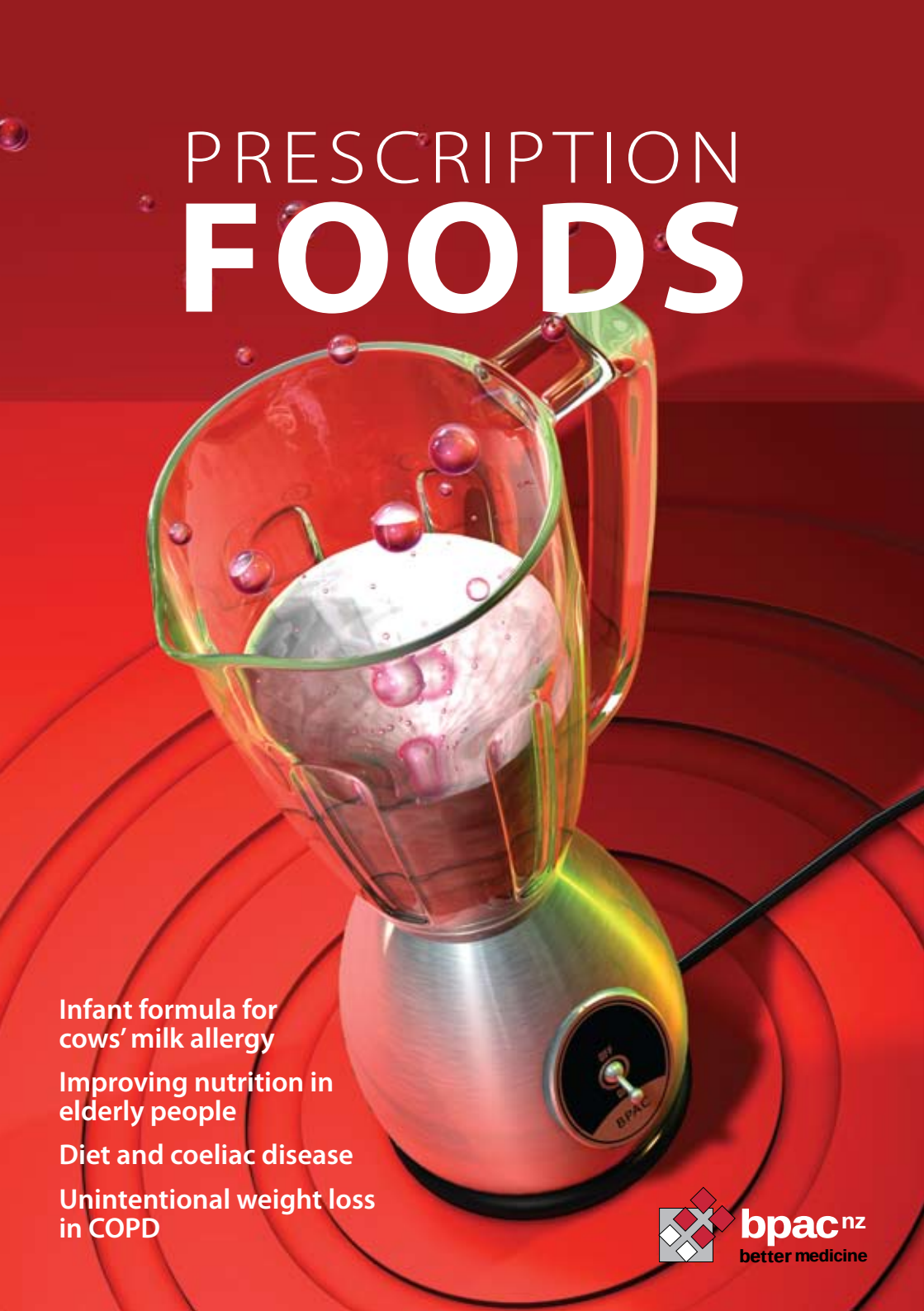
PRESCRIPTION FOODS



Infant formula for cows' milk allergy

Improving nutrition in elderly people

Diet and coeliac disease

Unintentional weight loss in COPD

bpac nz
better medicine

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Introduction

From April 1, 2011 the funding and access criteria for some oral nutritional supplements and infant formula were changed. A wider range of practitioners (including GPs and dieticians) are now able to prescribe these products, according to Special Authority criteria based on international consensus.

Over the last several years there has been a steady growth in the prescribing of ready-mixed liquid feeds and elemental infant formula at a significant cost to the pharmaceutical budget. Similar trends have also been observed in other countries including the United Kingdom and Australia.

This increase is in part due to inappropriate or unnecessary prescribing, targeted advertising and a lack of review of the patients' continuing need for a supplement. For example, there is a tendency to overuse ready-mixed sip feeds instead of taking steps to improve nutrition with simple "Food First" options, and expensive elemental amino acid formula tends to be prescribed first-line for cows' milk protein allergy when it should be reserved for specific conditions.

This special edition booklet provides an update of some articles which appeared in BPJ 15 (Oct, 2008), as well as some new material, in the context of the issues outlined above. The main aim is to provide guidance on the optimal and cost effective use of oral nutritional supplements and infant formula.

ACKNOWLEDGEMENT: Thank you to **Sue MacDonell**, Dietitian, Southern DHB, Clinical Tutor, Department of Human Nutrition, University of Otago, Dunedin for expert guidance in developing this special edition booklet.

CONTENTS

4 **Allergy to cows' milk protein and the appropriate use of infant formula**

Extensively hydrolysed formula for infants aged under six months and soy formula for infants aged over six months are the first-line choices for infants with cows' milk protein allergy, without anaphylaxis. Amino acid formula is the first choice for infants with anaphylaxis due to cows' milk protein allergy or eosinophilic oesophagitis.

15 **Dietary advice for people with coeliac disease**

People with a confirmed diagnosis of coeliac disease must adhere to a life-long gluten-free diet. When first diagnosed, nutritional status may be compromised and repletion doses of vitamins and minerals may be necessary. A small number of gluten-free foods are available, partially subsidised on the Pharmaceutical Schedule, however, a much greater range of products can be purchased from retail outlets.

20 **Strategies to improve nutrition in elderly people**

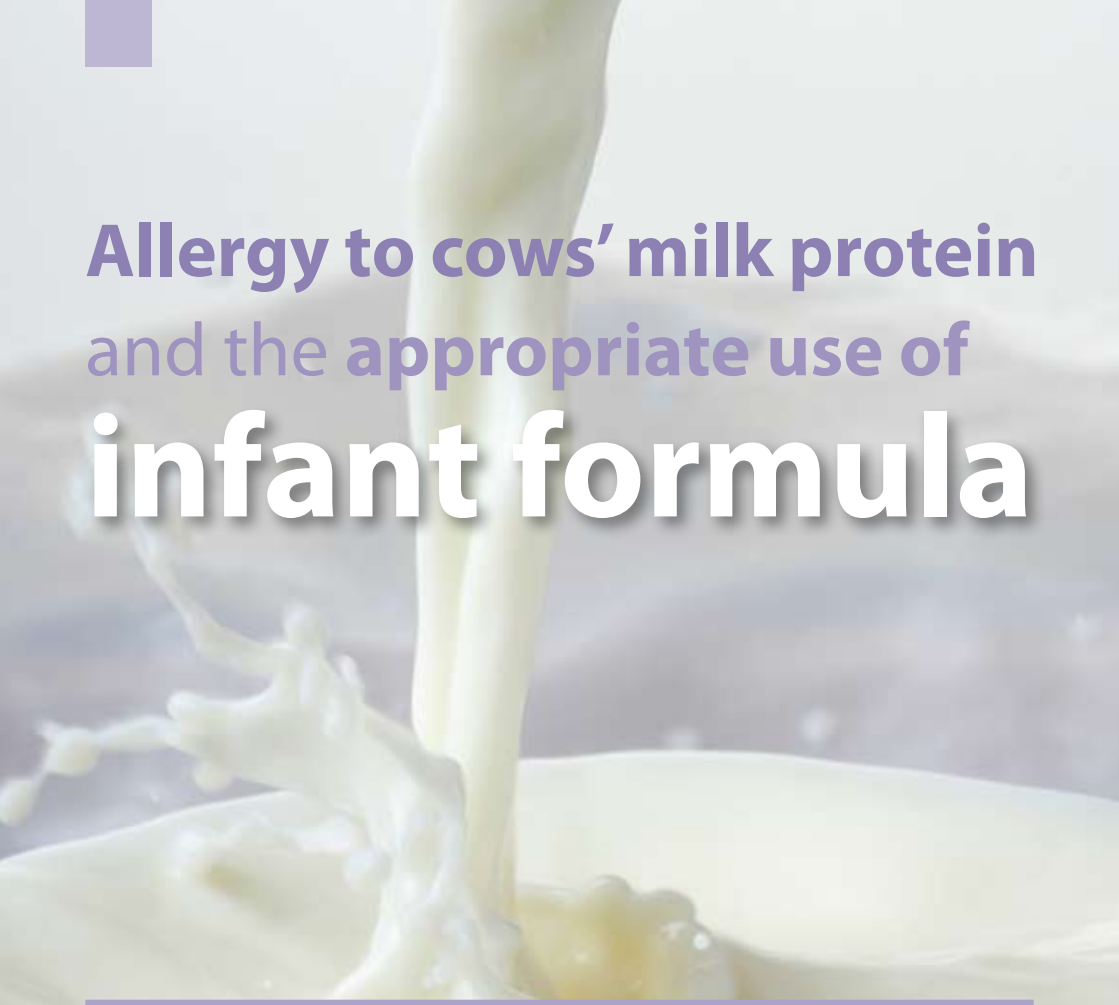
The incidence and impact of malnutrition in older people is underestimated. The best option for treating malnutrition is to enhance normal eating and drinking. A "Food First" approach encourages eating frequent, small, high energy and protein meals and snacks. Nutritional supplements for weight gain are generally not required unless body weight is unable to be maintained with a normal balanced diet, or if food cannot be eaten safely.

CONTENTS

35 **The nutritional management of unintentional weight loss in people with COPD**

People with COPD are generally underweight, have reduced muscle mass and are often malnourished, leading to other health problems. Opportunities for dietary intervention should be explored, aiming at early detection and early treatment of involuntary weight loss.

Allergy to cows' milk protein and the appropriate use of infant formula



Key Concepts

- Infants with cows' milk protein allergy (CMPA) can present with a range of syndromes. Definitive diagnosis can be difficult and specialist advice and/or referral may be necessary
- Three types of formula (soy, extensively hydrolysed protein and amino acid) are available for infants with CMPA
- Selection of the appropriate formula for CMPA depends on the allergy syndrome and the age of the infant
- For non-anaphylactic CMPA in infants aged under six months, extensively hydrolysed formula is recommended as first choice
- For non-anaphylactic CMPA in infants aged more than six months, soy formula can be trialled as first choice
- For infants with anaphylaxis due to CMPA or eosinophilic oesophagitis, amino acid formula is recommended as first choice
- If the first choice formula is not tolerated, an alternative formula can be trialled
- Other formula such as goats' milk-based, lactose-free and partially hydrolysed formula are not suitable for CMPA

Background to infant formula funding changes

Soy formula and elemental formula are the two main products used for infants with cows' milk protein allergy (CMPA). The two types of elemental formula available are extensively hydrolysed formula and amino acid based formula.

In New Zealand, more expensive and last-line amino-acid formula products, e.g. Neocate, are being prescribed as an early option. Pharmaceutical dispensing data indicate that 78% of infants with CMPA are being prescribed an amino acid formula without an initial trial of an extensively hydrolysed formula.

