NHS
National Institute for Health and Clinical Excellence

Quick reference guide

Issue date: February 2006

Nutrition support in adults

Oral nutrition support, enteral tube feeding and parenteral nutrition

Clinical Guideline 32
Developed by the National Collaborating Centre for Acute Care

Grading of recommendations

This quick reference guide summarises the recommendations in the NICE clinical guideline 'Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition'. The recommendations are based on the best available evidence and are graded A, B, C, D, good practice point D(GPP), depending on the type of evidence. For more information on the grading system, see the NICE guideline (www.nice.org.uk/CG032NICEguideline).

Contents

This guidance is written in the following context

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgment. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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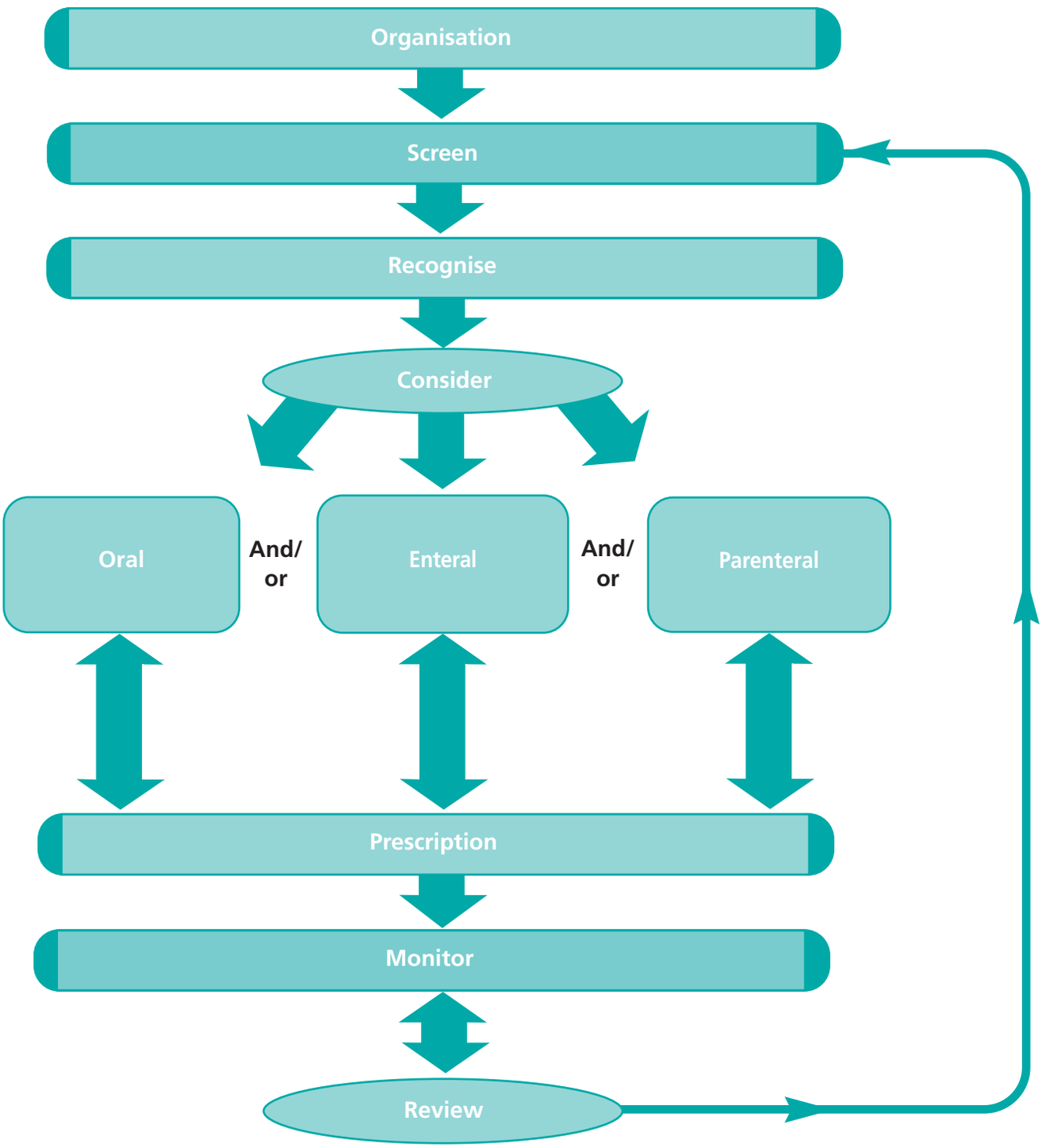
Outline care pathway



Patient-centred care

This guideline offers best practice advice on the care of adults who are malnourished or at risk of malnutrition.

