

**COMMUNITY & ALLIED HEALTH  
RICHMOND NETWORK**

CHILD AND FAMILY HEALTH SERVICE  
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**Health**  
Northern NSW  
Local Health Network

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**Mother's Group**  
c/- Lucy Frankham

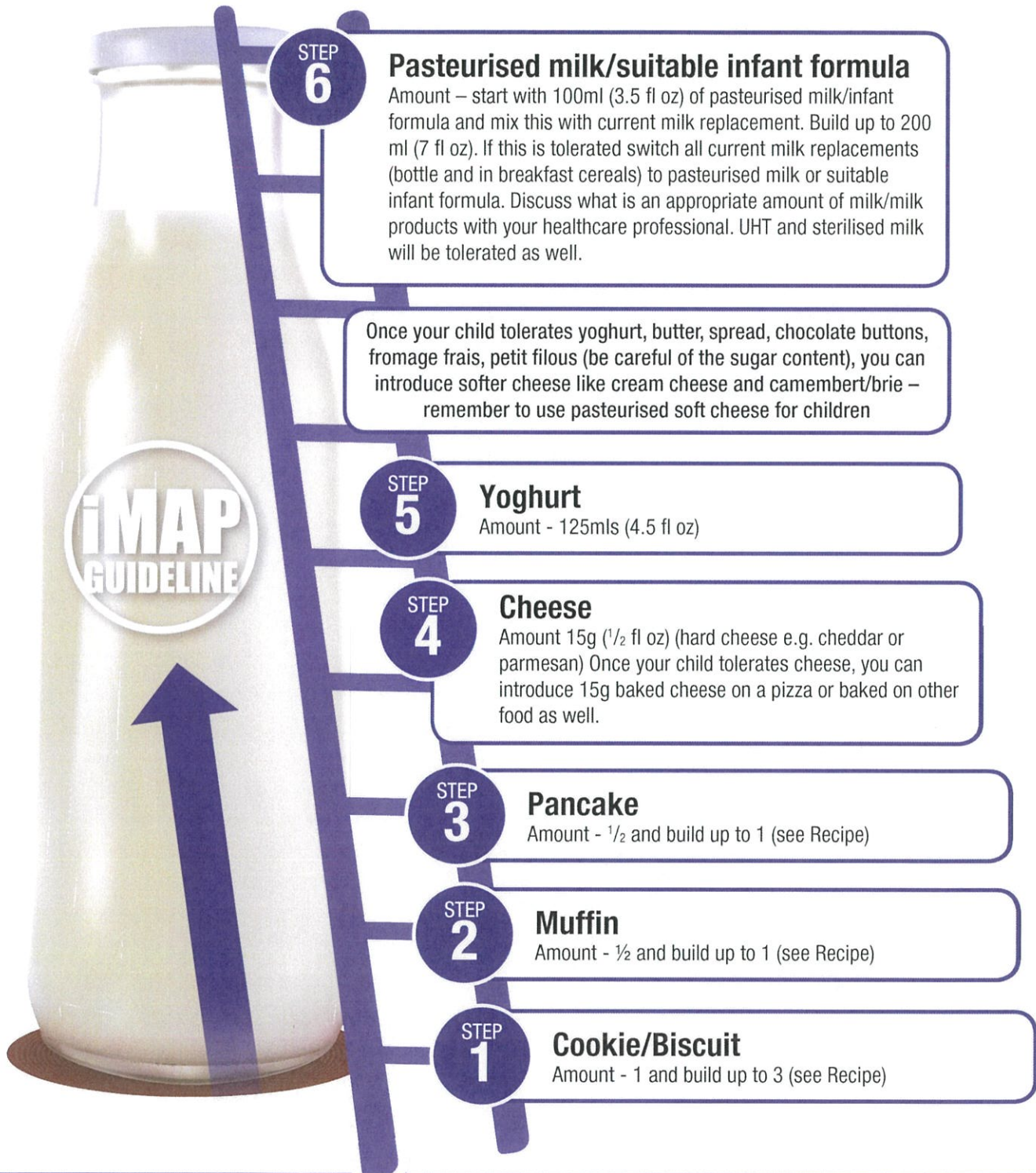
The milk ladder should only be used for a mild to moderate Non-IG mediated Cows Milk allergy, sometimes known as “cows milk intolerance” – if you are unsure, discuss with your GP first.