The use of amino acid formula as an early option is a concern on two fronts. Firstly, it is out of line with international guidelines which suggest that only approximately 5–10% of infants with CMPA require an amino acid formula.[1,2] Secondly, amino acid formula is significantly more expensive than other options (approximately five to six times the cost of extensively hydrolysed formula per 100 mL). The high cost and the high uptake of amino acid formula in New Zealand (the use of elemental formula is approximately 60% higher in New Zealand than in Australia on a per capita basis)[3] is causing expenditure growth in the Special Foods therapeutic group. In 2008/09 expenditure on elemental formula was $5.8 million, with approximately 38% annual growth (Figure 1).

Funding changes to infant formula

From April 1, 2011:

- Lactose free, soy (S26 Soy, Karicare Soy) and goats' milk infant formula will no longer be funded
- Special Authority approvals for the presently defined "elemental formula" will be split in to two groups:
  - Extensively hydrolysed formula, e.g. Pepti-Junior
  - Amino acid formula, e.g. Neocate, Elecare and Vivonex Pediatric

  Funding for amino acid formula will only be available to patients who have trialled the extensively hydrolysed formula or who have had anaphylaxis on exposure to cows' milk, or who have eosinophilic oesophagitis.
- Reassessment for continued funding, including assessment as to whether the infant can be switched to a less specialised formula will be required every six months instead of every 12 months.
- Patients who currently have a valid Special Authority will not be affected by these changes, until their current approval expires
- Extensively hydrolysed formula and amino acid formula will be fully funded (for eligible infants)

Given that clinical guidelines recommend the use of amino acid formula, only after a trial of an extensively hydrolysed formula (except for infants with anaphylaxis due to CMPA and in eosinophilic oesophagitis) and the unsustainable growth in expenditure, PHARMAC reviewed the access and funding of these products. This has resulted in modification of the access criteria so that:

- The less specialised products such as extensively hydrolysed formula should, in general, be trialled before funding is made available for the last-line amino acid formula
- Patients using these formulae should be reviewed regularly to determine if, as they get older, it is appropriate to transition them to cows' milk or less specialised products such as extensively hydrolysed or soy formula

PHARMAC also considered which of the milk-replacement options should be considered for funding versus which should be considered a private cost. PHARMAC concluded that the more specialised products, such as extensively hydrolysed formula and amino acid formula, should be fully subsidised (with Special Authority) and less specialised products that are available in supermarkets, such as lactose-free and soy formula, should not be funded (and be a private cost).

Cows' milk protein allergy – a spectrum of syndromes

CMPA is an immunologically mediated adverse reaction to cows' milk protein, with a prevalence of approximately 2% in infants aged under two years.[1] Allergic reaction to cows' milk protein can be IgE or non-IgE mediated, and the spectrum of reactions ranges from immediate anaphylaxis and food allergy reactions to delayed effects such as atopic

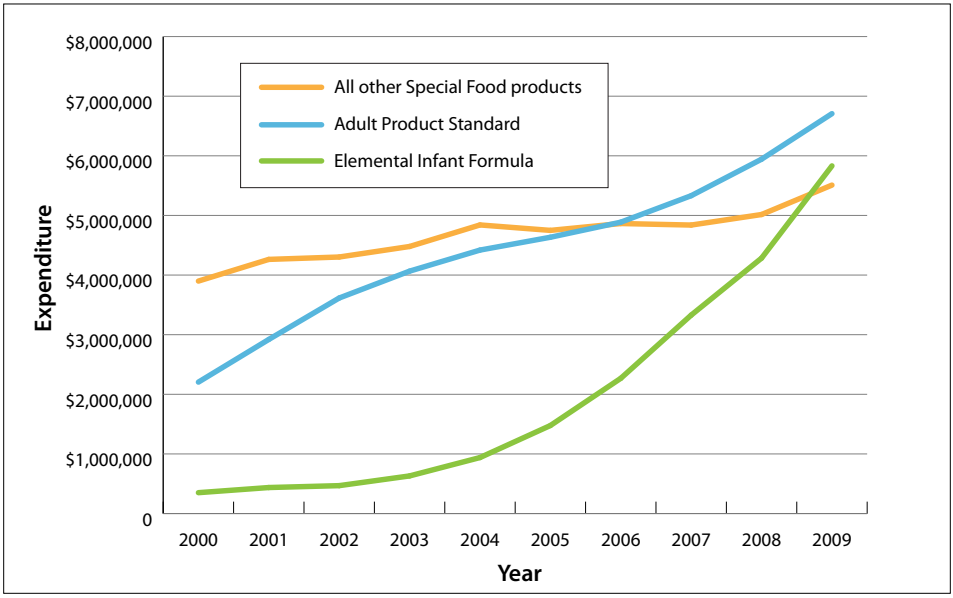


Figure 1: Special Foods expenditure in the Pharmaceutical Budget (main categories)

eczema. Table 1 (over page) provides a summary of the various clinical presentations of CMPA, including key differential diagnoses.

Immediate and delayed CMPA can be differentiated by the timing of the reaction in relation to the intake of cows' milk. Immediate reactions, such as anaphylaxis, angioedema, urticaria and vomiting, occur within minutes. In contrast, delayed reactions, such as food protein enteropathy, proctocolitis and eosinophilic oesophagitis, can manifest over hours or days. Some disorders have features of both immediate and delayed reactions, e.g. in eczema caused by CMPA, the pruritic rash can occur within minutes, hours or days. CMPA can also occur in exclusively breastfed infants due to allergens present in breast milk from maternal ingestion of dairy products.

Immediate allergic reactions

The most serious form of immediate reaction is anaphylaxis with respiratory tract involvement and/or hypotension. In infants the features of anaphylaxis are not always apparent and they may present with coughing, wheezing, severe distress, floppiness or collapse. Anaphylaxis due to CMPA is extremely rare in exclusively breastfed infants.

CMPA allergy can also present with an acute allergic (non-anaphylactic) reaction with erythema, angioedema, urticaria or vomiting. Infants with CMPA are often allergic to other foods such as eggs and peanuts. Immediate allergic reactions are possible in exclusively breastfed infants.

About 80% of cases of immediate CMPA reactions resolve by age three years.[2]

Food protein-induced enterocolitis syndrome

This syndrome is a relatively uncommon non-IgE mediated reaction. Infants usually present with rapid onset of projectile vomiting, floppiness, pallor and possibly diarrhoea, one to three hours after ingestion of cows' milk. The differential diagnosis may include gastroenteritis, sepsis or intestinal obstruction. Food protein-induced enterocolitis syndrome usually occurs when cows' milk is first introduced and can also be caused by other food allergies such as soy, wheat, rice and chicken. In most infants, symptoms resolve completely by age three years.[2]

Atopic eczema

CMPA or allergy to other foods (particularly egg, milk and peanuts) should be considered as a possible cause of eczema in children (**that is not responding to appropriate treatment**), especially if symptoms are moderate to severe.

The main feature of eczema due to CMPA is pruritic rash, which can be severe. Most, but not all, reactions are IgE mediated. The condition tends to improve over time, though the age of clinical resolution is variable.[2]

Gastrointestinal syndromes

There are a wide range of gastrointestinal syndromes due to CMPA. CMPA may present with vomiting, chronic diarrhoea, malabsorption and failure to thrive. Multiple food allergies are sometimes involved.

Gastro-oesophageal reflux disease (GORD)
In approximately 40% of infants referred for management of GORD, the underlying cause is CMPA.[1] The typical symptoms are frequent regurgitation, poor feeding and aversion to feeding. The reaction is not usually IgE-mediated. In GORD caused by CMPA, symptoms may partially improve with a protein pump inhibitor (PPI) and usually resolve by age 12 – 18 months.[2]

Allergic eosinophilic gastroenteritis
This condition is characterised by weight loss and failure to thrive associated with vomiting, diarrhoea, severe irritability and sometimes blood loss in the stool after feeding. Iron deficiency and protein-losing enteropathy can occur in severe cases.[1]

Food protein-induced enteropathy
Infants with allergic enteropathy presents with persistent diarrhoea, perianal excoriation, failure to thrive and vomiting. The infant may have anaemia

Table 1: Clinical presentations and differential diagnosis of CMPA conditions (Adapted from Allen et al, 2009)[2]

Condition	Timing of symptoms in relation to ingestion	Clinical features	Distinguishing features
Acute allergic reaction (nonanaphylactic)	Immediate, up to 60 min	Perioral/orbital angioedema/ erythema. Generalised urticaria Vomiting, diarrhoea	No recurrence if avoidance complete. Incidence approximately 2% in infants.
Anaphylaxis	Immediate, up to 60 min	Respiratory +/- cardiovascular involvement often associated with above features	As above. IM adrenaline treatment of choice. Rare manifestation of CMPA.
Food protein-induced enterocolitis syndrome	Typically 2–4 hours	Profuse vomiting +/- diarrhoea, sudden onset of pallor and floppiness. 20% present as hypovolaemic shock (with associated metabolic acidosis and methaemoglobinaemia)	Responds to fluid resuscitation, adrenaline not required. Unknown incidence but thought to be approximately 0.3%.
Eczema	Min/hours/days	Pruritic rash	Often generalised, onset at introduction of cows' milk. Incidence due to CMPA unknown.
Eosinophilic oesophagitis	Days	Vomiting, feed refusal, failure to thrive, oesophageal dysmotility	Histological diagnosis, 24 hours pH monitoring usually normal, unresponsive to proton pump inhibitors. Incidence approximately 0.04% in infants.
Cows' milk protein-induced GORD	hours/days	Frequent regurgitation, poor feeding, feed aversion	Partially responsive to proton pump inhibitors when underlying mechanism related to CMPA. Up to 40% of infants with GORD have CMPA.
Enteropathy	hours/days	Vomiting, diarrhoea, severe irritability, failure to thrive, iron deficiency anaemia, protein losing enteropathy	Receiving cow's milk in diet. Unknown incidence due to CMPA.
Proctocolitis	hours/days	Low-grade rectal bleeding in a well infant	Normal perianal inspection, thriving. CMPA is the most common cause.
Colic	hours/days	Paroxysms of unexplained, inconsolable crying	Responds to dietary elimination, early onset soon after the introduction of cows' milk protein. May be caused by CMPA in some cases.
Constipation	hours/days	Passage of infrequent and/or hard stools	Responds to dietary elimination, early onset soon after the introduction of cow's milk protein. Unknown incidence due to CMPA.