Treatment and care should take into account patients' needs and preferences. People with malnutrition should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals.

Good communication between healthcare professionals and patients is essential. It should be supported by evidence-based written information tailored to the patient's needs. Treatment and care, and the information patients are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

Patients having nutrition support, and their carers, should be:

- fully informed about their treatment
- given tailored information
- given the opportunity to discuss diagnosis, treatment options and relevant physical, psychological and social issues
- given contact details for relevant support groups, charities and voluntary organisations. D(GPP)

Recommendations in this guideline apply to all patients with malnutrition or at risk of malnutrition, whether they are in hospital or at home. Good coordination between the hospital and the home or community setting is needed when patients are transferred between settings.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Key clinical priorities

- Screening for malnutrition or the risk of malnutrition should be carried out by healthcare professionals with appropriate skills and training.
- All hospital inpatients on admission and all outpatients at their first clinic appointment should be screened. Screening should be repeated weekly for inpatients and when there is clinical concern for outpatients. People in care homes should be screened on admission and when there is clinical concern.
- Hospital departments who identify groups of patients with low risk of malnutrition may opt out of screening these groups. Opt-out decisions should follow an explicit process via the local clinical governance structure involving experts in nutrition support.
- Nutrition support should be considered in people who are malnourished, as defined by any of the following:
  - a body mass index (BMI) of less than 18.5 kg/m^2
  - unintentional weight loss greater than 10% within the last 3–6 months
  - a BMI of less than 20 kg/m^2 and unintentional weight loss greater than 5% within the last 3–6 months.
- Nutrition support should be considered in people at risk of malnutrition who, as defined by any of the following:
  - have eaten little or nothing for more than 5 days and/or are likely to eat little or nothing for the next 5 days or longer
  - have a poor absorptive capacity, and/or have high nutrient losses and/or have increased nutritional needs from causes such as catabolism.
- Healthcare professionals should consider using oral, enteral or parenteral nutrition support, alone or in combination, for people who are either malnourished or at risk of malnutrition, as defined above. Potential swallowing problems should be taken into account.

Key organisational priorities

- All healthcare professionals who are directly involved in patient care should receive education and training, relevant to their post, on the importance of providing adequate nutrition.
- Healthcare professionals should ensure that all people who need nutrition support receive coordinated care from a multidisciplinary team.[1]
- All acute hospital trusts should employ at least one specialist nutrition support nurse.
- All hospital trusts should have a nutrition steering committee working within the clinical governance framework.

[1] The composition of this team may differ according to setting and local arrangements.

Organisation of nutrition support

- Healthcare professionals should receive education and training on the importance of providing adequate nutrition. D(GPP)

Education and training should cover: D(GPP)

- nutritional needs and indications for nutrition support
- options for nutrition support (oral, enteral and parenteral)
- ethical and legal concepts
- potential risks and benefits
- when and where to seek expert advice.

- Healthcare professionals should ensure that all people who need nutrition support receive coordinated care from a multidisciplinary team.[2] D(GPP)

- All acute hospital trusts should have a multidisciplinary nutrition support team.

