

4.4.2 Increasing the texture, variety, flavour, and amount

A variety of foods and flavours can be introduced gradually as the infant accepts the taste. New foods should be introduced one at a time, allowing two to four days between each new food to establish that the infant does not have an allergy to that food (Butte et al 2004).

Taste influences food acceptance and preferences at all ages. The introduction of complementary foods involves the infant learning to recognise and enjoy different tastes as well as textures. Successful food introduction has to overcome the infant's aversion to new eating experiences, which is a common reaction in most infants. Research has shown a new food may need to be offered between 8–15 times before it is accepted (Briefel et al 2004). Infants choose or refuse foods because of the sensory stimuli of taste, texture, and smell and the appearance of colour, shape and presentation. An infant's natural responses may make a caregiver think the child does not like a new taste when it is simply that the child is unfamiliar with it.

As varied a diet as possible is the best means of ensuring the infant has an adequate intake of all nutrients, as well as offering them opportunities to develop personal preferences and accept a variety of tastes and textures (Mennella and Beauchamp 1998).

The texture should progress from puréed to mashed to chopped. If infants are not encouraged to chew more textured foods, they may not develop this ability as they age. Teaching older infants to chew can be difficult. Breast milk or formula should continue to be used to obtain the right consistency and moisten food until the infant is one year of age. Food should be presented in a variety of ways, including as finger food such as soft fruit pieces, slightly overcooked vegetable pieces and toast – all cut to a size and shape small hands can easily hold.

The quantity of complementary foods should be increased gradually. Aim for about two tablespoons to half a cup at one meal before increasing the number of meals. Meals should be provided two to three times per day when the infant is six to eight months of age, then three to four times a day with one to two snacks as required (PAHO and WHO 2003). The amount of complementary food required will vary due to differences in the infant's breast milk intake and growth rate.

When introducing toast, start with white or wholemeal and age-appropriate infant cereals. Wheat breakfast biscuits contain a moderate level of fibre and can be given to the child once they are eight months of age. If wheat breakfast biscuits are given, they should be served not more than once a day and with breast milk or infant formula, then, after the infant is one year of age, with cows' milk. Cereals and similar foods should never be added to an infant's feeding bottle. They can make the feed too concentrated, so the infant will not receive sufficient fluids for normal kidney function and the feed will be too difficult to drink.

Although cows' milk should not be given as a drink until the infant is one year of age, milk products such as cheese, yoghurt, cottage cheese, custard and milk puddings can be introduced when the infant is around seven to eight months of age (see section 6.3.4: Cows' milk as a drink). Commercial infant foods containing milk and milk products can be introduced once the infant is around six months of age because the high temperatures required to manufacture these products denatures some of the proteins and makes the food easier for infants to digest.

For information on food allergies and food intolerances, see section 12.5: Food allergies and food intolerances.

4.4.3 Feeding the toddler

Infants should progress to eating a variety of foods and textures and be eating more family foods by around one year of age, assuming that the family food environment provides a variety of appropriate and adequate foods.*

Toddlers should be offered a variety of nutritious foods and fluids in small amounts and at regular intervals (three meals and two snacks) to meet the requirements for growth.

Ongoing breastfeeding will continue to benefit the toddler (see section 4.3: Importance of continued breastfeeding beyond period of exclusive breastfeeding).

The family diet should be based on the *Food and Nutrition Guidelines for Healthy Adults: A Background paper* (Ministry of Health 2003a), so that the family food environment provides a variety of appropriate and adequate foods. Note, however, that the food offered to infants and toddlers, compared with adults' food, need not be especially low in fat or high in fibre.

* Adjustment to the textures of some foods may be necessary to minimise the risk of food-related choking. For more information see section 4.4.4 and Appendix 13. Do not give small hard foods such as nuts or large seeds until children are at least five years old.

Table 4: Developmental stages and complementary foods for the first and second years of life

Development stage	Newborn Head up	Supported sitter	Independent sitter	Crawler	Beginning to walk Independent toddler
Approximate age	0–6 months (0–180 days)	6–7 months (180–210 days)	7–8 months (210–240 days)	8–12 months (240–365 days)	12–24 months
Physical skills	Needs head support	When placed on stomach, holds head up, supports weight on forearms, and pushes up on arms with straight elbows When sitting on person’s lap, holds head up, keeps head controlled when tipped, sits with less help and reaches out for toy Puts hands and toys frequently in mouth, explores fingers, thumbs and fists with great interest	Sits independently Can pick up and bring food to mouth	Learns to crawl May pull self up to stand	Pulls self to stand Stands alone Takes early steps Learns to walk alone Runs Climbs
Eating skills	Suckles, sucks and swallows Has tongue extrusion reflex (tongue protrudes so baby cannot take food from a spoon)	Shows signs of chewing movements Opens mouth easily when spoon touches lip or as food approaches Has no tongue extrusion reflex (ie, tongue does not protrude) and moves gently back and forth as food enters mouth Keeps food in mouth and swallows it, instead of spilling food out.	Learns to keep thick purées in mouth Leans towards food or spoon Is interested in finger foods Is learning to chew and bite Probably has some teeth present	Is interested in extended range of food and varied texture Can eat reasonably independent (but still needs some help to eat) Can bite well and can chew soft lumps Clears spoon with lips	Feeds self easily with fingers Can drink from a straw Can hold cup with two hands and take swallows Is more skilful at chewing (has a rotary chewing movement) Demands to spoon-self-feed Bites through a variety of textures Has molar teeth starting to appear