	Occurrence in exclusively breast fed infants	Differential diagnosis	Age of clinical resolution	Useful investigations
	Possible	Idiopathic urticaria, insect bite	80% by 3 years	Skin prick test, IgE antibodies, oral food challenge
	Extremely rare	Sepsis, acute cardiovascular or respiratory compromise, seizures	As above	Skin prick test, IgE antibodies
	No	Sepsis, gastroenteritis, malrotation, intussusception, metabolic disorder	Most by 3 years of age	History diagnostic, no laboratory markers available
	Yes	Seborrhoeic dermatitis, acrodermatitis enteropathica	Variable, tendency to improve with age	Skin prick test, IgE antibodies, elimination – re-challenge sequence
	None reported	GORD, mucosal candidiasis (white plaques)	Unknown	Endoscopy
	Yes	Idiopathic GORD, eosinophilic oesophagitis, malrotation	12–18 months	Clinical diagnosis. Requires endoscopy if haematemesis or significant failure to thrive
	Yes	Lactose intolerance, coeliac disease giardiasis, immune deficiencies, autoimmune enteropathy	Unknown	Small bowel biopsy for histology, duodenal disaccharidases and microscopy of duodenal aspirate for giardia
	Yes	Constipation with anal fissure, infantile inflammatory bowel disease, chronic granulomatous disease, juvenile polyp	12 months	Rectal biopsy only if atypical features or non-responsive to treatment
	Yes	Idiopathic colic, developmental disorders, urinary tract infection	4–6 months	Cow's milk elimination and re-challenge
	Yes	Hirschsprung's disease, slow transit constipation	12–18 months	Cow's milk elimination and re-challenge in conjunction with laxative treatment. Rectal biopsy in infants with early-onset severe constipation

and hypoproteinaemia. Chronic malabsorption occurs due to intestinal villous damage.[2] An association with soy allergy or secondary lactose intolerance is common. If CMPA and lactose intolerance co-exist, a lactose free formula will ameliorate the osmotic diarrhoea but continued exposure to cows' milk protein will worsen intestinal damage.[2]

Constipation and infantile colic

The role of CMPA is controversial in these disorders and unequivocal diagnosis is difficult. Both conditions are common in infancy and the causes are multi-factorial, although elimination of cows' milk from the diet may resolve symptoms. Colic usually resolves by age four to six months and constipation by age 12 – 18 months.[2]

Food protein-induced proctocolitis

Infants with food protein-induced proctocolitis usually present with mild diarrhoea and low-grade rectal bleeding (often with mucous and flecks of blood) within the first three months of life and most develop tolerance to CMPA by 12 months.[2] Although CMPA is most often implicated, other food proteins such as soy, rice and wheat may contribute and this condition can also occur in infants who are breast fed. Infants are otherwise generally well although in prolonged or severe cases there may be failure to thrive or anaemia.[2]

Eosinophilic oesophagitis

This condition is more common in older children than infants. In infants, the usual features are refusal of food, failure to thrive, vomiting, reflux and poor response to anti-reflux treatments. Diagnosis requires endoscopy and is based on histological finding of eosinophilia of the oesophagus. Infants with eosinophilic oesophagitis may have hypersensitivity to multiple foods.[1]

Recommendations for referral for investigation of CMPA[2]

Urgent referral is required for infants with:

Anaphylaxis

Severe failure to thrive

Hypoproteinaemia/protein losing enteropathy

- Clinical features include; vomiting, diarrhoea, severe irritability, failure to thrive, iron deficiency anaemia

Food protein induced proctocolitis

- Low grade rectal bleeding in an otherwise well infant

Referral is required for infants with the following conditions if a trial of cows' milk elimination has failed:

Haematemesis*

Chronic diarrhoea

Persistent vomiting

Persistent rectal bleeding*

Persistent iron deficiency anaemia

Severe eczema

* Apply clinical judgement – these conditions would often warrant urgent referral.

Diagnosis of cows' milk protein allergy can be challenging

As CMPA is not a single, uniform entity, making a clear diagnosis can often be difficult. Many of the symptoms observed in CMPA syndromes are non-specific, e.g. diarrhoea, reflux, constipation and other allergies, and can be caused by other common clinical conditions or allergies. Generally, there is limited evidence for switching formula when infants experience symptoms such as vomiting, spilling, crying, diarrhoea or constipation, unless they are severe or persistent, when further investigation is warranted. There is significant potential for incorrect or over-diagnosis of CMPA, exacerbated by misinformation about the significance of milk and food allergies, targeted marketing of infant formula and a trend for avoidance of cows' milk products and use of hypoallergenic infant formula. Conversely, under-diagnosis of CMPA may increase the risk of adverse nutritional or behavioural outcomes.

A correct diagnosis is critical and this may often require referral for immunological or other investigations such as biopsy or specialist gastrointestinal examination (see sidebar Page 10).

In all cases, diagnosis is usually confirmed by complete elimination of cows' milk from the diet for two to three weeks and observing if the symptoms resolve.[1] In some situations, a rechallenge to see if symptoms recur may be indicated to confirm a diagnosis. As CMPA may naturally remit over time, a rechallenge after a period of avoidance might be useful to ascertain tolerance.[1]

Persistence of symptoms after elimination of cows' milk from feeds can indicate the possibility of other food allergies, e.g. peanut, egg or wheat, or another condition with similar symptoms, such as lactose intolerance or idiopathic urticaria.[2]

Infant formula for treatment of CMPA

Soy

Soy-based infant formula is not appropriate for infants aged under six-months as cross-reactivity or concurrent soy allergy is much higher in this group – 25% under age six months versus only 5% between age 6 – 12 months.[2] Some infants aged over six months find soy-based formula more tolerable than extensively hydrolysed formula.

Although soy-based formula are not subsidised, these products remain an option for treatment of CMPA in infants aged over six-months and are comparably priced to standard cows' milk formula.

Extensively hydrolysed formula

Partially or extensively hydrolysed formula contains cows' milk protein that has been broken down into peptides. In general, the more extensive the hydrolysis of the protein, the less likely it is to cause an allergic response. Only about 10% of infants do not tolerate extensively hydrolysed formula and require progression to amino acid formula.[2]

Amino acid formula

These are the most hypoallergenic formula and should only be considered as first line options for less common, specific types of CMPA or if extensively hydrolysed formula has been trialled and not tolerated.

Table 2: Syndromes associated with cows' milk protein allergy and appropriate choice of formula feed (adapted from Kemp et al, 2008).[1]

		Choice of Formula		
Syndrome	Onset of reaction	First Choice	Second (if first not tolerated)	Third (if second not tolerated)
Immediate Reaction				
Immediate Food Allergy	< 1 hour	Extensively hydrolysed formula (< 6 months)	Amino acid formula	
		Soy (> 6 months)	Extensively hydrolysed formula	Amino acid formula
Anaphylaxis	< 1 hour	Amino acid formula with urgent referral		
Food protein-induced enterocolitis syndrome	1 – 3 hours	Extensively hydrolysed formula	Amino acid formula	
Delayed reaction				
Atopic eczema	Hours to days	Extensively hydrolysed formula (< 6 months or > 6 months with failure to thrive)	Amino acid formula	
		Soy (> 6 months, no failure to thrive)	Extensively hydrolysed formula	Amino acid formula
Gastrointestinal syndromes.	Hours to days	Extensively hydrolysed formula (< 6 months or > 6 months with failure to thrive)	Amino acid formula	
GORD, allergic eosinophilic gastroenteritis, food protein-induced enteropathy, constipation, severe irritability (colic)		Soy (> 6 months, no failure to thrive)	Extensively hydrolysed formula	Amino acid formula
Food protein-induced proctocolitis	> 24 hours	Extensively hydrolysed formula	Amino acid formula	
Eosinophilc oesophagitis in infants	Days to weeks	Amino acid formula		

Management of CMPA

Irrespective of the cause and clinical type of CMPA in an infant, cows' milk should be removed from the diet and replaced with an elemental or soy based formula.

Mothers should be encouraged to continue breast-feeding whenever possible.[2] Cows' milk should be eliminated from maternal diets where the infant has immediate reactions such as anaphylaxis.[1] In cases of delayed reaction, maternal intake of cows' milk is often tolerated, and avoidance is usually only necessary if there are residual symptoms after elimination of cows' milk from the infant's diet.[2]

If the allergy is IgE mediated, avoidance of cows' milk should be strictly enforced with provision of an allergy action plan and adrenaline autoinjector if appropriate.[2]

See "Management of anaphylaxis in primary care", BPJ 18 (Dec, 2008).

When eliminating cows' milk, dietary intake should be assessed for nutritional adequacy of the recommended amounts of protein, calories and micronutrients, such as vitamin D and calcium. This also applies to the maternal diet if cows' milk avoidance is necessary.

Infant formula for CMPA

There are three types of formula available for CMPA; soy-based formula, extensively hydrolysed formula and amino acid formula (see sidebar Page 11).

There has been a trend in New Zealand and overseas to prescribe the most hypoallergenic formulas, especially amino acid formula, first line for CMPA.[3] This is an expensive option and in most cases not necessary.

The type of infant formula most appropriate as the initial option for CMPA should be determined by the age of the infant and the clinical characteristics of the CMPA. Amino acid formula should only be considered as a first line option in infants with CMPA with anaphylaxis and in infants with a confirmed

Nutritional adequacy of cows' milk (dairy) free diets

All food groups provide a variety of nutrients. When a whole food group is removed from an individual's diet there is a risk of an inadequate intake of one or more nutrients. When dairy products are avoided, the nutrients most at risk are protein and calcium.

Adequate amounts of energy in a dairy free diet can be obtained by ensuring a varied intake of breads, cereals and carbohydrate-rich vegetables while protein needs can be met by regular consumption of meat, fish, chicken, eggs and meat alternatives (nuts, seeds, legumes and pulses), providing there are no other allergies that indicate such foods should be avoided. In children the adequacy of these nutrients is best assessed by monitoring growth.

Consumption of a calcium fortified cow's milk alternative (soy, extensively hydrolysed formula or amino acid formula) will provide an additional source of calcium. Other dietary sources of calcium should also be encouraged, providing they are age appropriate and the individual does not have a proven allergy to them. Examples of other calcium containing foods* include:

- Canned fish where the bones are eaten, e.g. salmon, sardines
- Tahini (sesame paste)
- Almonds, brazil nuts, hazelnuts
- Figs
- Some breakfast cereals, check food label for calcium content

*check products are dairy free or suitable for other concurrent allergies.

diagnosis of eosinophilic oesophagitis.[1, 2] In the majority of cases of CMPA, extensively hydrolysed formula, (or soy if the infant is aged more than six months) should be considered first. In some cases failure to thrive affects the choice of formula.[1] These recommendations are summarised in Table 2 (Page 12) and form the basis of the current funding pathway.

Infants should be reviewed regularly (every six months) to check if tolerance to cows' milk protein has developed. This can be done by taking a history of accidental ingestion of cows' milk, skin prick testing, measurement of cows' milk specific serum IgE or food challenges.

In an infant with severe IgE mediated CMPA, tolerance should only be assessed in hospital because of the risk of anaphylaxis.

Other infant formula are not recommended

Soy-based, extensively hydrolysed formula and amino acid formula are the only infant formula recommended for the treatment of CMPA. The following are not recommended or contraindicated; Lactose-free cows' milk, (e.g. Karicare De-Lact), partially hydrolysed cows' milk (e.g. Karicare SensiKare), Goat's milk based formula and other mammalian milks, rice milk and oat milk.[1]

Monitoring and re-evaluation

Expert guidelines recommend regular monitoring of growth for children with food allergy in combination with nutrition counselling.[4] There are, however, no clear guidelines on when re-evaluation of CMPA or other allergies should occur. In practice re-trialling allergenic foods depends on clinical judgement, taking into consideration the severity of symptoms, the age of the child and other medical and social circumstances.[4] For infants with anaphylaxis, food challenges should be performed in hospital.[2]

There are also no clear guidelines on when an infant with CMPA should be weaned off a formula and when consideration should be given to changing to a less hypoallergenic formula, e.g. amino acid formula, to extensively hydrolysed formula, or extensively hydrolysed formula to soy-based, or for how long the effect of a switch should be evaluated for. However, given that most CMPA syndromes resolve over time, the requirement for on-going formula should be regularly reviewed.

Re-assessment should be on a case by case basis and it may be appropriate to consult with a paediatrician or dietitian with expertise in the management of CMPA for further advice.

