**The Milk Ladder**

Guidelines for Health Professionals:

1. This milk ladder was reproduced with the permission by Carina Venter, one of the authors of the paper – Venter C, et al. Diagnosis and management of non-IgE-mediated cow’s milk allergy in infancy – a UK primary care practical guide. Clinical and Translational Allergy 2013, 3:23. This included the Milk Ladder UK Version 2013.

2. The milk ladder was intended for infants and children with non-IgE-mediated cow’s milk allergy or mild IgE-mediated cow’s milk allergy.

3. This ladder may be useful for guiding parents if an infant or child with IgE-mediated cow’s milk allergy has successfully completed a baked milk challenge either at home or within the hospital setting without any reaction, has continued to have baked dairy included in their diet on a regular basis and you feel that they may now tolerate dairy in other cooked forms.

4. All children will be need to be treated as individuals and may need to have guidelines on starting with smaller amounts than suggested on the step of the ladder and to include that step for longer than other children depending on their tolerances.

Table: Amount of milk protein at each step of the milk ladder

<table>
<thead>
<tr>
<th>Step on the ladder</th>
<th>Food source</th>
<th>Milk source</th>
<th>Milk protein amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Biscuits</td>
<td>Milk solids or milk powder</td>
<td>Plain biscuits – 0.02-0.04g milk protein/biscuit. Cheese flavoured crackers – Arnott’s Country Cheese, Arnott’s Cheds – 0.2 - 0.4 g milk protein/biscuit.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Muffins</td>
<td>Standard cow’s milk, butter or margarine</td>
<td>Recipe with 1 cup milk for 10 muffins – 0.8g milk protein/muffin.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Pikelets</td>
<td>Cow’s milk, smaller amount of protein but the cooking process is much quicker</td>
<td>Using the recipe provided – 0.27g milk protein/pikelet.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Shepherds Pie</td>
<td>Cow’s milk in the mashed potato</td>
<td>Approximately 0.5g milk protein per child’s large serve.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Lasagne</td>
<td>White sauce with cow’s milk +/- cheese</td>
<td>Approximately 1 g of milk protein per child’s large serve without cheese and 2.2g per serve with cheese.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Pizza</td>
<td>Milk protein from cheese – no dairy in the base.</td>
<td>Approximately 2.75 g per 1/8” pizza and 5.5 g milk protein per ¾ standard pizza.</td>
</tr>
<tr>
<td>Step 7</td>
<td>Ice Cream (vanilla)</td>
<td>Skim milk or milk, cream, milk solids +/- skim milk powder</td>
<td>1.5g – 3.3 g milk protein per 100g depending on the flavor and brand.</td>
</tr>
<tr>
<td>Step 8</td>
<td>Yoghurt</td>
<td>Skim milk or milk, milk solids, +/- cream.</td>
<td>3.7g – 5 g milk protein per 100g.</td>
</tr>
<tr>
<td>Step 9</td>
<td>Cheese</td>
<td>Pasteurised milk</td>
<td>Hard cheese is 24-30% Protein – 2.5g milk protein per 10g cheese.</td>
</tr>
<tr>
<td>Step 10</td>
<td>Pasteurised milk</td>
<td>Pasteurised milk</td>
<td>3.3g milk protein per 100mls of milk</td>
</tr>
</tbody>
</table>

Helen Norrish, Paediatric Dietitian

Nov 2015
Guidelines for parents on how to use the milk ladder:
The following are a guide for you to understand how to use the Milk Ladder. This needs to be used with a health professional, ideally a dietitian, giving you advice that best suits your child.

• Before starting the milk ladder, and progressing each further step, please make sure your child is well at the time, and they are not experiencing any symptoms, e.g. diarrhoea, hives, or if they have eczema this is well controlled.

• Most children will start on Step 1 (i.e. introducing dairy in the baking) and you will need to be given the Home Based Milk Challenge Guidelines for this step, if your child has not already completed a milk challenge. If your child tolerates the milk as per these guidelines then he/she is ready to progress on to the next step.

• For children who already tolerate milk in the baking, and some other foods on the ladder, your Health Professional will advise you what step to start on the milk ladder.

• The time to spend on each step will vary with each child. This will be discussed with you by your health professional. Some may be on a step for days or weeks, others for a month or more.

• The starting serving amounts are a guide, sometimes a smaller sample size may be needed, depending on your child’s tolerance.

• If the food on one step of the ladder is tolerated- your child needs to continue with this food, and foods on previous steps and then try the new food on the next step.

• If your child can tolerate only a certain amount of milk containing foods in one day, you may need to temporarily stop the other foods while trying a new one. Bring back the other tolerated milk containing foods as tolerated.

• If your child does not tolerate a food on a particular step, go back to the previous step(s) and continue on these foods for longer before trialling the next step again.

Step 1 – Guidelines for using commercial biscuits. Use biscuits that have milk solids or milk powder as part of the ingredient list, rather than whey powder or condensed milk.
Start with ½ - 1 of the following plain biscuits – Homebrand Round tea biscuits, or Arnott’s Malt O Malt biscuits or Griffin Milk Arrowroot biscuits, and build up to giving a maximum of four biscuits at one time. Once tolerated move on to cracker biscuits with milk solids and cheese such as Arnott’s Country Cheese or Arnott’s Cheds. Start with one biscuit at a time, and increase as tolerates.