Development stage	Newborn Head up	Supported sitter	Independent sitter	Crawler	Beginning to walk Independent toddler
Approximate age	0–6 months (0–180 days)	6–7 months (180–210 days)	7–8 months (210–240 days)	8–12 months (240–365 days)	12–24 months
Baby's hunger and fullness cues	When hungry, the early signs are nuzzling, mouthing, increased alertness, hand sucking. Crying is a late sign of hunger. May open mouth during feeding, indicating desire to continue. When satisfied or wanting to stop eating, spits out nipple or falls asleep, stops sucking.	Seems hungry after the milk feed When hungry or wants more food, frequently cries, leans forward as food approaches, reaches for food or caregiver's hand, and opens mouth When satisfied or want to stop eating, turns head or body away from food, loses interest in food, pushes food or caregiver's hand away, loses mouth, looks distressed or cries	When hungry or wants more food, reaches for spoon or food, points to food When satisfied or wants to stop eating, slows down in eating, clenches mouth shut or pushes food away	When hungry or wants more food, reaches for food, points to food, shows excitement when food is presented When satisfied or wants to stop eating, pushes food away, slows down eating	When hungry or wants more food, expresses desire for specific foods with words or sounds, combines phrases with gestures, such as 'want that' and pointing, can lead caregiver to refrigerator and point to a desired food or drink When satisfied or wants to stop eating, shakes head to say 'no more' uses words like 'all done' and 'get down', plays with food or throws food
Appropriate textures and flavours	Liquids	<i>Puréed foods</i> Offer complementary foods after the milk feed Introduce new foods one at a time, starting with thin purées and gradually thickening consistency as tolerated Introduce new flavours	<i>Mashed foods</i> Offer complementary foods after the milk feed Offer an increasing variety of food, presented in different sizes and textures Serve some food as finger food Introduce new flavours	<i>Chopped foods</i> Offer complementary foods before the milk feed Offer an increasing variety of food, presented in different sizes and textures Serve some food as finger food Introduce new flavours	<i>Family foods (textures may need to be altered. See section 4.4.4 and Appendix 13)</i> Continue breastfeeding Introduce cows' milk or suitable alternatives* to drink instead of infant formula Offer an increasing variety of food, presented in different sizes and textures Introduce new flavours

Development stage	Newborn Head up	Supported sitter	Independent sitter	Crawler	Beginning to walk Independent toddler
Approximate age	0–6 months (0–180 days)	6–7 months (180–210 days)	7–8 months (210–240 days)	8–12 months (240–365 days)	12–24 months
Examples of foods	Breast milk Infant formula	Iron-fortified baby cereal Cooked and puréed meat (eg, beef, lamb or pork, chicken, or fish) or cooked and puréed vegetarian alternatives (eg, legumes) Puréeed plain rice, congee Cooked and puréed vegetables without skins, pips or seeds (eg, potato, kumara, pumpkin, cassava, tapioca, manioke ^(a)) (see Table 5) Puréeed fruit without skins, pips or seeds, cook to soften if necessary before puréeing (e.g., apple, pear, mango) (see Table 5) Age-appropriate commercial infant foods	Age-appropriate infant cereals Continue to cook and purée meat, fish and vegetarian alternatives Cooked and mashed egg Tofu, tempeh Mash (rather than purée) vegetables and fruit Use cows' milk or suitable alternatives* in cooked food (eg, custard, milk puddings) yoghurt, cottage cheese Age-appropriate commercial infant foods Finger food in pieces that can be easily picked up by infant (eg, ripe banana, well cooked pumpkin, toast fingers, thin slices of cheese)	Breakfast cereals (eg, porridge, wheat biscuits (iron-fortified), infant muesli) Meat, chicken and kai moana (seafood) minced or finely chopped and mixed with mashed cooked vegetables Thin scraping of peanut butter (smooth) Add chopped soft fruit to yoghurt or custard Age-appropriate commercial foods Slightly firmer finger foods: – soft ripe fruit or vegetables eg, kiwifruit or kumara – soft cooked carrot or apple (or finely grated if raw) – toast fingers, puffed crispbread – tender meat	All foods previously listed Tender finely chopped meats, chicken, kai moana or soft, slightly mashed vegetarian alternative Breads Small sandwiches with thinly sliced or spread filling Finely chopped salad vegetables (eg, lettuce, cucumber) Plain, pasteurised whole milk or suitable alternatives*
Liquids	Breast milk Infant formula	Breast milk Infant formula	Breast milk Infant formula	Breast milk Infant formula	Breast milk Milk Water

Source: Adapted from Butte et al (2004) and NHMRC (2003).

* Cows' milk as part of a varied diet is an important source of nutrients for children from one year of age. For some vegetarians, vegans and/or those who avoid cow's milk, there are suitable alternatives to cow's milk. For more information on suitable alternatives, see 'Plant-based milks' in section 12.1.1.3: Nutrition issues.