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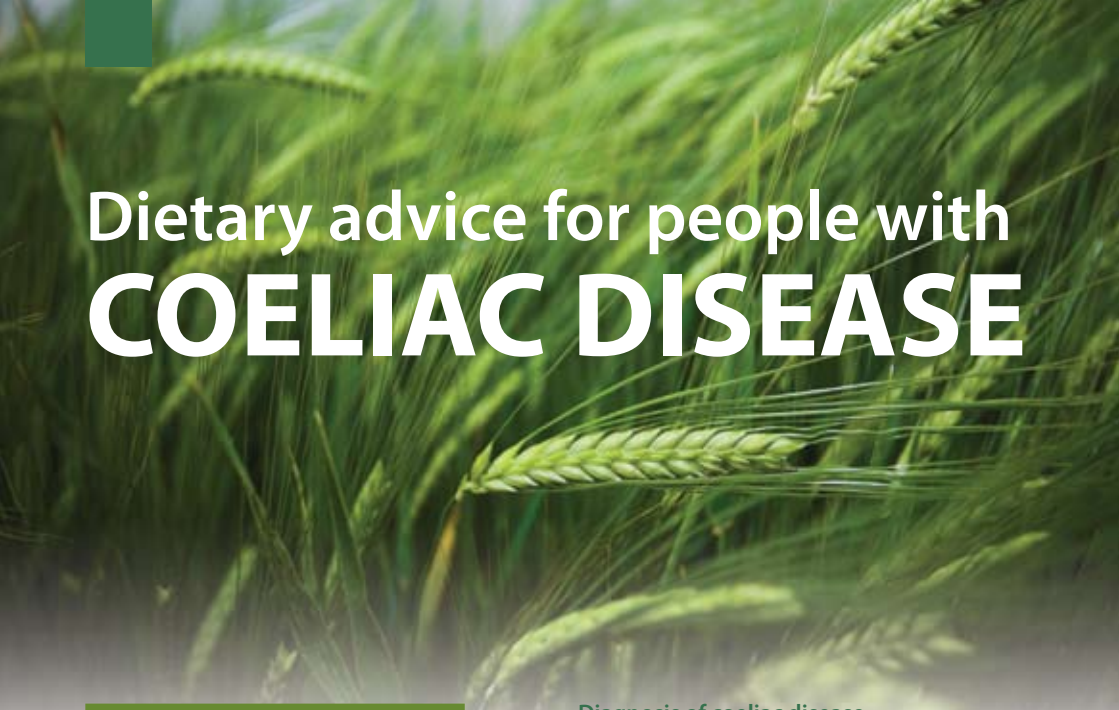

Dietary advice for people with COELIAC DISEASE

Key concepts

- A gluten-free diet is the first-line, lifelong treatment for coeliac disease
- A wide range of gluten-free foods are now available in supermarkets. It is important patients have a good understanding of gluten containing foods and ingredients and are able to interpret food labels
- There is a limited range of gluten-free foods available partly subsidised on prescription. The only advantage of obtaining these foods on prescription is a possible reduction in cost for the patient.
- Gluten-free foods on prescription are not different from, and not necessarily less expensive than, super market equivalents, when taking into account consultation and other fees

Diagnosis of coeliac disease

Coeliac disease is a chronic inflammatory condition of the small intestine in genetically susceptible people. It involves an immunological response to gluten, the major protein found in all varieties of wheat, rye and barley. A diagnosis of coeliac disease can easily be overlooked as symptoms vary in their severity and are often vague and non-specific. Typically symptoms include gastrointestinal disturbance (diarrhoea, constipation, nausea, cramping or distension), general and ongoing fatigue and weight loss, although some patients may be asymptomatic.[1,2]

Coeliac disease should be considered as a possible diagnosis in patients with the following symptoms and signs: [2]

- Gastrointestinal symptoms including chronic or intermittent diarrhoea and persistent or unexplained nausea and vomiting
- Recurrent abdominal pain, cramping or distension
- Ongoing fatigue
- Weight loss particularly if sudden or unexpected
- Unexplained anaemia

Partially subsidised gluten-free foods

Currently, a number of gluten-free substitute foods are subsidised in the Pharmaceutical Schedule (i.e. flour, bread mix, baking mix and pasta) although none are fully funded. Since 1 April, 2011, the funding of gluten-free foods is no longer actively managed by PHARMAC (i.e. no access, product or subsidy changes will occur).

The use of these subsidised listings is very low and gluten-free substitutes are widely available through retail outlets and in some cases may be less expensive than obtaining the subsidised product. The price of prescription gluten-free foods varies between pharmacies depending on their mark-up. Prescriptions for these foods would be appropriate for people who would be financially disadvantaged by the retail purchase of gluten-free foods. Costs of consultation fees, prescription renewal fees and access to pharmacies licensed to dispense special foods, need to be taken into consideration.

Gluten-free grains, flours and products

Rice	All varieties of rice, rice bran, rice cakes* and crackers* rice flour and products* made from rice flour, e.g. rice pasta and noodles
Corn	Maize flour, polenta, corn chips* and crispbreads*
Other grains	Lentil flours, soy flour, potato flour, arrowroot, sago, tapioca, quinoa, buckwheat, millet, amaranth, psyllium

* check flavourings for gluten content

There is an increased prevalence of coeliac disease in patients with type I diabetes, autoimmune thyroid disease and a number of other conditions.[2] Patients with a first degree relative with coeliac disease have a one in ten risk of testing positive for coeliac disease.[2]

Antibodies

Tissue transglutaminase (TTG) serology is the preferred initial test for people with suspected symptoms of coeliac disease and those who are at increased risk. In New Zealand, laboratories routinely test IgA in conjunction with TTG, to ensure a low TTG value is not the result of an underlying IgA deficiency.

While serology can indicate the likelihood of coeliac disease being present, the gold standard for diagnosis is a small bowel biopsy.

Both serological and biopsy screening should not occur if gluten has already been removed from the diet due to the increased likelihood of false negatives. Patients should be advised to resume consumption of a gluten containing diet for at least six weeks prior to testing.[1,2]

Nutritional status of newly diagnosed people

At the time of diagnosis, some patients with coeliac disease may have substantial weight loss, anaemia and evidence of vitamin and mineral deficiencies. Nutritional status depends on the severity of gastrointestinal tract damage and the length of time that the person has lived with the active disease. Malabsorption of iron, zinc, folate, calcium and fat-soluble vitamins are common.[1, 2]

When people with coeliac disease eliminate foods containing gluten from their diet, normal absorption of nutrients is usually restored within a few months but may take up to two years in older adults. Recommended repletion doses of vitamin and minerals are individually based, however, many people with coeliac disease benefit from a calcium and vitamin D supplement.[1]

Calcium and vitamin D malabsorption dramatically increases the risk of osteoporosis and osteomalacia in people with gluten-sensitive enteropathy. Most people with coeliac disease have some degree of osteopenia or osteoporosis. People who develop osteoporosis at a young age are usually advised to be tested for coeliac disease. Calcium and vitamin D supplementation, coupled with a strict gluten-free diet, usually results in re-mineralisation of the skeleton.[3,4]

Iron and folate deficiencies are common in people first presenting with coeliac disease, as the site of absorption in the bowel is commonly involved in the inflammatory changes. Removal of gluten from the diet has been found to correct anaemias in the majority of people.[1] If, however, symptoms of tiredness and lethargy persist, dietary intake of foods rich in iron and folate should be reviewed and supplementation considered.[1]

Secondary lactose intolerance

Many people with coeliac disease also have secondary lactose intolerance due to reduced enzyme production by the damaged villi. In the majority of people this resolves with the removal of gluten from the diet. People with lactose intolerance can present with gastrointestinal symptoms similar to those of coeliac disease. If symptoms persist after the removal of gluten, a lactose free trial should be considered and other food intolerances investigated. As lactose intolerance can resolve with repair of the villi, lactose containing foods should be re-trialled to ensure the diet is not unnecessarily restrictive and an adequate calcium intake is achieved.

Gluten free diets

People with coeliac disease must follow a lifelong gluten-free diet by excluding gluten containing grains and their derivatives. Oats are also generally avoided (see Page 18) This means that people with coeliac disease cannot eat most commercially available breads, cereals, biscuits, pastas and processed foods. For some people, adherence to a gluten-free diet is difficult. However eating gluten containing foods often results in an immediate return of gastrointestinal symptoms and increases the risk of long-term health issues including osteoporosis, anaemia, an increased risk of infertility and miscarriage, as well as lymphoma and small bowel cancers.[1,2]

People following a gluten-free diet can eat all non-carbohydrate food normally, however, it is important to read food labels as processed food, coatings, sauces and dressings may contain gluten. Most supermarkets and health food shops now sell a wide range of gluten-free products including non-wheat based flours and grains (Table 1).

Gluten-free or low-gluten

Internationally, different definitions of gluten restriction are used to define the treatment of coeliac disease. Food Standards Australia and New Zealand (FSANZ) define gluten-free foods as those that contain no detectable gluten, oats or oat products or malted cereals. FSANZ further defines low-gluten products as those that contain no more than 20 mg of gluten per 100 g of food.[6] In contrast, the United States and Canada define gluten-free foods only as those derived from naturally gluten-free grains.[5]

There is some concern about the level of gluten contamination in gluten-free products and little agreement about what level of trace amounts of gluten are acceptable for people with coeliac disease. A low-gluten diet may be tolerated by some adults with coeliac disease. One study found that the residual gluten in low-gluten products is at a safe limit at usual consumption levels for adults with coeliac disease.[7] Other researchers report resolution of gastrointestinal symptoms when patients moved from a low-gluten to a gluten-free diet.[2]

In New Zealand, a gluten-free diet, as defined by FSANZ, is recommended for children with coeliac disease. In general, the low-gluten recommendation is still used for older adults or for adults who have difficulty with the restriction of a gluten-free diet. However, if symptoms do not resolve it is worthwhile considering a trial of a gluten-free diet.

NB: Gluten-free diets should not be trialled without confirmation of the diagnosis of coeliac disease .

The role of oats in a gluten-free diet - has the evidence changed?

Although the addition of oats to a gluten-free diet has nutritional benefits and may introduce more variety in the diet, evidence for their use remains controversial.[8,9] The main protein type in oats is different to the gluten found in wheat and other cereals, however, oats do contain smaller amounts of avenin, a protein which is similar to gluten.

Recent evidence suggests that a subgroup of people with coeliac disease are intolerant to pure oats and also that the amount of avenin and the degree to which an immune response is triggered varies between different cultivars of oats.[8,9] This new research may help explain why earlier research into the safety of oats in people with coeliac disease has had contradictory results. Most studies have also differed in the type and purity of the oats used and in study size and design.

Contamination of oats and oat-containing products with gluten continues to be a problem for researchers and also for people who choose to include oats in their diet. Contamination may occur during planting, harvesting, transport and processing of oats. Many countries are now working to improve agricultural techniques and industrial processes so that an uncontaminated supply of oats and oat products are available.

Current advice in New Zealand (July 2010) recommends that the consumption of oats and oat containing products should be avoided by people with coeliac disease.[10]

"The safety of oats in individuals with coeliac disease has been extensively investigated. Some people with coeliac disease exhibit toxicity to oats. The Clinical Advisory Committee of the Coeliac Research Fund recommends that in Australia and New Zealand, oats should be excluded from a gluten free diet for people with coeliac disease."