If any skin condition, like eczema is present, there may be the involvement of an IG mediated allergy so the milk ladder should not be used unless directed by your GP.

**Mignon Halford**  
Paediatric dietitian

# THE iMAP MILK LADDER

To be used only in children with Mild to Moderate Non-IgE Cow's Milk Allergy  
Under the supervision of a healthcare professional  
PLEASE SEE THE ACCOMPANYING RECIPE INFORMATION



## AT EACH OF THE FOLLOWING STEPS

### Cookie, muffin, pancake, cheese and yoghurt

It may be advisable in some cases to start with a ¼ or a ½ of that particular food and then over a few days to gradually build up to a whole portion - Please ask your healthcare professional for guidance on this

**THE LOWER STEPS ARE DESIGNED TO BE USED WITH HOME MADE RECIPES. THIS IS TO ENSURE THAT EACH STEP HAS THE APPROPRIATE MILK INTAKE. THE RECIPES WILL BE PROVIDED BY YOUR HEALTHCARE PROFESSIONAL**

Should you wish to consider locally available store-bought alternatives - seek the advice of your healthcare professional Re: availability

# Practical Pointers for Parents/Carers on using at home the iMAP Milk Ladder

iMAP  
GUIDELINE

## ONLY FOR CHILDREN WHO ARE BEING MANAGED AS MILD-TO-MODERATE NON-IgE COW'S MILK ALLERGY

The practical concept of this Ladder is the recognised fact that the more 'baked' cow's milk protein is, usually the less allergenic it is. Therefore you will see that Step 1 begins with a form of very well baked milk protein and then the further Steps give examples of gradually less well baked milk protein products.

The following 'Pointers' should make it easier for you to understand how best to use this Ladder. We advise that you are supported by a Healthcare Professional (HCP) until the Ladder has been successfully climbed. This may be your doctor, nurse but ideally your dietitian.

- Before starting the Ladder and progressing to each further Step, please ensure that your child is well at the time and also that any tummy symptoms, bowel symptoms or eczema are settled.
- Most children will start on Step 1. However some may be already eating one or more foods on the Ladder. If that is the case, you need to be advised which Step you should start on.
- The Ladder has 6 Steps, but your HCP may adjust the number of Steps to suit your child best.
- The time spent on each Step will vary from one child to another depending on their individual expression of milk allergy. This should also be discussed and agreed with you.
- The amounts in the Ladder are given as a guide – occasionally smaller or larger amounts may be recommended.
- Each of the early Steps of the Ladder importantly is accompanied by the appropriate recipe (see recipes).
- Each of the recipes has an egg and wheat free option (they are all soya free) to make the Ladder suitable for children who may have other co-existing food allergies.
- If the food on any Step of the Ladder is tolerated, your child should continue to consume this (as well as all the foods in the previous Steps) and then try the food on the next agreed Step.
- If your child does not tolerate the food in a particular Step, simply go back to the previous Step. You should then be advised when that further Step can be tried again.

**Additional File 4**

**iMAP Milk Ladder Recipes**

**STEP 1: COOKIE OR BISCUIT – SWEET/PLAIN**

Recipe	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature
<i>1 cookie/biscuit</i>					<i>1 ml</i>	<i>0.35 g</i>	
<b>Bakes 20 small finger size biscuits/cookies</b>	1 cup	125 g	4.5 oz	Flour (wheat or wheat free)			180°C or 350°F Bake for 10 – 15 min Depending on size of cookie/biscuit  Practical tip – let dough cool in fridge for 30 min – which makes it easier handle
	¼ teaspoon	1 g		Xanthan gum – if wheat free flour is used			
	¼ cup	50 g	1 ¾ oz	Cold dairy free spread			
	¼-½ cup (may vary depending on fruit)			Grated apple/pear/ pureed banana			
	1 teaspoon	2 g		Skimmed/non-fat milk powder*			
	Tip of a knife		Vanilla powder				
<ol style="list-style-type: none"> <li>1. Mix the flour, xanthan gum and milk powder</li> <li>2. Rub in the cold dairy free spread</li> <li>3. Mix in the fruit (you may need to add a little bit more if it is too dry) and vanilla powder</li> <li>4. Roll out and cut in finger sized strips</li> <li>5. Bake in the oven</li> </ol> <p>Start with 1 cookie/biscuit (equivalent to 1 ml of milk); increase to 2 and then 3 cookies/biscuits (equivalent to 3 ml of milk - if child can manage a portion of 3 biscuits/cookies)</p>							
					3 ml	0.105 g	180°C or 350°F

