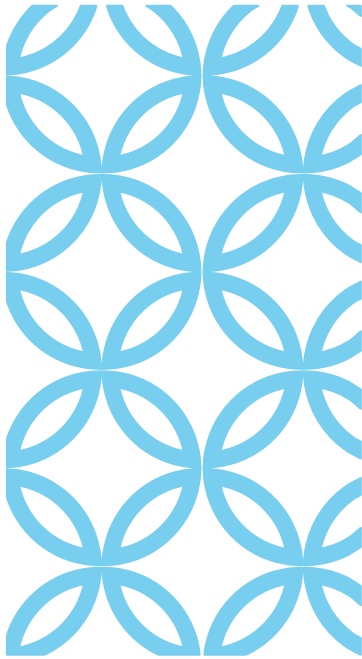
which infant formula is best for babies in australia 2023

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## WHICH FORMULA IS BEST??



Health Professionals – GP, Paediatrician, Midwife, CHN, Dietitian, Chiropracter

Internet

Forums

Facebook/Social media mothers groups

Formula company websites

Choice website

Opinions and experiences of other caregivers (family, friend, mothers' groups)  
Can be quite influential due to lived experience

Trial and error

Same formula that was given in hospital

TV advertisements for brand recognition

## PARENTAL DECISION MAKING REGARDING INFANT FORMULA

MALEK, 2016



Review

### Review of Infant Feeding: Key Features of Breast Milk and Infant Formula

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<sup>2</sup> Department of Surgery, Feihe Nutrition Laboratory, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA; pling@bidmc.harvard.edu

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Received: 14 March 2016; Accepted: 26 April 2016; Published: 11 May 2016

**Abstract:** Mothers' own milk is the best source of nutrition for nearly all infants. Beyond somatic growth, breast milk as a biologic fluid has a variety of other benefits, including modulation of postnatal intestinal function, immune ontogeny, and brain development. Although breastfeeding is highly recommended, breastfeeding may not always be possible, suitable or solely adequate. Infant formula is an industrially produced substitute for infant consumption. Infant formula attempts to mimic the nutritional composition of breast milk as closely as possible, and is based on cow's milk or soy milk. A number of alternatives to cow's milk-based formula also exist. In this article, we review the nutritional information of breast milk and infant formulas for better understanding of the importance of breastfeeding and the uses of infant formula from birth to 12 months of age when a substitute form of nutrition is required.

**Keywords:** breast milk; infant formula; cow's milk allergy; cow's milk alternatives

[Check for updates](#)

## OPEN ACCESS

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## A comprehensive review on infant formula: nutritional and functional constituents, recent trends in processing and its impact on infants' gut microbiota

Shiva Bakshi<sup>1</sup>, Vinod Kumar Paswan<sup>2\*</sup>, Satya Prakash Yadav<sup>1</sup>,  
Basant Kumar Bhinchhar<sup>2</sup>, Sheela Kharkwal<sup>3</sup>, Hency Rose<sup>4</sup>,  
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Human milk is considered the most valuable form of nutrition for infants for their growth, development and function. So far, there are still some cases where feeding human milk is not feasible. As a result, the market for infant formula is widely increasing, and formula feeding become an alternative or substitute for breastfeeding. The nutritional value of the formula can be improved by adding functional bioactive compounds like probiotics, prebiotics, human milk oligosaccharides, vitamins, minerals, taurine, inositol, osteopontin, lactoferrin, gangliosides, carnitine etc. For processing of infant formula, diverse thermal and non-thermal technologies have been employed. Infant formula can be either in

BAKSHI, ET AL. 2023

# CURRENT GUIDELINES FORMULA - FSANZ

## Standard 2.9.1 Infant formula products

**Note 1** This instrument is a standard under the *Food Standards Australia New Zealand Act 1991* (Cth). The standards together make up the *Australia New Zealand Food Standards Code*. See also section 1.1.1–3.**Note 2** The provisions of the Code that apply in New Zealand are incorporated in, or adopted under, the *Food Act 2014* (NZ). See also section 1.1.1–3.

### Division 1 Preliminary

#### 2.9.1–1

##### Name

This Standard is *Australia New Zealand Food Standards Code – Standard 2.9.1 – Infant formula products*.