Despite this recommendation, it is also stated that in some circumstances the benefits of including oats in a gluten-free diet may outweigh the risk.[10] For example, some patients with coeliac disease and poorly controlled type 1 diabetes may benefit from the inclusion of oats because of their low glycaemic index. Individual dietary preferences, enjoyment of food and the increased variability that the addition of oats allows should also be taken into account.

Most studies do show that the majority of people with coeliac disease can tolerate small amounts of oats as part of their gluten-free diet. The difficulty is identifying which people with coeliac disease are in the subgroup who do react to oats.

Appropriate guidance should be given to people who wish to include oats in their gluten-free diet. It is recommended that GPs and dietitians are involved in the decision.[10] People with coeliac disease who wish to add oats to their diet should ensure that:

- They are aware that some people with coeliac disease may not tolerate oats (even if they are pure uncontaminated oats)[11]
- If possible, only oats that are free from contamination with gluten should be eaten
- The amount of oats included in the diet is limited. Suggested intake of oats for an adult is 50-70 g per day (half to three quarters of a cup of dry rolled oats) and for a child, 20-25 g per day (one quarter cup of dry rolled oats).[11]
- It has been recommended that in a newly diagnosed patient, oats are excluded from the diet for the first six to twelve months until the initial symptoms of coeliac disease have improved.[12] If after that time oats are introduced into the gluten-free diet, a return of symptoms may help identify people who react to oats
- GP follow-up should be ongoing

Ongoing monitoring and support

Gluten-free diets have been found to be deficient in a variety of micronutrients and dietary fibre due to the restrictive nature of the diet. Ongoing monitoring of calcium, iron, folate, zinc and fat soluble vitamin intake and status is recommended.[1] In addition, the risk of osteoporosis and osteopaenia should be considered and monitored appropriately. Referral to a dietitian experienced in managing coeliac disease is strongly recommended to ensure nutritional adequacy and detailed dietary education.

Further resources

The Manufactured Foods Database, compiled by Auckland City Hospital on behalf of the New Zealand Food Safety Authority, provides listings of manufactured foods available in New Zealand that are suitable for people with some common food allergies or intolerances including gluten intolerance.

www.mfd.co.nz

The Coeliac Society of New Zealand offers many resources on its website including a list of gluten-free cafes and restaurants throughout New Zealand (click on "Eating out").

www.coeliac.co.nz

See **www.bpac.org.nz** Search term "coeliac" for various resources on the diagnosis and management of coeliac disease

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Strategies to improve nutrition in elderly people

Key concepts

- The incidence and impact of malnutrition in elderly people is underestimated
- Routine screening for malnutrition should be implemented for people in at risk groups
- "Food First" – eating small but frequent, high energy, high protein snacks and meals – is the first treatment option for elderly people who are malnourished
- Use of oral nutritional supplements (ready-made sip feeds or powders which are mixed with water or milk) is generally not recommended until a Food First approach has been trialled
- Nutrition support is recommended for malnourished people who are unable to maintain body weight by food intake alone
- Oral nutritional supplements are a top-up to food intake rather than a replacement – they should be given between meals, not at meal times

Defining malnutrition

Malnutrition is both a "cause and a consequence of ill-health".[1] The term malnutrition can apply to various states – under-nutrition, over-nutrition or deficiencies of specific nutrients. This article will concentrate on under-nutrition, and the term malnutrition when used will refer to this state. More specifically, malnutrition in this context refers to a deficiency in protein and energy, with or without micronutrient deficiencies. Such deficiencies are associated with a decline in body functioning and clinical outcome. The consequences of malnutrition are physiological, biochemical and psychological. They include reduced immunity, delayed wound healing and decreased muscle strength, which in turn have detrimental effects on recovery and rehabilitation. The psycho-social impact of malnutrition is also significant with changes in mood, attitude, self esteem and reduced socialisation.[1,2,3]

Prevalence of under-nutrition

Estimates of prevalence of under-nutrition in elderly people:

Prevalence	Type of population
>10%	Non-institutionalised elderly people[1]
10 – 50%	Hospitalised for acute illness[4]
10 – 70%	Long care units or nursing homes[1,5]

Causes of malnutrition

The "anorexia of ageing" [6,7]

Appetite and food intake often decline with ageing. Older people tend to be consistently less hungry than younger people, eat smaller meals, have fewer snacks between meals and also eat more slowly.[8] Between age 20 and 80 years, there is on average, a decrease in energy intake of approximately 30%. When this decline in energy intake is more than the decrease in energy use that is also normal with ageing, then there is loss of weight.[8]

Changes to the funding of oral nutritional supplements

PHARMAC has recently made a number of changes to the access and funding of oral nutritional supplements, including powders for reconstitution and ready-made liquids. These changes include:

- Reducing the funding of ready-made liquids to the level of powder alternatives
- Widening access to those who can initiate funding (**vocationally registered general practitioners can now make initial Special Authority applications**)
- Restricting funding to people who are malnourished or who have one of a number of listed specific indications which places them at high risk of malnourishment
- Emphasising "Food First" and regular review of patients

Background to the recent funding changes

In New Zealand, use of ready-made liquid supplements has been increasing steadily. Expenditure on standard adult oral and enteral products was $6.7 million in 2008/09 with annual growth of 13%. Of this, $5.7 million was for ready-made liquids, e.g. Ensure Plus and Fortisip (refer to Figure 1, Page 6 for an expenditure graph).

In the United Kingdom there has been concern regarding the treatment approach to malnutrition in elderly people. This has resulted in the formulation of treatment guidelines emphasising the provision of nutritional supplementation to only those who are malnourished or at a high risk of malnourishment, an emphasis on the use of first line dietary advice (Food First), and regular patient reviews

Most people lose weight as they age, but the amount lost is variable and those that are already lean, also lose weight. The problem with this weight loss is that it is not only unwanted adipose tissue that is lost but lean skeletal muscle.[9] The loss of lean tissue is associated with reductions in muscle function, bone mass and cognitive function, anaemia, dysfunction of the immune system, slow wound healing and recovery from surgery, and consequentially an increase in both morbidity and mortality.[8,9] Although lean muscle can be regained in younger people this is often not the case for elderly people. This means that being underweight becomes more of a health problem in older age, than being overweight.

Increasing age has several effects on gastrointestinal function. Secretion of gastric acid, intrinsic factor and pepsin is decreased, which then reduces the absorption of vitamin B6, B12, folate, iron and calcium. Other gastrointestinal problems such as gastritis and gastrointestinal cancers can reduce nutritional status.[10]

A hypermetabolic state where there is increased resting energy use can be caused by acute respiratory or urinary infections, sepsis, cirrhosis of the liver, hyperthyroidism and the hyperactive state found in some people with dementia or Parkinson's disease.[10] Chronic obstructive pulmonary disease (COPD) can cause anorexia and physical problems related to shortness of breath (see Page 35).

In addition to the "anorexia of ageing", there are physical, social, cultural, environmental and financial reasons for an inadequate diet.[1,8]

Impaired intake

Poor appetite: illness, pain or nausea when eating, depression or anxiety, social isolation or living alone, bereavement or other significant life event, food aversion, resistance to change, lack of understanding linking diet and health, beliefs regarding dietary restrictions, alcoholism, reduced sense of taste or smell.

Inability to eat: confusion, diminished consciousness, dementia, weakness or arthritis in the arms or hands, dysphagia, vomiting, COPD, painful mouth conditions, poor oral hygiene or dentition, restrictions imposed by surgery or investigations, lack of help while eating for those in hospitals and rest homes.

Lack of food: poverty, poor quality diet (home, hospital or rest home), problems with shopping and cooking, ethnic preferences not catered for, particularly in hospitals and rest homes.

Medicines: medicines can alter nutritional status in numerous ways, e.g. anorexia, decreased or altered taste, dry mouth, confusion, gastrointestinal disturbance including nausea, vomiting, diarrhoea, constipation, dyspepsia. Incorrect use of medicines may also cause problems, e.g. hypermetabolism with thyroxine and theophylline.[10]

Impaired digestion and/or absorption

Medical and surgical problems affecting stomach, intestine, pancreas and liver, cancer, infection, alcoholism

Altered requirements

Increased or changed metabolic demands related to illness, surgery, organ dysfunction or treatment.

Excess nutrient losses

Vomiting, diarrhoea, fistulae, stomas, losses from nasogastric tube and other drains.

Illness related Malnutrition

Some disease states also increase the risk of malnutrition. For example chronic respiratory, gastrointestinal, liver and kidney diseases, cancer, HIV, AIDS, stroke and surgery.[1]

Surgery

The metabolic changes caused by surgery, the increased demands required for successful healing, sepsis and the stress of the surgical procedure itself, all increase energy needs.[11] To supply this energy, protein stored as muscle is broken down and amino

acids released. A septic state will increase this muscle breakdown further. Nutritional requirements must meet these increased needs. Furthermore, patients may already be malnourished due to the illness that led to their surgery.

Once discharged, there will be ongoing higher nutritional needs during the recovery phase, although muscle lost may never be regained. Oral nutritional supplements may be useful during the recovery period, particularly if there are modifications to dietary intake as a consequence of the surgery, e.g. texture modification, low residue diet.

Cancer

People with cancer are often malnourished. Physical and metabolic changes can be compounded by social and psychological problems.[12] Treatment adverse effects such as taste changes, nausea or swallowing difficulties also result in a reduced food and nutrient intake. Cancer may result in cachexic syndrome which is a state of complex metabolic changes associated with anorexia, progressive weight loss and depletion of reserves of adipose tissue and skeletal muscle. Weight loss adversely affects treatment tolerance and survival outcomes.

Nutritional advice tailored on an individual basis should be given at an early stage to help prevent nutritional deficiencies.[13] Loss of appetite, pain, nausea and vomiting all contribute to poor oral intake. Prednisone may be used to stimulate appetite, but its effect tends to be short lived.[14]

Oral nutritional supplements can be beneficial when a normal balanced diet cannot be tolerated. These supplements help prevent malnutrition but eventually cannot halt the cachexic state associated with many end-stage cancers.

Chronic Kidney Disease (CKD)[15]

Nutritional requirements for people with CKD vary widely. In general, they require a diet that promotes adequate nutrition, minimises biochemical abnormalities and delays the progression of CKD. In later stages of CKD appetite is often poor and there is a high risk of malnutrition.

Guidance should be given to ensure the protein intake meets the recommended daily intake for the patients' age and gender and adequate energy is consumed. Micronutrients such as potassium and phosphorous should only be restricted if blood levels are elevated. The aim of treatment is to prevent malnutrition.

People requiring haemodialysis have some differing needs – they require 1.2 – 1.4 g/kg/day of protein due to losses in the dialysate. Some people may require adjustment of micronutrient intake, but this is dependent on the individual's clinical and biochemical profile.

There are specialised renal nutritional supplements available on the Pharmaceutical Schedule. These are indicated for patients requiring volume and potassium restrictions. For many patients, standard oral nutritional supplements will be suitable in the first instance.

How do we detect under-nutrition?

The onset of nutritional problems is often gradual and therefore hard to detect. However, features found in the history and examination may help identify those at risk. People can present with a variety of problems that may be vague or non-specific. Patients may report reduced appetite and energy and have altered taste sensation and changes to their normal bowel habit.[1] Clinical features that may suggest under nourishment include low body weight, fragile skin, wasted muscles, recurrent infections and impaired wound healing.[1]

A malnourished state is defined as any of the following: [1]

- BMI < 18.5 kg/m^2
- Unintentional weight loss > 10% within the last three to six months

- BMI < 20 kg/m^2 and unintentional weight loss > 5% within the last three to six months

$$\%\ \text{weight loss} = \frac{\text{original weight} - \text{current weight}}{\text{current weight}} \times 100$$

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{Height (m)}^2}$$

Screening for malnutrition risk

In many cases clinical judgment is sufficient to diagnose under-nutrition. However, not everyone who is malnourished is thin. Objective classification of a patient's risk of malnutrition assists clinical decision making. A validated and reliable nutrition screening tool is the first step in identifying at risk patients.