Additional Notes

- The ages of introduction are provided as guidelines only.
- Introduce new foods one at a time, allowing two to four days (Butte et al 2004) between each new food to establish that the infant does not have an allergy to the food. For those with a parent or sibling with a history of anaphylaxis or a severe food allergy or wanting more information on allergies, see section 12.5: Food allergies and food intolerances.

Table 5: Four major food groups: examples of foods and the nutrients they provide for infants and toddlers

Food group	Examples	Nutrients provided
<p>Vegetables and fruit (eg, fresh, frozen, canned and dried products*)</p> <p>(Remove stringy bits and skins for very young children)</p>	<p><i>Vegetables</i></p> <p>Potato, kūmara, pumpkin, taro, tapioca, cassava, manioke(a), carrot, kamokamo (marrow), parsnip, yam, green beans, pūhā, silverbeet, spinach, bok choy, Asian greens, broccoli, courgette (zucchini), cabbage, cauliflower, corn, parengo, peas, pele leaves, taro leaves (must be cooked), watercress, capsicum</p> <p>Salad vegetables</p> <p>Tomato</p> <p><i>Fruit</i></p> <p>Apple, apricot, avocado, banana, mango, melon, pawpaw, peach, plum, persimmon, pineapple, orange, berry fruit, kiwifruit</p> <p>Fruit salad</p>	<p>Energy</p> <p>Carbohydrates</p> <p>Dietary fibre</p> <p>Vitamins: especially folate, vitamin A (yellow and green vegetables), and vitamin C (dark green leafy vegetables and most fruit, potatoes)</p> <p>Minerals: magnesium, potassium</p>
<p>Breads and cereals (eg, breads, breakfast cereals, grains, rice and pasta)</p>	<p>Bread (eg, slice, roll, bun, pita, chapatti, rēwena)</p> <p>Baby muesli, cornflakes, infant cereal (eg, iron-fortified baby rice), porridge, wheat biscuits (iron-fortified)</p> <p>Plain rice, congee</p> <p>Pasta and noodles</p> <p>Steamed plain cake (mantou), steamed dumplings and buns</p> <p>Plain sweet biscuits, muffin, cake, rusks</p> <p>Crackers, puffed crispbread</p>	<p>Energy</p> <p>Carbohydrates</p> <p>Dietary fibre</p> <p>Vitamins: vitamins from the B group (except B12), vitamin E</p> <p>Minerals (particularly in wholegrain breads and cereals): magnesium, calcium, iron, zinc and selenium</p> <p>Protein</p>
<p>Milk and milk products (eg, milk, cheese, yoghurt) and suitable alternatives</p>	<p>Breast milk</p> <p>Whole (dark blue top) cows' milk</p> <p>Yoghurt</p> <p>Cheese</p> <p>Plant-based milk (calcium and vitamin B12–fortified) (eg, soy, rice)</p> <p>Soy yoghurt and cheese (calcium-fortified)</p> <p>Milk puddings (eg, custard, sago)</p>	<p>Protein</p> <p>Fats: higher proportion of saturated than poly- or monounsaturated fats especially in full fat products</p> <p>Energy</p> <p>Vitamins: riboflavin, vitamin B12, vitamin A, vitamin D</p> <p>Minerals: especially calcium, phosphorus, zinc and iodine</p>

* Dried fruit is high in sugar. It is also very sticky and can get stuck in teeth, contributing to dental decay. See section 12.12: Oral health for healthy infants and toddlers.

Food group	Examples	Nutrients provided
Lean meat, poultry, seafood, eggs, legumes, nuts and seeds	Casserole, mince Chicken Fish, kina, pipi, kōura (crayfish), pūpū (periwinkles), parengo (seaweed), pāua, eel Egg Hummus, baked beans, dhal, nut butters, patties/loaves Soy meat alternatives (eg, tofu, tempeh)	Protein Fats: both visible and marbled in meat (mostly saturated fat, cholesterol); mostly unsaturated fats in seafood, nuts and seeds) Carbohydrates: mainly legumes (dried peas and beans) Energy Vitamins: B12, niacin, thiamin Minerals: iron, zinc, magnesium, copper, potassium, phosphorus and selenium Iodine: particularly in seafood and eggs

Additional Notes

- Do not give:
 - salty meat such as corned beef, povi/pulu masima (salted brisket), and tinned fish as first foods
 - cows' milk before 12 months of age
 - honey before 12 months of age
 - whole nuts or large seeds before five years of age (because of the choking and inhaling risk)
 - foods with added fat, salt and sugar
 - alcohol, coffee, cordials, juice, soft drinks, tea (including herbal tea), and other drinks containing caffeine.

4.4.4 Creating a safe, positive feeding environment

Meals must be eaten while the infant is sitting in a high-chair or similar, and away from distractions such as the television or toys. Caregivers must always supervise an infant or toddler when they are eating, and be familiar with first aid for dealing with choking.

Family meals have an important impact on a child's dietary intake, psychosocial health and learning. Family meals can provide an opportunity to communicate, learn, transmit cultural and ethnic heritage, and develop family rituals. They are also an opportunity for positive role modelling by caregivers and other family members. There are positive nutritional and psychosocial outcomes from sharing meals. Traditions and routines are important to young children because they help to provide a sense of security (Story and Neumark-Sztainer 2005).