**STEP 1: COOKIE OR BISCUIT – SAVOURY**

Recipe	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature
<i>1 cookie/biscuit</i>					<i>1 ml</i>	<i>0.035g</i>	
<b>Bakes 20 small finger size biscuits/cookies</b>	1 cup	125 g	4 ½ oz	Flour (wheat or wheat free)			180°C or 350°F Bake for 10 – 15 min depending on size of cookie/biscuit  Practical tip – let dough cool in fridge for 30 min – which makes it easier handle
	¼ teaspoon	1g		Xanthan gum – if wheat free flour is used			
	¼ cup	50 g	1 ¾ oz	Cold dairy free spread			
	½ cup	40 g	1 ¼ oz	Grated DAIRY FREE CHEESE			
	1 teaspoon	2 g		Skimmed/non-fat milk powder*			
	2 tablespoons	10 ml		Water			
<ol style="list-style-type: none"> <li>1. Mix the flour, xanthan gum and milk powder</li> <li>2. Rub in the cold dairy free spread</li> <li>3. Mix in the grated DAIRY FREE CHEESE. Add water (you can add a bit more if it is too dry)</li> <li>4. Roll out and cut in finger sized strips</li> <li>5. Bake in the oven</li> </ol>							
Start with 1 cookie/biscuit (equivalent to 1 ml of milk); increase to 2 and then 3 cookies/biscuits (equivalent to 3 mls of milk - if child can manage a portion of 3 biscuits/cookies)					3 ml	0.105 g	180°C or 350°F

**STEP 2: MUFFIN – SWEET/PLAIN**

Recipe	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature	
Start with half a muffin and then one muffin: <i>half a muffin</i> : <i>one muffin</i>								
<b>Bakes 10 muffins</b>	2 cups	250 g	8 oz	Flour (wheat or wheat free)	12.5 ml	0.0.875 g	180°C - 200°C or 350°F- 400°F  Bake for 15 – 20 mins Tip – use a whisk and milk and oil together. This makes the muffins light	
	½ tsp	3 g		Xanthan Gum – if wheat free flour is used	25 ml	0.875 g		
	2 ½ tsp	10 g	1/3 oz	Baking powder				
	2 level tbsp	25 g	2/3 oz	Sugar – if your child is older you can add 2-3 tablespoons				
	Pinch			Salt				
	¼ cup	50 ml	1 2/3 fl oz	Sunflower oil or Canola oil				
	1 cup	250 ml	8 fl oz	Milk**				
	½ cup and 1 tbsp	110 g	3.9 oz	Finely chopped/mashed fruit: apple/pear/banana				
					Vanilla essence to taste			
	<ol style="list-style-type: none"> <li>1. Mix flour, xanthan gum, baking powder, sugar and salt</li> <li>2. Mix oil and milk together and to the dry ingredients</li> <li>3. Finally add in chopped fruit and vanilla (additional) and mix through</li> <li>4. Bake in oven</li> </ol>							
<b>1.5 muffin = equivalent to baked milk muffin from Mount Sinai Recipe(1) (which contains 1.3 g milk)</b>								