NICE clinical practice recommendations for nutrition screening[1]

Screening should take place for:

- All patients on admission to hospital
- All hospital outpatients at their first appointment
- All people in care homes on admission
- All people on registration at GP surgeries
- Upon clinical concern, e.g. patients with unintentional weight loss, prolonged intercurrent illness or poor wound healing.

Screening should also be considered at other opportunities, e.g. health checks, influenza injections, and repeated regularly for people in recognised risk groups.

Nutrition screening is defined as a quick and simple evaluation that detects the risk of malnutrition and guides implementation of a clear action plan. [1, 16] The NICE guidelines recommend the Malnutrition Universal Screening Tool (MUST) which aggregates scores for BMI, unintentional weight loss (over three to six months) and an acute illness or lack of adequate food for more than five days.[1]

Laboratory testing

Laboratory testing is not useful for diagnosing malnutrition, however, some tests may be required to detect specific deficiencies such as iron, folate and vitamin B12.[1, 10] Albumin has been suggested in the past as a marker of nutritional status but it is now regarded as unhelpful due to the fact that it can be altered by clinical conditions such as dehydration and inflammation.[17]

Malnutrition Universal Screening Tool (MUST)

MUST was originally designed for residential and community settings, however, it has now been validated in the acute setting, allowing screening to occur across the continuum of care. It takes on average three to five minutes to complete and includes clear treatment plans depending on the level of risk identified (Figure 1).

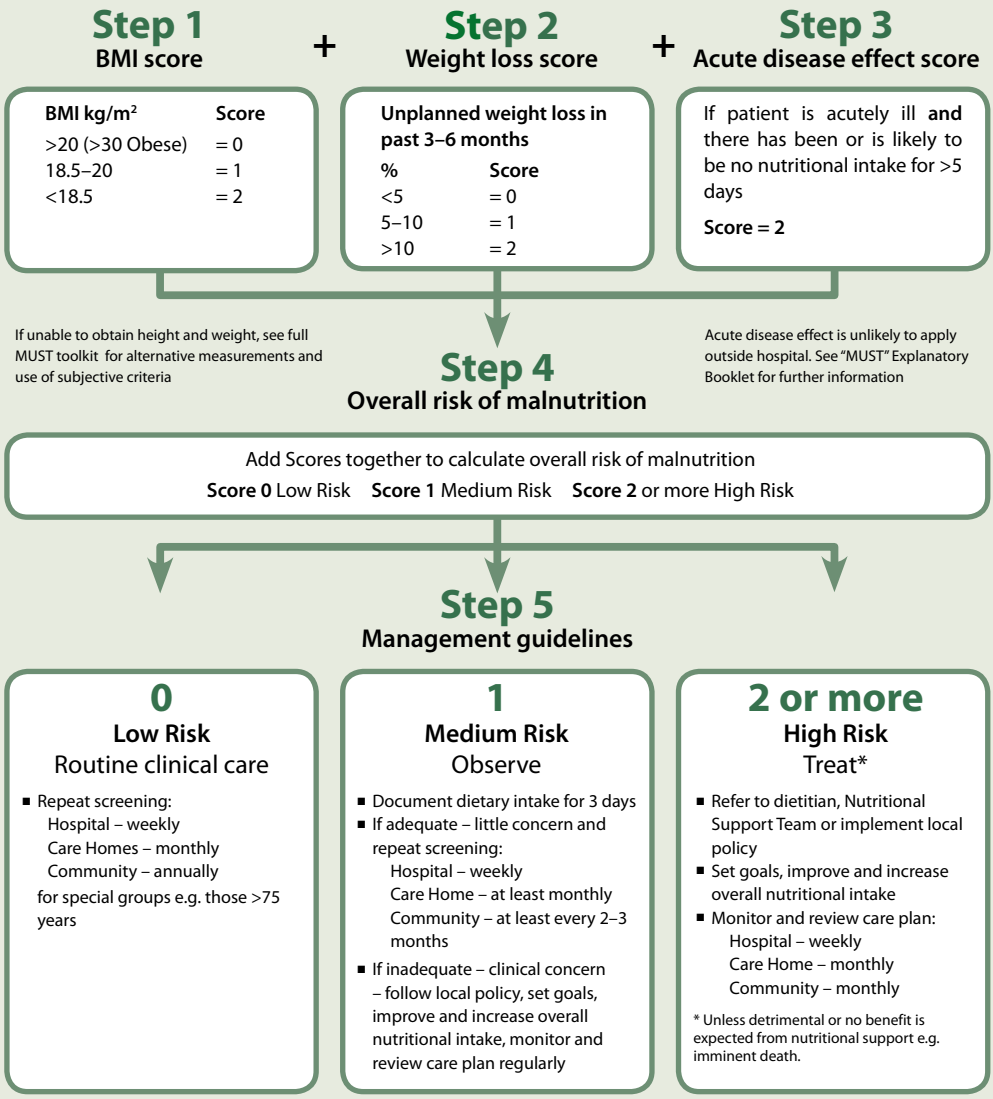
Further information and instructions on the use of the MUST toolkit are available from: **www.bapen.org.uk**

The full MUST toolkit includes tables that allow scoring of BMI and % weight loss without having to calculate the individual indices. These can be printed for clinical use. There is also a MUST calculator available to further speed up the screening process.

The complete MUST toolkit is available for download from:
www.bapen.org.uk/pdfs/must/must_full.pdf

An on-line calculator for MUST is available from:
www.bapen.org.uk/must-calculator.html

Figure 1: The MUST screening tool (from www.bapen.org.uk)



All risk categories:

- Treat underlying condition and provide help and advice on food choices, eating and drinking when necessary.
- Record malnutrition risk category.
- Record need for special diets and follow local policy.

Obesity:

- Record presence of obesity. For those with underlying conditions, these are generally controlled before the treatment of obesity.

Re-assess subjects identified at risk as they move through care settings

See The 'MUST' Explanatory Booklet for further details and The 'MUST' Report for supporting evidence.

Table 1: Ways to optimise oral nutrition in elderly people[10,19]

Problem	Solution
Loss of appetite	▪ Check medications: alter where possible to minimise adverse effects ▪ Encourage "little and often" – three small meals with regular in-between snacks of energy rich, high protein foods (see sidebar for ideas). Encourage people to eat every three to three hours. ▪ Maximise times of better appetite, e.g. if hungry in the morning suggest a cooked breakfast – eggs, baked beans, cheese on toast ▪ Serve meals and snacks that are appealing in size and appearance – large meals can be off putting, use small plates and maximise the "eye appeal" of the food ▪ Food has to be eaten to be of benefit – encourage the patient to select favourite foods that can be eaten at any time, e.g. cereal for supper, soup for breakfast ▪ Drinks can lessen appetite – suggest that drinks are taken after meals rather than before and during a meal ▪ Find ways to stimulate the appetite – a short walk before meals can be helpful ▪ Consider meal settings – make meal times enjoyable and avoid interruptions or rushing during meals
Chewing problems	▪ Encourage adequate dental and mouth care ▪ Try soft foods that require little chewing – tender cuts of meat cooked in gravies are often more easily managed
Swallowing difficulties	▪ Consider referral for speech language therapy assessment ▪ Modify the consistency of foods as appropriate – see **www.dietitians.org.nz/texture-modified-food-and-fluids/** for further information
Fatigue or difficulty obtaining or preparing food	▪ Use convenience foods: frozen meals, canned items (soup, fruit, beans, fish) ready desserts (custard, yoghurt, rice pudding), snack bars, breakfast cereals ▪ Enlist family and carer support, consider Meals on Wheels ▪ Make the most of good days: prepare snacks and meals to eat later or to store in the freezer ▪ Fortify food with extra fats and sugar – add oil, butter, margarine, cream, cheese, dressings, sauces, sugar, honey and spreads to meals and snacks to boost energy intake
Mobility problems	▪ Consider assessment by a physiotherapist or occupational therapist ▪ Ensure shopping and food preparation assistance is available
Chronic pain	▪ Find and treat cause where possible – check analgesic use
Social isolation, depression	▪ Meals on wheels; family, friends and social services ▪ Check medication use, consider counselling

Nutrition support strategies

Nutrition support is not limited to providing supplements in the form of oral nutritional supplements (ready-made liquids or powdered sip feeds) or enteral feeding (Page 33). The first step should always be to maximise an individual's nutritional intake from regular food and drink, often termed "Food First". The Food First approach includes increasing the frequency of eating, maximising the nutrient and energy density of food and drink and fortifying food with the addition of fats and sugars. Strategies to optimise adequate oral nutrition are summarised in Table 1.

In some situations a Food First approach can be sufficient to correct malnutrition outcomes (see sidebar "Practical food suggestions").[5] For patients who are at very high risk of malnutrition or for whom first-line dietary measures are not sufficient, oral nutritional supplements should be considered in combination with the Food First approach.[1, 16]

Oral nutritional supplements

Oral nutritional supplements are nutritionally complete liquid supplements that contain a mix of macro and micronutrients. These products are available from pharmacies in:

- A powder form which is reconstituted with water or milk to make 1 kcal/mLor 1.5 kcal/mL liquids – brands include Ensure powder and Sustagen Hospital Formula*
- Ready-mixed liquid forms (often referred to as sip feeds) – brands include Ensure Plus and Fortisip

* Sustagen Hospital Formula can be used by patients at home – not just in hospital as the name implies

Evidence that oral nutritional supplements improve health outcomes is limited. A systematic (Cochrane) review of 62 trials, updated in 2009, concluded that there was evidence of small consistent weight gain

Re-feeding Syndrome

Re-feeding syndrome occurs when nutrition support is re-introduced too quickly after a period of significantly reduced intake or starvation. The subsequent change from fat to carbohydrate metabolism causes alterations in electrolyte levels, such as hypophosphataemia, hypokalaemia and hypomagnesaemia. Thiamine levels may also be reduced.[18]

NICE recommends that people who have eaten little or nothing for five or more days have nutrition support introduced slowly, at a rate of 50% of requirements. Patients at high risk of re-feeding syndrome should be managed by a team who has expert knowledge of nutritional requirements and care.[1]

Patients at high risk of re-feeding syndrome[1]

One or more of the following

- BMI less than 16 kg/m^2
- Unintentional weight loss greater than 15% within the last three to six months
- Little or no nutritional intake for more than ten days
- Low levels of potassium, phosphate or magnesium prior to feeding

Two or more of the following:

- BMI less than 18.5 kg/m^2
- Unintentional weight loss greater than 10% within the last three to six months
- Little or no nutritional intake for more than five days
- A history of alcohol misuse or taking medicines including insulin, chemotherapy, antacids or diuretics

Practical food suggestions for people who are malnourished

Healthy eating guidelines promote low fat and low sugar food choices. Patients who are malnourished or losing weight unintentionally, however, must rely on fat and sugar as concentrated sources of calories. The benefit of energy dense foods in these circumstances should be explained to patients and carers to assist compliance. Ideally fats should be heart healthy (oils, margarines, seeds and nuts) but with the priority being to ensure an energy dense intake. Calories from butter, cream, full fat milk and cheese can be utilised.