Responsive feeding is a term used to recognise that optimal feeding depends on how, when, where and by whom the child is fed, as well as what is fed (PAHO and WHO 2003). Responsive feeding calls for attention to be paid to signs of hunger and fullness to avoid underfeeding and overfeeding. Signs of hunger include nuzzling, mouthing, increased alertness, hand sucking and crying. Older infants may reach for the spoon or food, point to the food or show excitement when food is presented (Table 4). Signs of fullness can include spitting out the nipple, eating more slowly, clenching the mouth shut, or pushing food away.

Parents may be concerned if their child does not feed themselves early on and that the child's nutrition will suffer. In the Feeding Infants and Toddlers Study conducted on more than 3000 infants and toddlers in the United States in 2002, caregivers reported the ages that gross motor developmental milestones and fine motor skills required for self-feeding developed, and the food intakes at these ages were compared. Some differences in nutrient intakes were observed, but these differences disappeared as the children got older. By 15–18 months of age, self-feeding skills were comparable for all children, regardless of whether they self-fed earlier or later than the average (Clarke et al 2006).

Many caregivers experience times when their toddler is unusually fussy with their food. This is a common occurrence and is often associated with toddlers exerting their independence.

Babies and toddlers can choke on food quite easily

This is mainly because they have small air and food passages and are still learning to move food around in their mouths and how to bite, chew and grind food. To reduce their risk of choking:

- always make sure babies and toddlers sit down while they eat and that an adult is with them while they are eating or drinking
- offer food that matches their chewing and grinding ability

Be aware of foods that are more likely to cause choking – for example:

- **small hard foods** that are difficult for children to bite or chew (eg, nuts, large seeds⁺, popcorn husks, raw apple, carrot and celery)
- **small round foods** that can get stuck in children's throats (eg, grapes, berries, raisins/sultanas, peas, watermelon seeds, lollies)
- foods with **skins or leaves** that are difficult to chew (eg, sausages, chicken, lettuce, nectarines)
- **compressible*** food that can get stuck in children's throats (eg, hot dogs, sausages, pieces of cooked meat, popcorn)

⁺ For example, sunflower and pumpkin seeds.

* Compressible foods are those that can squash down into the shape of the child's throat and get stuck there.

- **thick pastes** that can get stuck in children’s throats (eg, chocolate spreads, thick peanut butter)
- **fibrous or stringy foods** that are difficult for children to chew (eg, celery, raw pineapple).

To reduce the risk of choking on these foods, you can:

- alter the food texture – grate, cook, finely chop or mash the food
- remove the high-risk parts of the food – peel off the skin or remove the strong fibres
- avoid giving small hard foods, such as whole nuts and large seeds until children are at least five years old.

For more information on choking see Appendix 13 and www.health.govt.nz

Meal time tips for caregivers with toddlers

- Establish a meal and snack-time routine.
- Make meal times sociable and relaxed.
- Sit with the toddler and eat as a family at the table.
- Where possible, let the toddler select their food from the food provided at the family meal.
- Offer food that matches the toddler’s chewing and grinding ability. This may mean you need to alter the textures of some foods.
- Be aware of foods which are more likely to cause choking. See Section 4.4.4 and Appendix 13.
- Serve small amounts and offer more if the toddler is still hungry after eating the serving.
- Give the toddler a choice of healthy foods for meals and snacks, and do not offer other options if the toddler chooses not to eat.
- Offer foods in a variety of ways (for example, in a bowl, as finger food, as soup or grated into main dish).
- Make food easy to eat – a size that is easy for toddlers to pick up is good.
- Limit a toddler’s milk consumption to no more than 500 mL per day. More than this can displace solid foods containing the other nutrients that children need.
- Involve the toddler in food preparation, as appropriate and possible.
- Try different ways of preparing food the toddler has previously refused.
- Ignore other people’s comments, particularly if they are comparing your child with their children.
- Accept that a toddler’s appetite and the amount they eat may vary from day to day.
- If your child is growing and developing appropriately, they are eating enough.
- Be a positive role model with food.
- Always supervise your child when they are eating.
- If you are unsure of issues regarding your child’s health, seek advice from your health practitioner.

All hospitals' neonatal units use ready-to-use formula where possible. If a preterm or immuno-compromised infant is formula fed in the community, it is important the best formula-feeding option is discussed with the infant's neonatologist or paediatrician.

The Food and Agriculture Organization of the United Nations and WHO convened, in 2004 and 2006, two expert consultations on *Enterobacter sakazakii* and *Salmonella* in powdered infant formula, and commissioned a risk assessment model (FAO and WHO 2004; FAO and WHO 2006). The Codex Committee on Food Hygiene is developing a Code of Hygienic Practice for Powdered Formulae for Infants and Young Children. It will then be adopted by the Codex Alimentarius Commission. Utilising these bodies of work and in light of the New Zealand situation, the following advice is considered appropriate to minimise the risk of infection from pathogens in reconstituted powdered formula for infants and young children.

For further information about *Enterobacter sakazakii*, see the Ministry of Health website (www.health.govt.nz) or the New Zealand Food Safety Authority website (www.nzfsa.govt.nz).