The team may include: doctors (for example, gastroenterologists, GI surgeons or intensivists or those with a specific interest in nutrition support), dietitians, a specialist nutrition nurse, other nurses, pharmacists, caterers, biochemistry and microbiology laboratory support staff, and other allied healthcare professionals (for example, speech and language therapists). D(GPP)

- All acute hospital trusts should employ at least one specialist nutrition support nurse. D(GPP)

- The specialist nutrition support nurse should work alongside nursing staff, as well as dietitians and other experts in nutrition support, to:
  - minimise complications related to enteral tube feeding and parenteral nutrition
  - ensure optimal ward-based training of nurses
  - ensure adherence to nutrition support protocols
  - support coordination of care between the hospital and the community. D(GPP)

- All hospital trusts should have a nutrition steering committee working within the clinical governance framework. D(GPP)

- Members of the nutrition steering committee should be drawn from trust management, and include senior representation from medical staff, catering, nursing, dietetics, pharmacy, and speech and language therapy. D(GPP)

[2] The composition of this team may differ according to setting and local arrangements.

Step 1. Screen

- Screen: D(GPP)
  - all hospital inpatients on admission
  - all outpatients at their first appointment
  - all people in care homes on admission
  - all people on registration at GP surgeries
  - and upon clinical concern.

Clinical concern includes, for example, unintentional weight loss, fragile skin, poor wound healing, apathy, wasted muscles, poor appetite, altered taste sensation, impaired swallowing, altered bowel habit, loose fitting clothes, or prolonged intercurrent illness.

- Consider screening at other opportunities (for example, health checks, flu injections).
- Repeat screening weekly for inpatients and when there is clinical concern for all.
- Screening should be carried out by healthcare professionals with appropriate skills and training. D(GPP)
- Assess body mass index (BMI), percentage unintentional weight loss and time over which nutrient intake has been unintentionally reduced and/or the likelihood of future impaired nutrient intake. D(GPP)

BMI is weight in kilograms divided by height in metres squared.

Some hospital departments may opt out of screening. Decisions to opt out must be approved by local clinical governance structures involving experts in nutrition support. D(GPP)

How to use this guide

This quick reference guide has been divided into steps. Step 2 is overleaf. We suggest you keep this fold-out page open when you are reading so you can refer to the indications for nutrition support as you go along.

Step 2. Recognise

If your patient has any of the following:

- BMI less than 18.5 kg/m^2
- unintentional weight loss greater than 10% within the last 3–6 months
- BMI less than 20 kg/m^2 and unintentional weight loss greater than 5% within the last 3–6 months.

→ **Malnourished** D(GPP)

- eaten little or nothing for more than 5 days and/or likely to eat little or nothing for the next 5 days or longer
- poor absorptive capacity, and/or high nutrient losses and/or increased nutritional needs from causes such as catabolism.

→ **At risk of malnutrition** D(GPP)

Healthcare professionals should consider using oral, enteral or parenteral nutrition support, alone or in combination, for people who are either malnourished or at risk of malnutrition, as defined above. D(GPP)

Ethical and legal issues

When starting or stopping nutrition support:

- obtain consent
- act in the patient's best interest
- be aware that the provision of nutrition support is not always appropriate. Decisions on withholding or withdrawing of nutrition support require a consideration of both ethical and legal principles (both at common law and statute including the Human Rights Act 1998).

When such decisions are being made guidance issued by the General Medical Council[3] and the Department of Health[4] should be followed. D(GPP)

[3] Withholding and withdrawing life prolonging treatments: good practice in decision making. General Medical Council. Available from www.gmc-uk.org

[4] Reference guide to consent for examination or treatment (2001) Department of Health. Available from www.dh.gov.uk

Step 3. Treat: oral

Malnourished or at risk → **check for dysphagia**

Dysphagia

Obvious indicators of dysphagia	Less obvious indicators of dysphagia
Difficult, painful chewing or swallowing	Change in respiration pattern
Regurgitation of undigested food	Unexplained temperature spikes
Difficulty controlling food or liquid in the mouth	Wet voice quality
Drooling	Tongue fasciculation (may be indicative of motor neurone disease)
Hoarse voice	Xerostomia
Coughing or choking before, during or after swallowing	Heartburn
Globus sensation	Change in eating – for example, eating slowly or avoiding social occasions
Nasal regurgitation	Frequent throat clearing
Feeling of obstruction	Recurrent chest infections
Unintentional weight loss – for example, in people with dementia	Atypical chest pain

- Be aware that people with acute and chronic neurological conditions and those who have undergone surgery or radiotherapy to the upper aero-digestive tract are at high risk of dysphagia. D(GPP)