##### Note

Commencement:  
This Standard commences on 1 March 2016, being the date specified as the commencement date in notices in the *Gazette* and the *New Zealand Gazette* under section 92 of the *Food Standards Australia New Zealand Act 1991* (Cth). See also section 93 of that Act.

#### 2.9.1–2

##### Outline of Standard

- (1) This Standard regulates various types of infant formula products.
- (2) Division 1 deals with preliminary matters.
- (3) Division 2 sets out general compositional requirements for infant formula products.
- (4) Division 3 sets out compositional requirements for infant formula and follow-on formula.
- (5) Division 4 sets out compositional requirements for infant formula products for special dietary use.
- (6) Division 5 sets out labelling and packaging requirements for infant formula products.
- (7) Division 6 sets out guidelines for infant formula products. The guidelines are not legally binding.





# FSANZ — FOOD STANDARDS AUSTRALIA NEW ZEALAND

## Division 3 Infant formula and follow-on formula

### 2.9.1—9 Infant formula and follow-on formula—composition

- (1) Infant formula must have:
- (a) an energy content of no less than 2500 kJ/L and no more than 3150 kJ/L; and
  - (b) a protein content of no less than 0.45 g/100 kJ and no more than 0.7 g/100 kJ; and
  - (c) a fat content of no less than 1.05 g/100 kJ and no more than 1.5 g/100 kJ.
- (2) Follow-on formula must have:
- (a) an energy content of no less than 2500 kJ/L and no more than 3550 kJ/L; and
  - (b) the following protein content:
    - (i) for a milk-based follow-on formula—a protein content of no less than 0.38 g/100 kJ and no more than 1.3 g/100 kJ; and
    - (ii) for all other follow-on formulas—a protein content of no less than 0.45 g/100 kJ and no more than 1.3 g/100 kJ.
  - (c) a fat content of no less than 1.05 g/100 kJ and no more than 1.5 g/100 kJ; and
  - (d) a potential renal solute load value of no more than 8 mOsm/100 kJ.

#### L-amino acids that must be present in infant formula and follow-on formula

L-amino acid	Minimum amount per 100 kJ
Histidine	10 mg
Isoleucine	21 mg
Leucine	42 mg
Lysine	30 mg
Cysteine & cysteine total	6 mg
Cysteine, cysteine & methionine total	19 mg
Phenylalanine	17 mg

As at 1 March 2016

2

Schedule 29

L-amino acid	Minimum amount per 100 kJ
Phenylalanine & tyrosine total	32 mg
Threonine	19 mg
Tryptophan	7 mg
Valine	25 mg

## S29—8

### Infant formula products—limits on fatty acids that may be present in infant formula and follow-on formula

For section 2.9.1—11, the table is:

#### Limits on fatty acids that may be present in infant formula and follow-on formula

Fatty acid	Limits
<b>Essential fatty acids</b>	
Linoleic acid (18:2)	no less than 9% of the total fatty acids no more than 26% of the total fatty acids
α-Linolenic acid (18:3)	no less than 1.1% of the total fatty acids no more than 4% of the total fatty acids
<b>Long chain polyunsaturated fatty acids</b>	
Long chain omega 6 series fatty acids (>= 20)	no more than 2% of the total fatty acids
Arachidonic acid (20:4)	no more than 1% of the total fatty acids
Long chain omega 3 series fatty acids (>= 20)	no more than 1% of the total fatty acids
<b>Total trans fatty acids</b>	
Eruic acid (22:1)	no more than 1% of the total fatty acids

# INFANT FORMULA

	Nutritional components			Bioactive components		
	Protein	Fat	CHO	Probiotics	Prebiotics	Nucleotides
Type	Cow Goat Soy Rice Rice and Pea Protein	LCPUFA's Linoleic Alpha- linolenic acid Palmitic acid	Lactose containing	Lactobacillus reuteri Lactobacillus rhamnosus GG Bifidobacterium lactis Bifidobacterium breve	Addition of HMO's  20 -fucosyllactose, 20 ,3-di-fucosyllactose, lacto-N-tetraose, 30 -sialyllactose, 60 -sialyllactose  GOS FOS	Nonprotein nitrogenous compounds Cytidine monophosphate Uridine monophosphate Adenosine monophosphate Guanosine monophosphate Inosine monophosphate
Modification	Partially Hydrolysed Extensively Hydrolysed Amino acid	Milk fat globules (MFG's) MCT's	Low lactose/lactose free Added thickener (Anit-regurgitation) Maltodextrin			