5.4.1 Cleaning and sterilising feeding and preparation equipment

To reduce the risk of contamination, the equipment used to prepare formula for feeding must be sterilised before use in the first three months of an infant's life. Equipment can be sterilised with sterilising solutions, in boiling water or in a steam-sterilising unit designed for use in a microwave. A dishwasher will not sterilise equipment.

If boiling water is used for sterilising equipment, great care should be taken to keep children away from it. Boiling (or even hot) water is a significant safety risk to children.

Steps for cleaning and sterilising feeding equipment

The steps for cleaning and sterilising feeding equipment are as follows.

- 1 Wash hands thoroughly with soap and water and dry them using a clean cloth or single-use paper towel.
- 2 Wash feeding and preparation equipment (for example, cups, bottles, teats and spoons) thoroughly in hot soapy water. If using feeding bottles, use clean bottle and teat brushes to scrub the inside and outside of bottles and teats to ensure all remaining feed is removed.
- 3 Rinse the feeding and preparation equipment well in hot water and air dry it, or wash it in a dishwasher.
- 4 If using a commercial home steriliser (for example, an electric or a microwave steam steriliser or a chemical steriliser), follow the manufacturer's instructions.
- 5 If sterilising by boiling:
 - fill a large pot with water
 - submerge all the washed feeding and preparation equipment in the water, ensuring no air bubbles are trapped under the equipment
 - cover the pot with a lid and bring the water to a rolling boil
 - turn off the element and keep the pot covered until the equipment is needed.

- 6 Before removing the feeding and preparation equipment from the steriliser or pot, wash hands thoroughly with soap and water, and dry them using a clean cloth or single-use paper towel. Sterilised kitchen tongs should be used for handling sterilised feeding and preparation equipment.
- 7 To prevent recontamination, remove feeding and preparation equipment from the boiled water or steriliser just before it is to be used. If equipment is removed from the steriliser and not used immediately, cover and store in a clean place. Feeding bottles can be fully assembled to prevent the inside of the sterilised bottle and the inside and outside of the teat from becoming contaminated.

Sterilise all equipment until the infant is three months old, after which it is sufficient just to wash the equipment thoroughly with hot soapy water and then rinse it.

5.4.2 Preparing a feed using powdered infant formula

Formula is best made up fresh for each feed and for immediate consumption. The formula must be made up according to the instructions on the container.

The scoop provided with the container of formula should be used for that formula only. The scoop has been designed to measure the correct amount of that particular formula to achieve the correct formula concentration. Use only level scoops of formula powder.

The formula should not be diluted or concentrated or have any food, beverage or medicine added unless on the advice of a health practitioner.

Steps for preparing a feed using powdered infant formula

The steps for preparing a feed using powdered infant formula are as follows.

- 1 Clean and disinfect a surface on which to prepare the feed.
- 2 Wash hands thoroughly with soap and water, and dry them using a clean cloth or single-use paper towel.
- 3 Boil a sufficient volume of water to last the day. If using an automatic kettle, wait until the kettle switches off, or if using a non-automatic kettle let the water come to a rolling boil.
- 4 Cool boiled water by placing it in a covered, sterilised container in the refrigerator with its mid-fridge temperature at 2–4°C. Keep this water for no longer than 24 hours.
- 5 Measure the appropriate amount of cooled boiled water into the cleaned and sterilised bottle. Add the powdered formula as instructed on the product label.
 - If using bottles, assemble the cleaned and sterilised teat and bottle according to the manufacturer’s instructions. Shake or swirl the bottle gently until the contents are mixed thoroughly.
 - If using feeding cups, mix the product thoroughly by stirring it with a clean and sterilised spoon.

Volume indicators on baby bottles marked with the EN14350 standard are considered accurate to within 5 percent at the 100 ml mark. Therefore, the Ministry recommends using bottles marked with the EN14350 standard to measure the water and make up infant formula. Baby bottles sold without the standard may have significantly inaccurate volume markings.

Household measuring cups and jugs are suitable for general kitchen use, but are not recommended for measuring small amounts of fluid such as for making up infant formula.

Use cooled boiled water until the infant is three months old, then use tap water from reticulated water supplies. If using bore water or tank water, boil the water until the infant is 18 months' of age. If using bore water, the quality of the water should be checked with local authorities or local public health units, especially for nitrate levels (Ministry of Health 2005a). See section 6.3.3: Water

5.4.3 If formula must be prepared in advance for later use

Prepared formula may be stored at up to 4°C in the lower half of the fridge, at the back, but should be kept for only a maximum of four hours.

If transporting a prepared bottle, keep the bottle cold in a chilly bin or an insulated carrier. Throw out prepared formula that has been out of the refrigerator for more than two hours. Ideally, when transporting formula, the cooled boiled water and powder should be kept separate, then mixed just before use (see section 5.3.5: Transporting feeds safely).

5.4.4 Warming stored feeds

Formula should be warmed gradually by placing the bottle containing the formula in hot water. Before feeding, caregivers must thoroughly shake the bottle containing the formula then test the temperature of the formula. The temperature of the formula can be tested by shaking a few drops onto the inside of the wrist. The formula is safe for the infant when it is comfortably warm to the touch.