General suggestions for a Food First approach may include:

- Three small meals with snacks in-between every day
- Two courses for each of the three meals (see below for ideas)
- Add oil, butter, margarine, cream, cheese, dressings, sauces, sugar, honey and spreads to meals and snacks to boost energy intake
- Choose nourishing fluids such as milky drinks, soups or fruit juice instead of water or tea
- Make dessert a regular option rather than a treat

Meal and snack suggestions

- Breakfast:
  - Porridge made with milk plus added cream and sugar, followed by toast with liberal amounts of butter or margarine and spreads
  - Scrambled eggs with added cheese and bacon followed by yoghurt and fruit
- Light meal
  - Thick milk based soup with a protein (meat, egg, cheese or canned fish) and salad filled sandwich or cheese on toast
  - Baked beans on toast with added grated cheese followed by dessert
- Main meal
  - Meat, fish , chicken or eggs and include potato, rice or pasta, vegetables or salad with added butter/margarine and grated cheese, dressings, gravies or sauces
  - If tolerated, use high fat cooking methods such as roasting or frying
- Dessert
  - Custard, ice-cream, instant puddings, mousses or yoghurt with fruit and cream
  - Milk puddings such as creamy rice, sago or baked custards
  - Ready-made baked or sponge puddings with fruit plus cream or ice-cream
- Snacks
  - Crackers and cheese, hummus, cottage cheese, cream cheese or dips
  - Scones, pikelets, english muffins, crumpets or toast with liberal spreads
  - Dried fruit and nuts (with a little chocolate if enjoyed)
  - Protein filled sandwiches
  - Sweet muffins, cakes and pastries

Other beneficial products available in supermarkets include Complan, Vitaplan and Up & Go. These products are not nutritionally complete and should not be used as a sole source of nutrition. They can, however, be used as part of the Food First approach as the overall emphasis for these patients should be eating foods high in calories and protein.

This page can be downloaded and printed as a patient resource from **www.bpac.org.nz**

following the use of oral nutritional supplements and that for undernourished patients mortality is possibly reduced.[3] In addition, there was greater evidence of a reduction in complications compared to previous reviews but the reviewers noted that the data was limited and of poor quality. A further review of dietary advice for illness related malnutrition in adults could not clearly define whether dietary advice or supplements provided better outcomes.[20] The reviewers concluded that nutritional intervention (oral nutritional supplement plus other dietary measures) was more effective than no intervention on enhancing short term weight gain but whether survival or morbidity are improved remains uncertain. All reviews agree that oral nutritional supplements are useful means of increasing protein, energy and micronutrient intake when used appropriately and as part of a combination of nutrition support strategies.[1, 3, 16]

The success of oral nutritional supplements can be limited by a lack of compliance often due to low palatability, adverse effects, e.g. nausea and diarrhoea, and by cost.[16] Some studies have shown that there can be a decrease in the consumption of normal foods when oral nutritional supplements are given,[16, 21] whereas other studies found no effect on appetite.[22] Wastage of up to 35% of these products is also reported. [23]

Best results are seen when people are offered a variety of different flavours and consistencies and also when the temperature at which the products are consumed is varied.[16] **Oral nutritional supplements should be given between meals, not at meal times** and there is some evidence of improved adherence if administered in small regular doses similar to a medicine.[5] They are not usually intended as a food replacement but as a supplement.

As part of clinical monitoring, prescribers should check that patients are using oral nutritional supplements appropriately, **as a top up to their food intake rather than a replacement**. Ensure patients are clear about the role of oral nutritional supplements in their overall nutritional care.

After trying Food First, oral nutritional supplements should be considered where a patient has been identified at medium to high risk of malnutrition, ideally in combination with Food First. The prescription should be based on the gap between the patient's estimated requirements and how much they are managing orally. The need for continuation of an oral nutritional supplement should be monitored regularly and adjusted as malnutrition risk reduces.[1, 5]

Considering prescription of oral nutritional supplements

Vocationally registered medical practitioners are now able to make initial applications for Special Food Special Authorities. It is intended that dietitians will also be able to make applications in the near future. The eligibility criteria for Special Authorities give clear guidance on who should be considered for oral nutritional supplements. The reduced time span of initial applications encourages regular monitoring and evaluation of continuation of oral nutritional supplements.

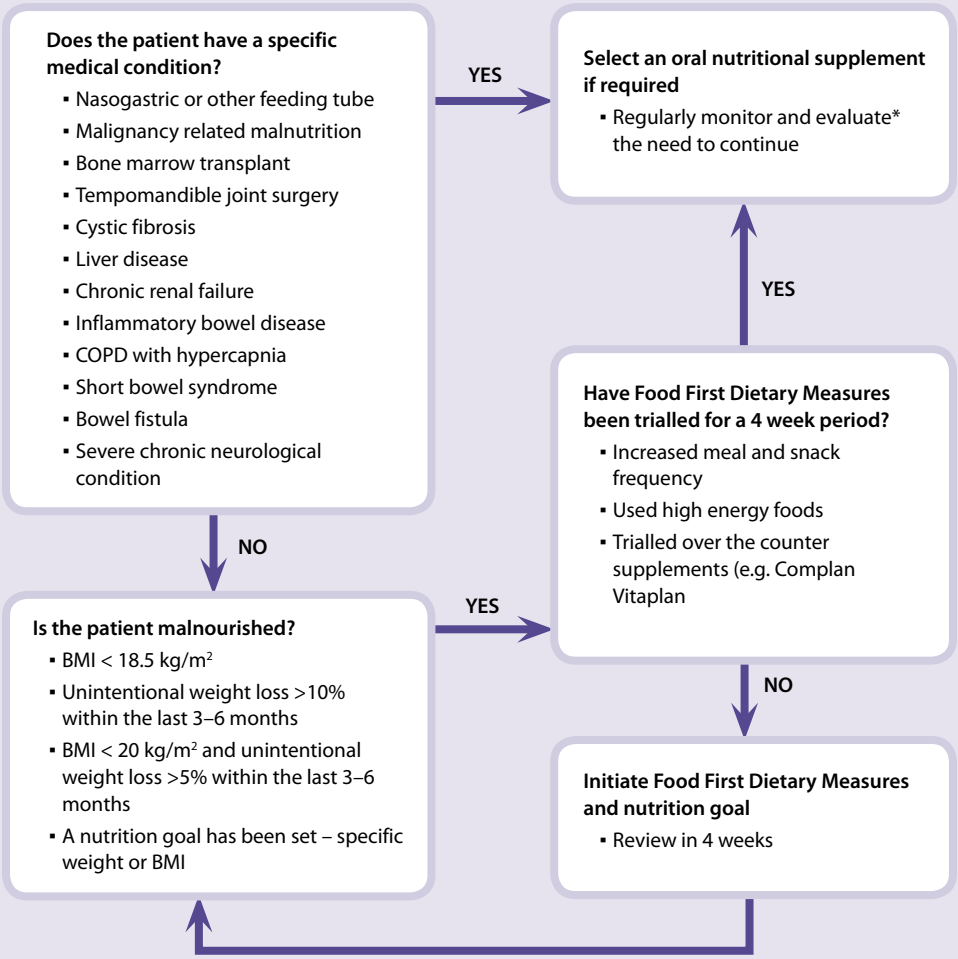
The evaluation pathway is summarised in Figure 2.

Suitable oral nutritional supplements for patients who have been identified at risk of malnutrition

Points for consideration:

- Encourage the patient to use Food First principles
- The powdered supplements are fully funded whereas the ready-made liquids are not. Full funding is available via "endorsement" for tube fed patients when using the ready-made liquids as a bolus tube feed.
- Is the patient lactose intolerant? Ensure Powder with water, and the ready-made liquids (Fortisip and Ensure Plus) are lactose free.
- Is the patient volume challenged? i.e. do they struggle to drink fluids at any volume? If so they should use a product which provides 1.5 kcal/mL.
- Measured volumes for mixing do not have to be exact, e.g 200 mL can be used instead of

Figure 2: The evaluation pathway summary



* Monitoring and evaluation considerations may include:

- Is the patient using the supplement? Is there any wastage?
- Is the supplement an addition to food or is it replacing food?
- Changes in weight – is this being recorded?
- Could the patient be encouraged to adopt a diet that meets their nutritional needs, through reiteration of the Food First approach?
- Is there a plan in place to gradually replace use of the supplement with a regular diet?
- Does the patient understand the supplementary role of oral nutritional supplements? Do they require additional ideas or tips on how best to maximise compliance? E.g. recipes, timing in relation to other food and drinks.

Table 2: Nutritional composition of the ready-made and powdered drinks when mixed with water and milk

Product	Mix	Vol (mL)	Kcal per serve	Kcal per mL	Protein per serve	Fibre per serve	Lactose	Subsidy
Powder drinks when mixed with water								
Ensure powder (can)	6 scoops (53g)+ 195ml of water	230 mL	230	1.0	8.5	2 g	No	Full
Sustagen hospital formula (can)	3 scoops (60g) + 200ml of water	240 mL	228	1.0	13.8	0 g	Yes	Full
Ensure powder (can)	9 scoops (80g) + 180ml water	230 mL	345	1.5	15	3 g	No	Full
Powder drinks when mixed with 200ml of standard (blue top) milk								
Ensure powder (can)	6 scoops (53g)	230 mL	354	1.5	15	2 g	Yes	Full
Sustagen hospital formula (can)	3 scoops (57g)	240 mL	352	1.5	20.3	0 g	Yes	Full
Ready-made drinks								
Ensure plus (cans)	n/a	237 mL	355	1.5	13	0 g	No	Part
Ensure plus (tetrapak)	n/a	200 mL	300	1.5	12.5	0 g	No	Part
Fortisip (bottle)	n/a	200 mL	300	1.5	12	0 g	No	Part
Fortisip multifibre (bottle)	n/a	200 mL	300	1.5	12	4.6 g	No	Part
Two cal HN (can)	n/a	237 mL	474	2.0	19.9	2.0 g	No	Part

Note: these instructions may vary from the mixing instructions on some of these products

Tips for patients using powdered products

1. Use the scoop provided so that the correct amount of powder is used
2. Sustagen Hospital Formula and Ensure powder can be mixed with either water or milk

   (preferably whole or full fat milk)
3. Mix using a spoon, fork, shaker, whisk or blender until the powder has dissolved – it may be easier to mix if the water/milk is added to the powder, rather than vice versa

Once mixed, it can be drunk straight away. Any leftover mixture can be covered and placed in the fridge for up to 24 hours. After 24 hours it should be thrown away.

Powdered products can be mixed with other food:

- Add other flavours, e.g. milkshake flavours, Milo, coffee or drinking chocolate
- Make a thick-shake by adding 2 teaspoons of instant pudding powder
- Make a hot drink by heating gently – but do not boil

Make a fruit smoothie by blending the made up mixture with:

- 1 banana and 2–3 tablespoons of ice cream or yoghurt
- ¼ cup of canned fruit and 2–3 tablespoons of ice cream or yoghurt
- ¼ cup of frozen berries

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196 mL. The key is to have the recommended amount of powder per day.

- Whilst there is a part charge for the ready-made liquid supplements, some patients may be willing to pay this especially if they prefer the taste and flavour varieties of the ready-made drinks or find it difficult to physically mix the powdered drinks or find the ready-made drinks convenient to carry when away from home.
- Is constipation an issue? Fortisip multifibre contains a mix of dietary fibres (4.6 g/200 mL) while the powdered drinks have a lower fibre content (Table 2).