# REVIEW OF HUMAN MILK OLIGOSACCHARIDES

Addition is safe and well tolerated

Shift microbiome closer to that of breastfed infants

Shift in intestinal immune markers closer to that of breastfed infants



Systematic Review

## Clinical Studies on the Supplementation of Manufactured Human Milk Oligosaccharides: A Systematic Review

Yannik Bernd Schönknecht <sup>1,\*</sup>, Maria Virginia Moreno Tovar <sup>2</sup>, Stina Rikke Jensen <sup>2</sup> and Katja Parschat <sup>1</sup>

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\* Correspondence: deyas@chr-hansen.com

**Abstract:** Human milk oligosaccharides (HMOs) are a major component of human milk. They are associated with multiple health benefits and are manufactured on a large scale for their addition to different food products. In this systematic review, we evaluate the health outcomes of published clinical trials involving the supplementation of manufactured HMOs. We screened the PubMed database and Cochrane Library, identifying 26 relevant clinical trials and five publications describing follow-up studies. The clinical trials varied in study populations, including healthy term infants, infants with medical indications, children, and adults. They tested eight different HMO structures individually or as blends in varying doses. All trials included safety and tolerance assessments, and some also assessed growth, stool characteristics, infections, gut microbiome composition, microbial metabolites, and biomarkers. The studies consistently found that HMO supplementation was safe and well tolerated. Infant studies reported a shift in outcomes towards those observed in breastfed infants, including stool characteristics, gut microbiome composition, and intestinal immune markers. Beneficial gut health and immune system effects have also been observed in other populations following HMO supplementation. Further clinical trials are needed to substantiate the effects of HMO supplementation on human health and to understand their structure and dose dependency.

**Keywords:** infant formula; human milk oligosaccharide; clinical trial; growth; tolerance; safety; microbiome; immunity



Citation: Schönknecht, Y.B.; Moreno

SCHONKNECHT, 2023

# ADDITION PROBIOTICS OR SYNBIOTICS

Significant heterogeneity of studies  
Lack of RCT's for robust evidence

Potential for some reduction in colic and regurgitation



Review

## Health Effects of Infant Formula Supplemented with Probiotics or Synbiotics in Infants and Toddlers: Systematic Review with Network Meta-Analysis

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**Abstract:** Supplementation of infant and follow-up formula with probiotics or synbiotics has become a common practice. In 2011 and 2017, the evidence regarding the impact of these interventions was analysed systematically. Recently new evidence was published. To evaluate through a systematic review with network meta-analysis the evidence on the impact of infant formula supplemented with probiotics or synbiotics for healthy infants and 36-month-old toddlers. RCTs published between 1999–2019 for infant formulas supplemented with probiotics alone or synbiotics in healthy infants and toddlers were identified. Data analysis included clinical (gastrointestinal symptoms, risk reduction

## NH&MRC RECOMMENDATIONS REGARDING CHOOSING INFANT FORMULA

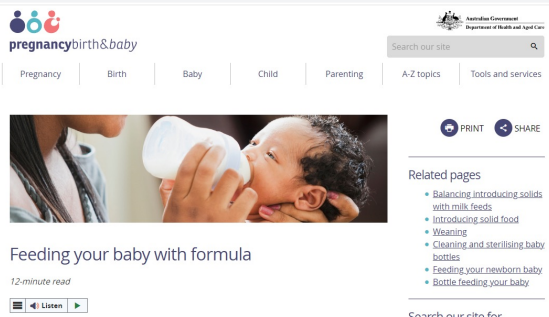
The NHMRC recommends that formula-fed infants receive a cow's milk based formula (preferably with a lower protein level) and avoid specialty formulas, unless they can not take a cow's milk based formula for medical, cultural or religious reasons