**STEP 2: MUFFIN – SAVOURY**

Recipe	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature
<i>Start with half a muffin and then one muffin: half a muffin : one muffin</i>							
<b>Bakes 10 muffins</b>	2 cups	250 g	8 oz	Flour (wheat or wheat free)	12.5 ml	0.0.875 g	180°C - 200°C or 350°F- 400°F Bake for 15 – 20 mins Tip – use a whisk and milk and oil together. This makes the muffins light
	½ teaspoon	3 g		Xanthan Gum – if wheat free flour is used	25 ml	0.875 g	
	2 ½ tsp	10 g	1/3 oz	Baking powder			
	Pinch			Salt			
	¼ cup	50 ml	1 2/3 fl oz	Sunflower oil or Canola oil			
	1 cup	250 ml	8 fl oz	Milk **			
	½ cup	60 g	2 oz	Grated DAIRY FREE CHEESE			
<ol style="list-style-type: none"> <li>1. Mix flour, xanthan gum, baking powder and salt</li> <li>2. Mix oil and milk together and to the dry ingredients</li> <li>3. Add DAIRY FREE CHEESE; Add a bit of water if required - Feel free to chop in a handful of spinach to add colour and fibre</li> <li>4. Bake in oven</li> </ol>							

**1.5 muffin = equivalent to baked milk muffin from Mount Sinai Hospital(1) (which contains 1.3 g milk)**

Step 3: PANCAKE								
Recipe	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature	
<i>Start with half pancake and then 1 pancake as indicated below: half a pancake : one pancake</i>								
<b>Bakes 6 pancakes</b>	1 cup	125 g	4.5 oz	Flour (wheat or wheat free)	21 ml	0.735 g	Fry in a hot pan using oil of choice until golden brown and crispy	
	2 ½ tsp	10 g	1/3 oz	Baking powder	42 ml	1.47 g		
	¼ tsp	1-2 g	pinch	Salt				
	2 tbsp	30 ml	1 fl oz	Sunflower or Canola oil				
	1 cup	250 ml	8 fl oz	Milk**				
	2/3 cup	50 ml	1.5 fl oz	Water				
<ol style="list-style-type: none"> <li>1. Add all ingredients into a mixing bowl and mix together</li> <li>2. Fry in a hot pan</li> </ol>								
<p>Some children do not like cake or pancake textures: For these children there is the option of boiling a small potato, adding 42 ml of milk (1.3 g protein) and some milk free spread, cover with foil and bake in the oven for 40 minutes at 180°C - 200°C or 350°F- 400°F. This product does not contain any wheat in the food matrix and it may therefore affect the allergenicity.</p>								



Step 4: CHEESE							
Food	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature
Cheese	2 ½ tbsp	15 g	½ oz	Cheese***	15 g	3.43 g	85°C or 185°F (no need to further heat this – just an indication of how cheese is made)

Step 5: YOGHURT							
Food	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature
Yoghurt	½ cup	125 ml	4.5 fl oz	Yoghurt	125 ml	6.0 g depending on brand	98°C (no need to further heat this – just an indication of how yoghurt is made)

Once your child tolerates yoghurt, butter, spread, chocolate buttons, fromage frais, petit filous (be careful of the sugar content), you can introduce softer cheese like cream cheese and camembert/brie – remember to use pasteurised soft cheese for children

Step 6: MILK							
Food	tsp/tbsp/ cup	g/ml	oz/lb	Ingredient	Milk per portion (ml)	Milk protein per portion	Temperature
Pasteurised Milk	½ cup	100 ml	3.5 fl oz	Pasteurised Milk**	100 ml	3.47 g	57-68°C 15-20 seconds Both pasteurised milk and infant formula is produced this way – there is no need to further heat this.
	¾ cup	200 ml	7 fl oz		200 ml	6.95 g	

Protein information obtained from: <https://ndb.nal.usda.gov/ndb/search/list>

\* The protein content of milk powder was calculated using: Basic Report: 01091, Milk, dry, non-fat, regular, without added vitamin A and vitamin D

\*\* The protein content of milk was calculated using: Basic Report: 01085, Milk, non-fat, fluid, with added vitamin A and vitamin D (fat-free or skim)

To convert g of milk to ml of milk a conversion of 1.031 was used i.e. 1 g milk = 103.1 g = 100 ml

\*\*\* The protein content of cheese was calculated using: Basic Report: 01009, Cheese, cheddar

1. Leonard SA, Nowak-Wegrzyn AH. Baked Milk and Egg Diets for Milk and Egg Allergy Management. Immunol Allergy Clin North Am. 2016;36(1):147-59.