Step 2 – Use a muffin recipe that has 1 cup of cow’s milk, making 10 muffins. Ask your dietitian for this recipe. Start with a pea size amount of muffin and double the amount given every second day as tolerates. Your child may have successfully completed a baked milk challenge in hospital, if so you can move on to the next step.

Step 3 – This next step contains less milk but the cooking time is less. Use the following recipe and start with ½ pikelet.
Pikelet Recipe: adapted from a Scotch Pancake recipe

Gluten free adaptation:
3/4 cup flour
¾ cup Gluten free flour mix
½ tsp baking powder
2 Tbsp buckwheat flour
¼ cup sugar
1 tsp xathan gum
½ cup sugar
1 egg
50mls milk

Sift the dry ingredients together.
Add the sugar and stir.

Lightly mix in the egg into the flour, then add the milk and gently mix, but do not over mix. The mixture is thick

Divide into 6 portions and place each portion into a hot frying pan that has had a smear of milk free margarine on the base.

Spread the pikelet out as thin as possible. Be careful not to have the pan too hot or the pikelet will burn and not cook properly in the centre. When air bubbles appear flip over and cook on the other side.

Step 4 – Shepherds Pie is a dish which has minced meat, such as minced beef, cooked with added vegetables and a mashed potato topping. This dish is then placed in the oven to brown and heat through. The milk protein comes from ½ cup of milk added when mashing the potato, before placing it on the cooked minced meat. This would serve 8 child’s full size servings.

Step 5 – Lasagne is a layered dish, with cooked mince, pasta and white sauce. When making the white sauce, use 1 cup of milk in the recipe. The dish is also placed in the oven to brown and heat through. This would serve 8 child’s full size servings. Start introducing this dish without the cheese in the sauce initially and then next time you make it adding the cheese as 40g of grated cheddar cheese, about ½ cup, to the sauce, depending on your child’s tolerance.

Step 6 – Pizza – make sure you choose a base that does not have cheese or dairy products in the base. Use ¾ cup grated cheese sprinkled on the top and place in the oven to melt and brown. You can choose to use a smaller amount of cheese initially – e.g., just a few strands of cheese on your child’s portion. Start with 1/8th of a regular pizza, progressing to ¼ of the pizza.

Step 7 – Ice cream – use commercial ice cream, vanilla flavor. Start with a small amount – 1 tsp and increase by 1 tsp every 1-2 days depending on the tolerance.

Step 8 – Yoghurt – Use a yoghurt that has no more than 5 g of protein per 100g on the nutrition label. E.g. standard fruit flavoured low fat yoghurt. Start with a small amount 1 tsp on the first day and increase by 1 tsp every 1-2 days depending on the tolerance.

Step 9 – Cheese – Use a hard cheese such as cheddar cheese. Start with 10g or ½ processed cheese slice or stick on the first day and increase the amount given every 2-3 days, depending on the tolerance, until able to tolerate up to 25g in one day.

Step 10 – Pasteurised milk – this is the last step on the ladder. Some children are not used to drinking milk and may not be keen on the taste. To help taste acceptance you may need to mix a small amount, 25-50mls of cow’s milk in with their current milk. Slowly increase the amount of standard cow’s milk and decrease the milk they have been having every week depending on their tolerance, until all the milk is standard cow’s milk.

Reference:

Acknowledgment: Thank you to Carina Venter for the permission to reproduce a New Zealand version of the UK milk ladder.
The Milk Ladder

A Step by step guideline to reintroducing milk
Please see overleaf for further details of the process.

**STEP 10**
Milk — Standard pasteurised full fat milk or infant formula
Discuss with dietitian. Start with 25 or 50mls in one serve and slowly increase by 10-20mls as tolerates. The milk may need to be mixed with the current milk your child is having.

**STEP 9**
Cheese — use a hard cheese such as cheddar
Start with 10g or ½ slice of processed cheese or ½ cheese stick and increase to 25g as tolerates.

**STEP 8**
Yoghurt - commercial yoghurt, up to 5g protein per 100g
Start with 1 tsp on the first day and slowly increase by 1 tsp as tolerates.

**STEP 7**
Ice Cream — commercial, vanilla, up to 3.3g protein per 100g
Start with 1 tsp on the first day and slowly increase by 1 tsp as tolerates.

**STEP 6**
Pizza — no cheese or dairy in the base, small cheese on top
Home-made regular size pizza with ¾ cup of grated cheese over the top. Serve size 1/8th of a pizza initially moving to ¼ of a pizza.

**STEP 5**
Lasagne - with cheese sauce - using 1 cup of milk and 40g cheese in the sauce for the family dish
Start with half of your child’s normal serving size of Lasagne.

**STEP 4**
Shepherds Pie - with ½ cup milk in the mashed potato
for the family dish
Start with half of your child’s normal serving size of Shepherds Pie.

**STEP 3**
Pikelets — see recipe on the back
Start with ½ pikelet and increase to 1 pikelet if tolerated, 1-2 days later.

**STEP 2**
Muffins — hospital challenge recipe – Start with pea size amount of muffin and double the amount each day as tolerates.

**STEP 1**
Plain biscuits — purchased
Biscuits that contain milk solids – not whey powder or condensed milk
See guidelines for suitable biscuits to try.

Helen Norrish, Paediatric Dietitian
Nov 2015