### European Childhood Obesity Project

The higher protein content in formula is associated with higher body weight in the first 2 years of life but it has no effect on the babies length

Lower protein intake in infancy may reduce the risk of overweight and obesity later in life

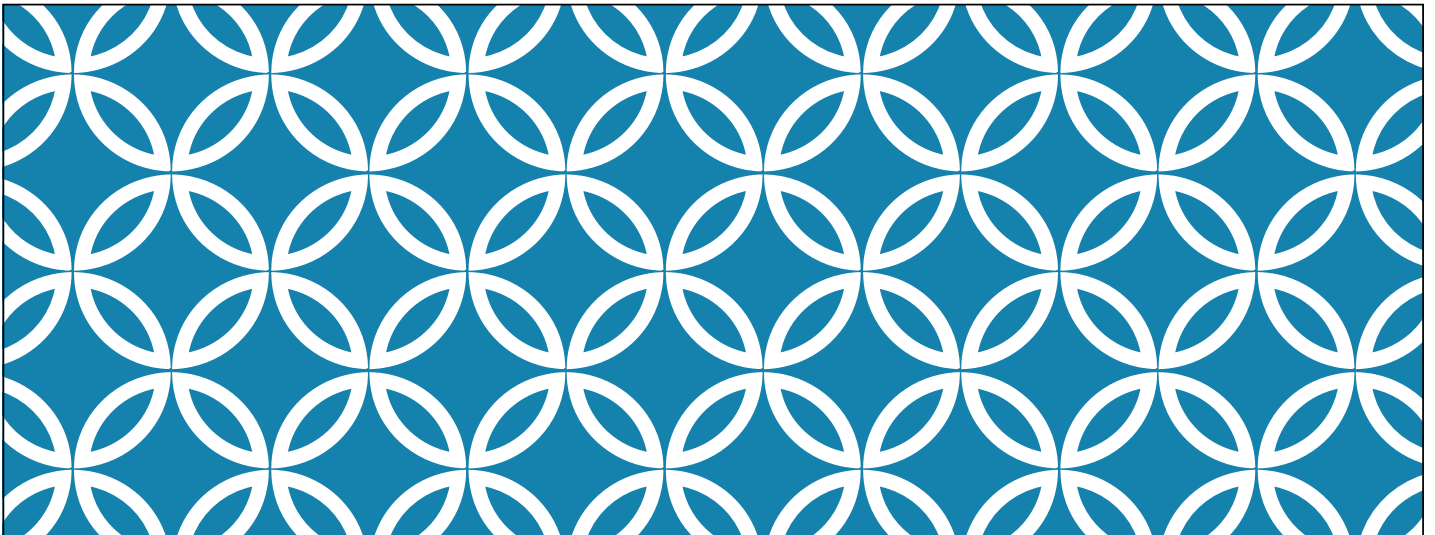
NHMRC 2012  
KOLETZKO, ET AL 2009



### ❗ Tips for choosing a baby formula

- If your baby is healthy, was born full-term and they are not breastfeeding, you should offer a cow's milk-based formula before trying any other type of formula.
- The price of a formula is not a sign of its quality. Words like 'Superior' or 'Gold' are used by formula companies to persuade parents to buy their product. Choose what you can afford.
- Look at how many scoops of formula are needed to make a feed. This will give you a good idea of how long a tin of formula may last.
- Read the label and make sure you're choosing the right formula for your baby's age.
- Look at the amount of protein the formula contains. Too much protein can increase the risk of your baby becoming overweight or obese later in life.
- Give your baby a few days to get used to a new type of formula. Avoid switching brands multiple times.