Microwaves are not recommended for warming feeds because it is very easy to overheat formula. Microwaves can cause variations in temperature throughout the formula with 'hot spots', and the formula may continue to heat after it has been removed from the microwave (hence manufacturers' recommendations for standing time). This can cause extremely high temperatures, which may cause scalding (James 1989). Despite not being recommended, some caregivers will still use a microwave to warm feeds. In this case, they must shake the formula after heating, leave it to stand for two to three minutes, then shake it again before using. They should test the formula's temperature on their wrist as described above.

Discard made up formula that is not used after two hours at room temperature. Do not reheat used feeds.

For more information on warming infant formula see www.foodsmart.govt.nz

5.4.5 Transporting feeds safely

Transporting feeds increases the potential for harmful bacteria to grow. To minimise the risk of this occurring do the following.

- Before leaving home, measure cooled boiled water into cleaned (and sterilised, if infant is less than three months old) bottles. Screw the bottle's lid on tightly.
- Carry formula powder in measured amounts in a clean and sterilized container.
- When a feed is required, add the measured powder to the water in the bottle, replace the lid and shake the bottle gently to mix the formula.
- If possible, warm formula as described in section 5.4.4: Warming stored feeds
- Discard made up formula that is not used after two hours at room temperature.
- Do not reheat used feeds.

Appendix 7:

Sample Meal Plans for Infants and Toddlers

The meal plans in Tables 12–15 have been analysed for nutrients and to meet the nutrient reference values (NRVs) for healthy infants aged nine to 12 months and toddlers aged one to two years.

For infants aged seven to 12 months, the NRVs are based on the average intake of breast milk (600 mL per day) and 200 g of complementary food. The reference body weights are 9 kg for infants seven to 12 months of age and 13 kg for toddlers aged one to three years (NHMRC 2006).

For details on average breast milk intake at specific ages, see section 4.3: Importance of continued breastfeeding beyond period of exclusive breastfeeding.

The purpose of the meal plans is to demonstrate how the NRVs can be met, but they are not intended to be used as a dietary regimen for individuals. For more information on complementary feeding, see section 4, including Tables 4 and 5, which include examples of foods that can be given, including vegetarian options, foods for different ethnic groups, and vegetables and fruit available during different seasons.

The meal plans were analysed using Foodworks Professional Edition 2005.

Table 12: Three-day meal plan for infants aged 9 to 12 months

Day 1	Day 2	Day 3
<p>Breakfast</p> <p>Infant rice, iron fortified (5 tablespoons)</p> <p>Apple, stewed (3 tablespoons)</p> <p>Breast milk or formula to mix</p>	<p>Infant muesli, iron fortified (4 tablespoons)</p> <p>Pears, stewed or canned and mashed (3 tablespoons)</p> <p>Breast milk or formula to mix</p>	<p>Infant cereal, iron fortified (3 tablespoons)</p> <p>Fruit salad, canned and mashed (3 tablespoons)</p>
<p>Mid-morning snack</p> <p>Cheese on toast (½ slice)</p> <p>Kiwifruit (3 pieces)</p>	<p>Toasted bread, white (¼ slice)</p> <p>Margarine, low salt (½ teaspoon)</p> <p>Avocado (2 teaspoons)</p>	<p>Puffed crispbread (1)</p> <p>Cheese, Edam (2 thin slices)</p> <p>Carrot, raw, finely grated (2 tablespoons)</p>
<p>Lunch</p> <p>Soft pasta spirals (¼ cup), chopped, mixed with kumara (1 tablespoon), mashed and cottage cheese (1 tablespoon)</p> <p>Pieces of peeled, soft melon (4 tablespoons)</p>	<p>White toast (1 slice)</p> <p>Margarine, low salt (½ teaspoon)</p> <p>Vegetemite (1 teaspoon)</p> <p>Cheese, Edam, grated (1 tablespoon)</p> <p>Banana, 3 pieces</p>	<p>Chicken casserole with vegetables (2 tablespoons)</p> <p>Mashed potato (2 tablespoons)</p>
<p>Mid-afternoon snack</p> <p>Banana custard (3 tablespoons)</p> <p>Puffed crispbread (1)</p>	<p>Fruit yoghurt (¼ cup)</p> <p>Peaches, canned, mashed (3 tablespoons)</p> <p>Weetbix, crushed (3 tablespoons)</p>	<p>Puffed crispbread (1)</p> <p>Margarine, low salt (½ teaspoon)</p> <p>Soft pear pieces (¼ of a pear)</p>
<p>Dinner</p> <p>Cooked, mashed fish (¼ cup)</p> <p>Potato wedges (2)</p> <p>Cooked, mashed mixed vegetables (1 tablespoon)</p>	<p>Chicken casserole with vegetables (¼ cup)</p> <p>Carrot, mashed or soft finger food sized pieces (1 tablespoon)</p>	<p>Spaghetti noodles, chopped (2 tablespoons)</p> <p>Tomato and meat sauce (4 tablespoons)</p> <p>Mashed or chopped soft broccoli and carrot (1 tablespoon)</p>
<p>Total breast milk or formula for the day</p> <p>Breast milk or formula (2 ¼ cup)</p>	<p>Breast milk or formula (2 ¼ cup)</p>	<p>Breast milk or formula (2 ¼ cup)</p>

Metric conversion:

1 tablespoon = 15 ml 1 cup = 250 ml

Finger foods need to be in a size that can be easily picked up by infant.