Changing from ready-made liquids to a powder

When considering whether it is suitable for a patient to change from a ready-made liquid sip feed to a powdered sip feed the main considerations are; the purpose for which the patient needs the sip feed, the nutrient density of the sip feed, hidden costs and convenience.

Powdered sip feeds are not suitable for tube feeding. The ready-made sip feeds are fully subsidised where prescriptions are endorsed with "Bolus fed through a feeding tube". It is possible to also use fully subsidised tube feeding formula. Refer the patient to a dietitian for full review and recommendations.

Nutritional content

The ready-made liquid sip feeds, e.g. Ensure Plus and Fortisip, are 1.5 kcal/mL with 12 – 13g of protein per serve. In comparison, the powdered sip feeds (Ensure Powder and Sustagen Hospital Formula) when mixed with water according to the instructions provide 1.0 kcal/mL with 8.5 g and 13.8 g protein/serve respectively. By making a direct switch to standard dilution powdered drinks the nutrient density is reduced. This can be overcome if the powder is mixed with milk, the patient drinks a larger volume, or the powder is concentrated (refer to the mixing instructions in Table 2).

Enteral feeding

In its broadest sense enteral nutrition refers to any feeding method that uses the gastrointestinal tract. More commonly, however, the term enteral feeding refers to methods of providing food via a tube directly into the gastrointestinal system.

The tube can be inserted through the nose to the stomach (nasogastric) or to the small intestine (nasoduodenal or nasojejeunal). Alternatively a feeding tube can be placed via the abdominal wall directly into the stomach (gastrostomy). Percutaenous Endoscopic Gastrostomy (or PEGs) refers to gastrostomy tubes that are placed using endoscopy.[16]

Enteral (tube) feeding should be considered for people who cannot eat and drink safely, such as with dysphagia following a stroke. It can also be used when people cannot maintain an adequate diet from normal food and fluids or from oral supplements.

If tube feeding is likely to be required for more than four weeks, then insertion of a PEG/gastrostomy tube may be required.[16] The main benefit of gastrostomy tube over a nasogastric tube is patient comfort. It is also less likely to be displaced and can be hidden under clothes.[1] However, a PEG is invasive and the risk of aspiration remains with both nasogastric and PEG feeding.[24]

NICE recommends that tube feeding in the community is delivered by health professionals trained in nutrition support using a coordinated multidisciplinary team approach.[1] The team should include dietitians, district nursing, GPs and community pharmacists. Additional allied health staff should be involved as needed, e.g. speech and language therapists, occupational therapists. Monitoring of tolerance and oral intake by the team will provide guidance of when enteral feeding should be stopped. [1]

The use of tube feeding in people who are chronically unwell is controversial, especially when used for people with dementia. The debate focuses on the selection of which people will benefit from this form of nutritional supplementation.[25] Both oral supplements and tube feeding can improve the nutritional state of people with dementia. European Society Parenteral and Enteral Nutrition (ESPEN) guidelines recommend that its use be considered in early and moderate dementia, however, not in terminal dementia.

The decision regarding the use of tube feeding must always be made on an individual basis with input from relatives, caregivers, GP, therapists and if required, legal representation.[16]

Considerations for the use of long-term tube feeding may include:[16]

- Does the patient suffer from a condition likely to benefit from enteral feeding?
- Will nutritional support improve outcome and/or accelerate recovery?
- Does the patient suffer from an incurable disease, but one in which quality of life and wellbeing can be maintained or improved by enteral nutrition?
- Does the anticipated benefit outweigh the potential risks?
- Does the use of enteral nutrition agree with the expressed or presumed will of the patient or in the case of incompetent patients of his/her legal representative?
- Are there sufficient resources available to manage enteral nutrition properly? If long-term enteral nutrition implies a different living situation, e.g. home vs institution, will the change benefit the patient overall?

Caution! Medicines and enteral feeds should not be mixed. Temporarily stop the tube feed flush with water, administer individual medicines, flushing the tube before and after each dose. Resume feeding.

Parenteral nutrition

Parenteral nutrition is a method of providing nutrition directly into the venous system, usually via a central line and so avoiding the digestive system. It is referred to as total parenteral nutrition

and in general is used in a hospital setting. Its use in the community is mainly reserved for people with severe Crohn's disease, those with vascular damage to the bowel and some people with cancer. Home parenteral nutrition is expensive and requires careful patient selection and training and should be managed by a healthcare professionals trained in parenteral nutrition.

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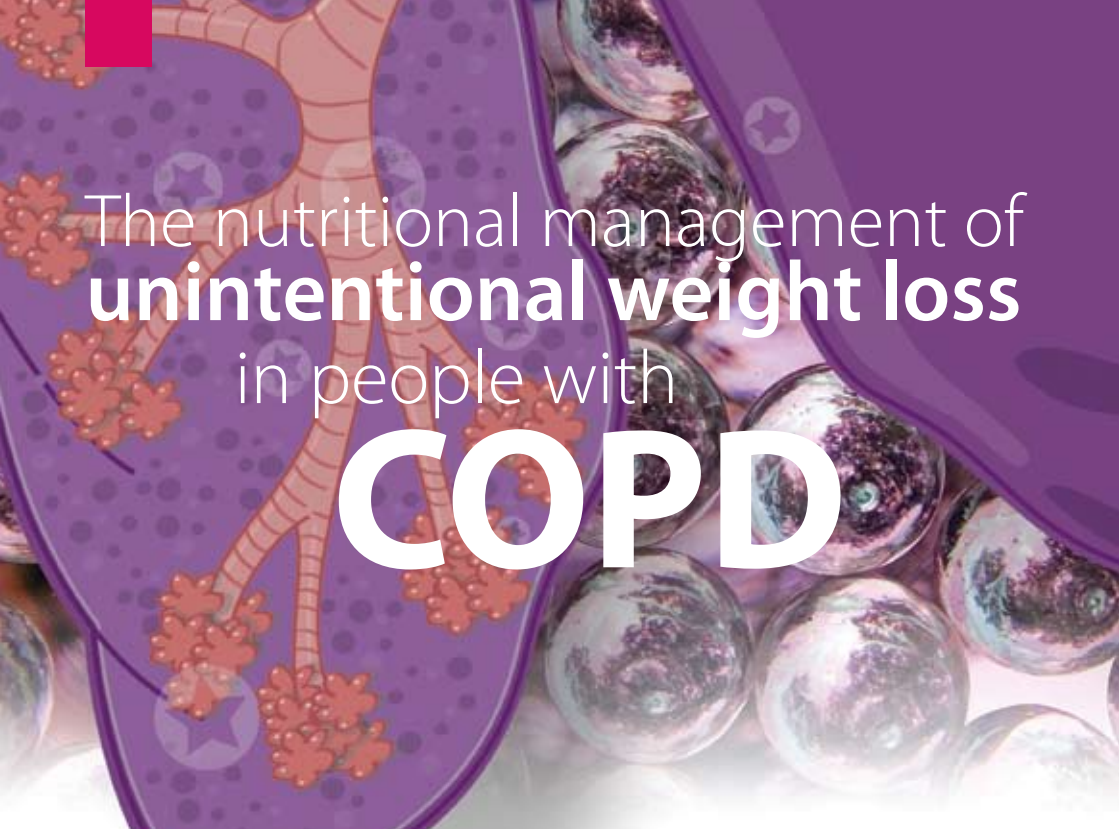

The nutritional management of **unintentional weight loss** in people with **COPD**

Key concepts:

- Unintentional weight loss is common in people with COPD and nutritional management has an important role
- Weight loss is related to decreased exercise capacity, health status and increased morbidity
- Opportunities for dietary and nutritional interventions in COPD management should be explored, aiming at early detection and treatment

Weight loss is common in people with COPD

In people with chronic obstructive pulmonary disease (COPD), energy requirements have been reported to be 15–20% above normal needs due to the increased energy required for breathing. People with COPD are generally underweight and have reduced muscle mass.[1] One United Kingdom based study showed that 23% of subjects with COPD were classified as malnourished. The malnourished subjects had lower lung function measurements, had more dietary problems and had lower nutritional intake compared with the adequately nourished subjects.[2]

Careful balancing of caloric intake is required. One study showed that a total caloric intake in excess of 50% above need was associated with poorer outcomes, while caloric intake of 30% above need was beneficial.[3]

Referral to a dietitian is recommended to establish an appropriate diet for a person with COPD who is malnourished.

Eating small, frequent meals may help to reduce dyspnoea

As COPD progresses, many people find that breathing becomes more difficult if they eat a heavy meal, so in this situation, eating frequent, small and nutritious (high energy, high protein) meals is best. If people with COPD are not managing to keep their weight above a desired level they may require dietary assistance.[4]

Evidence for nutritional support is limited

Evidence supporting the use of nutritional supplements for people with COPD is limited. A 2005 Cochrane review found no evidence that nutritional supplementation makes a significant difference to weight gain or health outcomes in people with COPD.[5]

Despite this lack of evidence, international guidelines for the management of COPD in adults suggest that nutritional supplements may improve nutritional status for patients with COPD who are malnourished. Patients using oral nutritional supplements should also be encouraged to exercise regularly to build muscle mass.[6]

The American Thoracic Society also recommends considering nutritional supplementation for people who have involuntary weight loss of more than 10% in the last six months or more than 5% in the past month.[7]

Nutritional management of patients with severe COPD is challenging and interventions should be extended to the early detection and further prevention of weight loss before patients become malnourished.

Hypercapnia

A late manifestation of COPD is hypercapnia. It is caused by a reduction in ventilatory drive and is a feature of severe COPD.

In theory, under ideal conditions, dietary fat utilisation produces less CO_2 per O_2 molecule consumed than carbohydrate. However, most studies indicate that consuming excess calories is a more important contributor to increased CO_2 production than the fat composition of the food.[3]

Higher fat supplements have been found to delay gastric emptying. This may be important in determining patient tolerance of these formulas as a delay in gastric emptying can lead to extended periods of abdominal distention.

Nutritional support

Pulmocare is a high fat, low carbohydrate formula designed to minimise CO_2 retention in chronic or acute respiratory insufficiency.

Subsidy for **Pulmocare** (which contains 1.5 Kcal/mL in 237 mL cans) is available under Special Authority from a specialist or vocationally registered GP for patients who have COPD and have hypercapnia and need the supplement as part of, or as a complete, diet.

GPs role in the nutritional care of people with COPD

Encourage patients with COPD to make and maintain dietary changes to minimise involuntary weight loss and nutritional depletion.

For those who have lost weight encourage Food First strategies (see Nutrition Support Strategies Page 28).

Advise people with COPD who become breathless when eating, to eat frequent small meals.

Consider oral nutritional supplements for patients who have been identified at risk of malnutrition (BMI < 18.5kg/m^2 or unintentional weight loss > 10% within the last three to six months or a BMI < 20kg/m^2 and unintentional weight loss > 5% within the last three to six months).

For patients who develop hypercapnia, a specialist respiratory oral nutritional supplement may be of value.

Consider referral for dietetic assessment if BMI remains low.[6]

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From April 1, 2011 the funding and access criteria for some oral nutritional supplements and infant formula were changed. Over the last several years there has been a steady growth in the prescribing of ready-mixed liquid feeds and elemental infant formula. Inappropriate or unnecessary prescribing, targeted advertising and a lack of review of the patients' continuing need for a supplement are all factors that have contributed to this increase.

This special edition booklet provides guidance on the optimal and cost effective use of oral nutritional supplements for elderly people and formula for infants with cows' milk allergy. Nutritional advice for people with coeliac disease and COPD is also included.

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