	Human Milk	Formula Stage 1	Formula Stage 2	Formula Stage 3	Cows Milk
<b>Energy</b>	65-70kcal/ 290KJ	65-70kcal/ 270-290Kj	63-74kcal/ 265-310Kj	70-73 kcal/ml/ 290-310Kj	70 kcal/ 290 KJ
<b>Protein</b>	1.0g	1.3-1.8g	1.5-2.5g	2.2-3.4g	3.5g
<b>Fat</b>	4.4g	3.1-3.7g	2.8-3.5g	2.4g	3.5g
<b>CHO</b>	6.9g	7.3-8.2g	7.0-8.7g	9.8g	6.3g
<b>Calcium</b>	32mg	43-65mg	60-100mg	132mg	107mg
<b>Iron</b>	0.03mg	0.5-0.8mg	0.8-1.2mg	1.2-1.6mg	nil
<b>Vit D</b>	0.1ug	0.62-2.2ug	1.0-1.2ug	0.69 ug	0.52 ug
<b>Sodium</b>	17mg 0.74mmol	16-27mg 0.7-1.2mmol	19-31mg 0.8-1.35mmol	26mg 1.1mmol	37mg 1.6mmol



## RECENT TRENDS IN INFANT FORMULA

- Plant based
- Organic
- Goat

## VEGAN FORMULAS

- Australian made
- Plant based (Rice and pea-based protein)
- Meets FSANZ standards
- Member of MAIF
  
- Markets formula as allergen free
- ~? Conflict with early allergen introduction advice

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## HIGH ENERGY FORMULA

- 100kcal/ml
- 2.6g protein/100ml
- 360 mOsm/kg
- Suitable for infants with high calorie requirements and/or fluid restriction

## Guide for Milk Substitutes in Cow's Milk Allergy

This document has been developed by ASCIA, the peak professional body of clinical immunology/allergy specialists in Australia and New Zealand. ASCIA information is based on published literature and expert review, is not influenced by commercial organisations and is not intended to replace medical advice. For patient or carer support contact [Allergy & Immunology Australia](http://allergy&immunology.org.au) or [Allergy New Zealand](http://allergy.org.nz).

Breastfeeding is recommended for the many benefits it brings to both the mother and child. If breastfeeding is not possible, this Guide can assist health professionals in recommending substitute milks when an infant has cow's milk allergy (CMA). This Guide also provides information about safe, nutritionally equivalent alternatives if a particular specialised formula is not available due to supply issues. Commercial names and suppliers of specialised infant formula in Australia and New Zealand, and their availability is provided for ease of reference.

Exclusion of cow's milk from a breastfeeding mother's diet is not necessarily required in CMA and should be discussed with a medical specialist. If undertaken, cow's milk exclusion should be supervised by a dietician.

**Table 1: Abbreviations used in this document**

AAF - Amino acid formula	FPIAP - Food Protein Induced Allergic Proctocolitis
CMA - Cow's milk allergy	FPIES - Food Protein Induced Enterocolitis Syndrome
eHF - Extensively hydrolysed formula	OTC - Available over the counter
EoE - Eosinophilic oesophagitis	PBS - Pharmaceutical Benefits Scheme (AU)
FPE - Food Protein Enteropathy	PSA - Pharmac Special Authority (NZ)

**Table 2: Commercially available specialised infant formula suitable for cow's milk allergy (CMA)**

Suitable formula (see table 3 for indications)	Brand names and suppliers	Availability*
<b>Soy based infant formula</b>	<ul style="list-style-type: none"> <li>Alula® Gold Soy (Sanulac)</li> <li>Karicare® Soy (Nutricia)</li> </ul>	OTC
<b>Extensively hydrolysed formula (eHF)</b>	<ul style="list-style-type: none"> <li>Aptamil® Allerpro SYNEO™ 1, 2 and 3 (Nutricia) - contains lactose</li> </ul>	OTC
<b>Extensively hydrolysed formula (eHF)</b>	<ul style="list-style-type: none"> <li>Allare® (Nestlé) <b>TO BE DISCONTINUED IN 2023 (AU)</b></li> <li>Aptamil® Gold+ Pepti-Junior® (Nutricia)</li> </ul>	PBS and PSA listed (prescription required)
<b>Rice protein based formula (see page 2 for further information)</b>	<ul style="list-style-type: none"> <li>Alula® Gold Allergy (Sanulac)</li> <li>Novalac® Allergy (Aspen Australia)</li> </ul>	OTC
<b>Amino acid based formula (AAF) for infants &lt;12 months of age</b>	<ul style="list-style-type: none"> <li>Neocate® Junior LCP and SYNEO™ (Nutricia)</li> <li>Elecare® (Abbott)</li> <li>Elecare® LCP (Abbott)</li> <li>Alfamino® (Nestlé)</li> </ul>	PBS and PSA listed (prescription required)
<b>Amino acid based formula (AAF) for children &gt;12 months of age</b>	<ul style="list-style-type: none"> <li>Neocate® Junior (Nutricia)</li> <li>Neocate® Junior Vanilla (Nutricia)</li> <li>Elecare® Vanilla (Abbott)</li> <li>Alfamino® Junior (Nestlé)</li> <li>Essential Care Jr (Cortex Health)†</li> </ul>	PBS and PSA listed (prescription required) † Not currently PSA listed