Table 13: Summary of the nutritional analysis of the three-day meal plan for infants aged 9 to 12 months, average per day

	Average
Weight of food and fluid (g)	970
Fluid (mL)	788
Energy (kJ)	3265
Energy (kcal)	777
Carbohydrate (g)	91
Protein (g)	29
Total fat (g)	34
Fibre (g) (Englyst)	5
Saturated fat (g)	14
Calcium (mg)	581
Iron (mg)	10
Sodium (mg)	655
Zinc (mg)	5.1
Selenium (µ)	21
Vitamin C (mg)	96
Total vitamin A equivalents (µg)	860

Table 14: Three-day meal plan for toddlers aged one to two years

Day 1	Day 2	Day 3
Breakfast Wheat biscuits (1½ biscuits) Banana, chopped (½) Milk (¼ cup) Water (¼ cup)	Rice cereal (½ cup) Milk (½ cup) White toast (½ slice) Margarine, low salt (1 teaspoon) Jam (1 teaspoon) Water (¼ cup)	Wheat biscuits (1½ biscuits) Milk (¼ cup) Strawberries, chopped (4) Banana (½) or tinned fruit in juice
Mid-morning snack Puffed crispbread with scraping of smooth peanut butter (2) Carrot sticks, cooked (3 tablespoons) Water (½ cup)	Puffed crispbread (2) Avocado (2 tablespoons) Banana (½) Water (½ cup)	Malt biscuits (2) Apple, grated (½ cup) Water (½ cup)
Lunch Wholemeal bread (1 slice) Egg, mashed (½) Lettuce, finely chopped (2 leaves) Mayonnaise, reduced fat (1 teaspoon) Margarine, low salt (1 teaspoon) Kiwifruit pieces (½) Milk (¼ cup)	Mousetrap Wholemeal bread toast (1 slice) Vegemite (1 teaspoon) Cheese, grated (2 tablespoons) Carrot sticks, cooked (3 tablespoons) Celery sticks, cooked (3 tablespoons) Orange (½) Milk (½ cup)	Macaroni cheese (30 g) Wholemeal roll (⅓) Margarine, low salt (1 teaspoon) Milk (¼ cup)
Mid-afternoon Fruit yoghurt (⅓ cup) Water (½ cup) Banana (½)	Apricots, cut in slices (2 pieces) Cheese, thin slices (2) Milk (½ cup)	White bread toasted (¼ slice) Margarine, low salt (½ teaspoon) Vegemite (1 tablespoon) Yoghurt (¼ cup) Water (½ cup)
Dinner Pasta (⅓ cup) Tomato and meat sauce (4 tablespoons) Peas (2 tablespoons) Broccoli (3 tablespoons) Water (¼ cup)	Fish pie with mashed potato (½ cup) Green beans, cooked (3 tablespoons) Carrot, mashed or soft finger food sized pieces (1 tablespoon) Water (¼ cup)	Lamb chop, finely chopped (1 small) Parsnip and carrot mash (4 tablespoons) Broccoli (3 tablespoons) Spinach (3 tablespoons) Water (¼ cup)
Supper Apples, stewed (3 tablespoons) Wheat germ (2 tablespoons) Milk (½ cup)	Peaches, canned (⅓ cup) Milk (½ cup)	Fruit yoghurt (⅓ cup) Plums, stewed (3 tablespoons) Milk (½ cup)

Metric conversion: 1 tablespoon = 15 ml 1 cup = 250 ml

Finger foods need to be in a size that can be easily picked up by infant.

Table 15: Summary of the nutritional analysis of the three-day meal plan for toddlers aged one to two years, average per day

	Average
Weight of food and fluid (g)	1280
Fluid (mL)	1060
Energy (kJ)	3965
Energy (kcal)	944
Carbohydrate (g)	117
Protein (g)	41
Total fat (g)	35
Fibre (g) (Englyst)	12
Saturated fat (g)	15
Calcium (mg)	708
Iron (mg)	6.4
Sodium (mg)	1099
Zinc (mg)	5.6
Selenium (µ)	17
Vitamin C (mg)	70.1
Total vitamin A equivalents (µg)	1201

Appendix 13:

Food-related choking in babies and young children

People can choke on food at any age but young children, especially those less than three years old, are at greatest risk. Approximately 70–90 percent of all choking incidents reported are in children under three years, with foods being the most common cause of choking (Altkorn et al 2008, Altmann and Ozanne-Smith 1997, Despres et al 2006 and Goren et al 2005).

Sixteen children and young people (aged 0–24 years) died from foreign body inhalation (involving choking) in New Zealand during 2002–2009 (Hayman and Dalziel 2010). Thirteen deaths were in children under six years of age and nine of the deaths involved the inhalation of food, namely meat/sausage, peanuts, apple and grapes.

European data found that for every child that dies from foreign body inhalation, another 10 are hospitalised (Zigon G et al 2006). Non-fatal choking incidents can cause severe acute and chronic health problems such as aspiration pneumonia, perforation to the airway or brain damage due to lack of oxygen.

The US Centers for Disease Control (CDC 2002) suggests that because complete removal of all choking hazards is unlikely, parents and caregivers should:

- be aware of the types of foods and objects that pose a choking risk for children
- become familiar with methods to reduce risk
- be able to treat choking in children.