\* PBS and PSA item numbers for formula products are listed on <http://www.pbs.gov.au> and <https://www.pharmac.govt.nz/>

## ASCIA INFORMATION FOR HEALTH PROFESSIONALS

### Rice protein based formula

There are two rice protein based formula available in Australia:

- Alula® Gold Allergy (Sanulac) – whilst there are no product specific studies hypo-allergenicity or growth studies currently available, each batch is tested for milk and soy contamination.
- Novalac® Allergy (Aspen Australia) - Product specific hypo-allergenicity and growth studies have been undertaken.

Data is limited for use of rice protein based formula in non IgE mediated food allergies.

### Infant formula NOT recommended for cow's milk allergy (CMA)

The following types of formula are NOT recommended for infants with CMA:

- Standard infant formula including anti-regurgitation, lactose free, organic, newborn, and follow on.
- Goat milk based infant formula.
- Other mammal milks and formula.
- A2 formula.

**Table 3: Specialised formula and indications in cow's milk allergy (CMA)**

Type of Allergy	First choice	Second choice (if first not tolerated)	Third choice (if second not tolerated)
<b>Immediate (IgE mediated) CMA (not anaphylaxis)</b>	<ul style="list-style-type: none"> <li>eHF (&lt;6 months) or</li> <li>Rice protein based formula*</li> </ul>	AAF	
	<ul style="list-style-type: none"> <li>Soy formula** (&gt;6 months) or</li> <li>Rice protein based formula*</li> </ul>	eHF	AAF
<b>Anaphylaxis</b>	<ul style="list-style-type: none"> <li>AAF or</li> <li>Soy formula** (&gt;6 months) or</li> <li>Rice protein based formula*</li> </ul>		
	<ul style="list-style-type: none"> <li>eHF (&lt;6 months) or</li> <li>Rice protein based formula*</li> </ul>	AAF	
<b>FPIES</b>	<ul style="list-style-type: none"> <li>Soy formula (&gt;6 months and already soy-tolerant/after medically supervised soy introduction), or</li> <li>Rice protein based formula*</li> </ul>	eHF	AAF
<b>Non IgE mediated CMA (FPE, FPIAP)</b>	<ul style="list-style-type: none"> <li>eHF (&lt;6 months)</li> <li>Soy formula** (&gt;6 months and growing well)</li> </ul>	<ul style="list-style-type: none"> <li>AAF</li> <li>Rice protein based formula*</li> </ul>	
<b>EoE</b>	<ul style="list-style-type: none"> <li>AAF</li> </ul>	<ul style="list-style-type: none"> <li>eHF</li> <li>Rice protein based formula*</li> </ul>	AAF

Atopic dermatitis (eczema) alone is not an indication for specialised infant formula.

\* Unless allergic to rice, eHF or AAF is recommended if poor growth and/or multiple non IgE food allergies.

\*\* Unless allergic to soy. Soy is offered as an option for IgE-mediated CMA and anaphylaxis based on expert opinion, and review of the literature which presents very limited evidence of IgE mediated clinical reactions to soy in children with IgE-mediated CMA. (Adapted from Kemp et al., 2008).

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ASCIA 2023

# ALTERNATI

## ASCIA INFORMATION FOR HEALTH PROFESSIONALS

# ED...

### Guidance regarding specialised formula substitutes for cow's milk allergy (CMA)

If an infant's usual formula is unavailable, use table 3 to select suitable substitutes. The most straightforward approach is to select a product from the same group that the child is already on (e.g. substitute one eHF for another eHF).

**Recommendations for a substitute formula should involve a review of factors that led to the initial choice, and any change in clinical history. For example:**

- A thriving child with non-anaphylactic IgE-mediated reactions to cow's milk formula was established on eHF due to age being less than six months, but is now older than six months, therefore soy formula should be considered.

**When AAF for children older than 12 months is required, but is unavailable:**

- A paediatric allergy dietician should be consulted to assist with modifying the recipe for a substitute AAF.
- For all formula changes, recipe instructions should be reviewed with the family, as scoop to water ratios can vary substantially.

**For children over 12 months using soy as their milk replacement:**

- Calcium fortified soy milk is an appropriate replacement for soy formula, if they are growing well and eating a wide range of family foods.

**For children with cow's milk and soy allergies:**

- Most plant based milk replacement products that are not calcium fortified are too low in protein, fat, and calcium. Therefore, they are not nutritionally adequate for children under two years of age, unless growth and nutrition have been assessed carefully.
- Children under four years of age only need 400-500 mL of calcium fortified plant based milk replacements a day to meet their calcium requirements. Larger quantities can reduce appetite, nutritional intake, and growth.

**Referral of infants and children with CMA to a paediatric allergy dietician is recommended to assess nutritional needs.**

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For more information go to [www.allergy.org.au/hp/food-allergy](http://www.allergy.org.au/hp/food-allergy)

To support allergy/immunology research go to [www.allergyimmunology.org.au](http://www.allergyimmunology.org.au)

## EXTENSIVELY HYDROLYSED FORMULA

3 on Australian market

### Protein

- Vary in the size of the peptides
- One has 20% free amino acids

### Fat

- Vary from nil up to 50% MCTs

### Carbohydrate

- lactose or glucose/maltodextrin

### Low osmolality

- Generally able to be well tolerated when concentrated

## AMINO ACID FORMULAS

• 3-4 on Australian market

• Infant preparations and over 1 yr (or > 10kg) preparations

### Protein

- 100% amino acids- high protein content vs standard polymeric formula

### Fat

- Mix LCT and MCTs

### Carbohydrate

- Corn syrup, dried sugar syrup

### High osmolality

• Poor tolerance with concentration

## FORMULA FEEDING - PRACTICALITIES

Three different recipes for making up formula in Australia:

1 scoop to 30ml

1 scoop to 50ml

1 scoop to 60ml

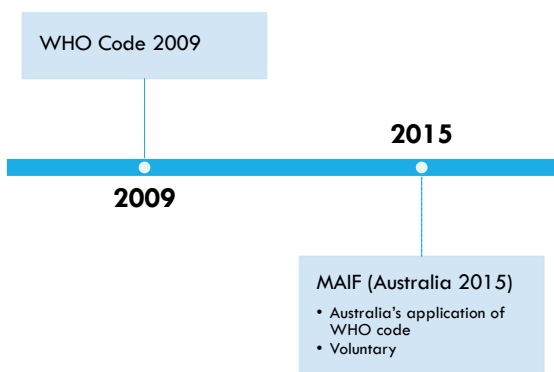
Can be brand specific but even within brands there are different recipes

Feeding guide on back of tin

Parents need education regarding cue-based feeding

Need education regarding demand feeding and satiety

## MARKETING CODES



Contribute to provision of safe and adequate nutrition for infants by

- Promote and protect breastfeeding
- Ensure proper use of milk substitutes
  - Adequate information
  - Appropriate marketing and distribution



# MAIF AGREEMENT MARKETING IN AUSTRALIA OF INFANT FORMULAS

## Participating companies

The companies that have signed the agreement are:

- [Abbott Australasia Pty Ltd](#)
- [Aspen Pharmacare Pty Ltd](#)
- [Australian Dairy Nutritionals Limited](#)
- [Australian Dairy Park Pty Ltd](#)
- [Bellamy's Organic](#)
- [H & H Group](#)
- [Bega Nutritionals](#)
- [The Infant Food Co. Pty Limited](#)
- [The LittleOak Company](#)
- [Max Biocare](#)
- [Nature One Dairy Pty Ltd](#)
- [Nestlé Australia Ltd](#)
- [Nuchev Limited](#)
- [Nutricia Australia Pty Ltd](#)
- [Sanulac Nutritionals Australia Pty Ltd](#)
- [Spring Sheep Milk Co.](#)
- [Sprout Organic](#)
- [The a2 Milk Company Ltd](#)
- [Wattle Health Australia Limited](#)

## About the agreement

The [MAIF Agreement](#) outlines obligations for companies making and selling infant formula to ensure:

- the proper use of formula
- parents make informed decisions.