Ozdemir et al (2005) also suggest parents must be educated about the importance of age and stage of development on feeding with solid food.

While people of any age can choke on food, young children choke on food more easily for a number of reasons (Byard et al 1996, Committee on Injury, Violence, and Poison Prevention 2010), including:

- the small diameter of their air and food passages (similar to the diameter of their little finger) which can be easily blocked by small objects
- their inexperience with moving food around in the mouth
- biting and chewing skills that are not fully developed
- a less effective cough mechanism to dislodge foreign bodies.

Byard et al (1996) suggest that although some young children are able to bite off food they may, due to age, lack the second molars that enable them to successfully grind the food prior to swallowing. Children don't normally have these second molars fully erupted into the mouth and functioning until they are over 30 months (two-and-a-half-years) of age. There are also significant individual, behavioural and anatomical differences among healthy children of the same age (Carruth and Skinner 2002). As a result, using age alone as a guide to judge eating competency can be problematic.

There are a number of high risk foods that are often associated with young children choking and most of these share common characteristics see Table 20. Making carers aware of them and how to make changes to reduce their risk is recommended.

Table 20: Characteristics and examples of foods that pose a high choking risk for children under five years

Food characteristics	Food examples	Choking risk	Changes to reduce risk
Small hard foods	Nuts Large seeds Hard dried fruit Pieces of raw carrot, celery or apple Food that break into hard sharp pieces eg, crisps, corn chips and rice crackers Unpopped popcorn husks	Difficult for children to bite through and break down enough to swallow safely. Pieces can become stuck in children's airways	Avoid giving whole nuts, large seeds or hard dried fruit to children under the age of five Use thinly spread smooth peanut butter instead of whole or chopped nuts Carrot, apple and celery can be either cooked until soft or finely grated
Small round or oval foods	Grapes, berries, cherry tomatoes Raisins/sultanas Fruit with stones and large seeds or pips, eg, watermelon, small stone fruits Peas Lollies/sweets	Foods with these qualities can lodge in children's airways Children do not have the ability to chew small round hard, chewy or sticky lollies/sweets	Grapes, berries and cherry tomatoes can be halved or quartered or chopped smaller Soak raisins/sultanas to soften and cut in half if large Remove stones from fruits Peas can be squashed with a fork Small round hard or chewy and sticky lollies/sweets should not be given to children under the age of three years
Foods with skins or leaves	Chicken, Sausages, saveloys, 'cherrios', frankfurters etc Stone fruits (eg, plums, peaches, nectarines) Apples and pears Tomatoes Lettuce and other raw salad leaves. Spinach, cabbage	Food skins are difficult to chew and can completely seal children's airways	Remove or peel skins before serving Chop up (to at least size of child's small finger nail and add to mashed food Remove stones from fruit Finely chop salad leaves Cook spinach and cabbage until soft and chop finely

Food characteristics	Food examples	Choking risk	Changes to reduce risk
Compressible foods	Sausages, saveloys, 'cherrios', frankfurters, hotdogs etc Pieces of cooked meat Marshmallow Popcorn Chewing or bubble gum	Can conform to the airway shape and get wedged tightly	As above, remove skins before serving Cook meat until very tender Chop finely (to at least size of child's small finger nail) and add to mashed food Marshmallows and popcorn should not be given to children under three years Do not give chewing or bubble gum
Thick pastes	Chocolate spreads Peanut butter	Can form to the shape of a child's airway and stick to its side	Use thick pastes sparingly and spread evenly onto bread
Fibrous or stringy foods	Celery Rhubarb Raw pineapple	Fibres make it difficult for children to break up the food into smaller pieces	Peel the skin/strong fibres off celery and rhubarb Slice these foods thinly across the grain of fibres

Based on information from Altkorn et al 2008, Altmann and Ozanne-Smith 1997, Byard et al 1996, Committee on Injury, Violence, and Poison Prevention 2010, Goren et al 2005, Hayman and Dalziel 2010, Karatzanis et al 2006, Morley et al 2004, Ozdemir et al 2005.

One of the most important choking prevention measures is for carers to stay with and supervise young children while they are eating. Young children should learn not to play or run around while eating (Hayman and Dalziel 2010). Establishing a routine where young children sit while eating is recommended.

Parents and caregivers should never resort to forcing children to eat and should request a feeding assessment through their general practitioner for a child who repeatedly gags or chokes on age appropriate foods. An oral health assessment via the community oral health service may be needed if there is the child has discomfort with eating.

Although all care can be taken to prevent food related choking incidents they may still occur. Due to young children's greater vulnerability to accidental injuries it is recommended people caring for children, including parents, teachers and child care providers should learn cardiopulmonary resuscitation (CPR) and choking first aid for children (Ozdemir et al 2005, Committee on Injury, Violence, and Poison Prevention 2010).

For the key messages on minimising the risk of food-related choking in young children see section 4.4.4 Creating a safe, positive feeding environment.

For more information on food related choking see the Ministry of Health website: www.health.govt.nz

For information on choking first aid and cardiopulmonary resuscitation (CPR), see your *Well Child Tamariki Ora Health Book* or the Ministry of Health website www.health.govt.nz