Including providing clear information about the:

- benefits and superiority of breastfeeding
- risks of switching to formula
- health risks of the incorrect use of infant formula.

Participating companies must not:

- advertise or promote infant formula
- imply that formula is better than breastfeeding
- advertise formula to parents through the healthcare system
- hand out free formula to parents
- give financial incentives to sales staff or health workers for selling or promoting formula.

The agreement is Australia's response to the World Health Organization's [International Code of Marketing of Breast-milk Substitutes](#).

# DIETETIC ROLE IN INFANT FEEDING

Understand the anatomy and physiology of breastfeeding

Have a thorough understanding of infant feeding development

Understand infant growth and tools in use to measure same

Stay abreast of the developing evidence base of infant formula

Be able to detect changes in growth patterns to determine if and when dietetic intervention is indicated

Be able to conduct a thorough nutrition assessment for a breastfed, formula fed or mixed fed infant

***Respect and support the parents in their decision regarding how to feed their infant***

# ASSESSMENT OF DIETARY INTAKE - INFANTS

## Breastfed

- Parental description of cues for feeding (crying, sucking on hands, smacking of lips)
- Number of breastfeeds per day
- One/both breasts offered
- Length of feeds
- Alertness during feeds
- Contentedness between feeds (how many hours)
- Clustering of feeds – when and how frequent
- Any bottle feeds in addition to/top ups – see formula section for further questions
- Outputs – number of wet nappies per day, frequency and appearance of bowel motions

## Formula fed

- Name of formula
- How it is being made up – number of scoops to volume of water
- How often it is being offered – record times
- Length of feeds
- How much consumed at each feed + average 24 hour intake
- Outputs – number of wet nappies, frequency and consistency of bowel motions
- Any other fluids offered – if so what and how often, how much consumed

# RESOURCES

## Federal Government Websites



## Raising Children's Network



## NH MRC Infant feeding guidelines



## Child Health Nurses

# SUPPLEMENT INTAKE

## HOW MUCH?

### Breast Feeding Baby Slow Weight Gain Management Flow Chart

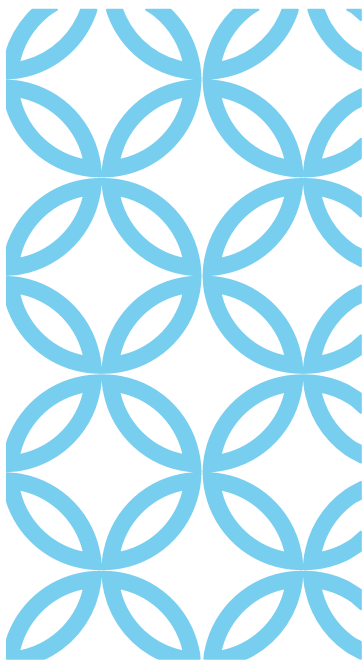
(Royal Children's Hospital, Melbourne)

– Supplement with up to 25% daily fluid requirements

- Eg if baby needs 150ml/kg/d, and weighs 4 kg
- Estimated Fluid Requirement is 600ml/d
- Supplement 25 % of 600ml = 150ml/d
- Divide by number of feeds you are going to supplement
- Eg 6 feeds in 24 hours = 25ml per feed

Dr. Brodribb, GP and IBCLC, UQ

– Min 50ml/kg/d from supplement divided across several feeds over day



Essential to continue regular stimulation of the breast via frequent breastfeeding and pumping

NB – > 25% of EER coming from formula may interfere with breast milk supply

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## SUPPLEMENTATION

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