- Refer people with any obvious or less obvious indicators of dysphagia to healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders. D(GPP)

safe to swallow → **consider oral nutrition support.**[5] A

Provide:

- food and fluid of adequate quantity and quality in an environment conducive to eating
- appropriate support, for example modified eating aids, for people who can potentially chew and swallow but are unable to feed themselves. D(GPP)

- Ensure that the overall nutrient intake contains a balanced mixture of protein, energy, fibre, electrolytes, vitamins and minerals. D(GPP)
- Offer a complete oral multivitamin and mineral supplement if concerned about intake. D(GPP)

If dysphagia is present

Consider the risks and benefits of modified oral nutrition support and/or enteral tube feeding. D(GPP)

Before modification of nutrition support and hydration consider: recurrent chest infections; mobility; dependency on others for assistance to eat; perceived palatability and appearance of food or drink; level of alertness; compromised physiology; poor oral hygiene; compromised medical status; metabolic and nutritional requirements; vulnerability (for example, immunocompromised); comorbidities. D(GPP)

For people in the acute setting with inadequate or unsafe oral intake consider a 2–4 week trial of nasogastric enteral tube feeding. A For more on enteral tube feeding see page 13.

Check that drug formulation, route and timing is appropriate and without contraindications for the feeding regimen or swallowing process. D(GPP)

- Stop oral nutrition support when adequate oral intake from normal food is established. D(GPP)

[5] Oral nutrition support includes any of the following methods to improve nutritional intake: fortified food with protein, carbohydrate and/or fat, plus minerals and vitamins; snacks; oral nutritional supplements; altered meal patterns; the provision of dietary advice.

Surgical patients

Surgical patient who is:

In post-caesarean or gynaecological surgical patients consider post-operative oral intake within 24 hours of surgery. A

In post-abdominal surgical patients consider post-operative oral intake within 24 hours of surgery. Monitor for signs of nausea or vomiting. A

Step 3. Treat: enteral

Malnourished or at risk + **inadequate or unsafe oral intake** + **a functional, accessible gastrointestinal tract** → **consider enteral tube feeding.** D(GPP)

Do not give enteral tube feeding unless these circumstances are met or in the context of a clinical trial. A

Access

- Feed via a tube into the stomach unless there is upper gastrointestinal dysfunction. A
- In people with upper gastrointestinal dysfunction (or an inaccessible upper gastrointestinal tract) consider post-pyloric (duodenal or jejunal) feeding. D(GPP)
- Consider gastrostomy for long-term (4 weeks or more) enteral tube feeding. D(GPP)
- Percutaneous endoscopic gastrostomy (PEG) tubes can be used 4 hours after insertion. A

Management

- People requiring enteral tube feeding should have their tube inserted by healthcare professionals with the relevant skills and training. D(GPP)
- Check the position of all nasogastric tubes after placement and before each use, using aspiration and pH graded paper (with X-ray if necessary) as advised by the National Patient Safety Agency in 2005. Local protocols should address the clinical criteria that permit enteral tube feeding. D(GPP)
- Confirm initial placement of post-pyloric tubes with an abdominal X-ray (unless placed radiologically). D(GPP)

Delivery

- Consider bolus or continuous delivery when feeding into the stomach. Take into account patient preference, convenience and drug administration. B
- Deliver continuously over 16–24 hours daily in intensive care patients having nasogastric enteral tube feeding. If insulin administration is needed, administer feeding continuously over 24 hours. D(GPP)

Motility agents

- Consider a motility agent in intensive care patients who have delayed gastric emptying. A
- Offer a motility agent in other acute care patients who have delayed gastric emptying. D(GPP)
- Consider post-pyloric enteral tube feeding and/or parenteral nutrition if delayed gastric emptying is severely limiting feeding, despite the use of motility agents. D(GPP)

Surgical patients

Surgical patients who are due to undergo major abdominal procedures:

Malnourished + **inadequate or unsafe oral intake** + **a functional, accessible gastrointestinal tract** → **consider pre-operative enteral tube feeding.** B

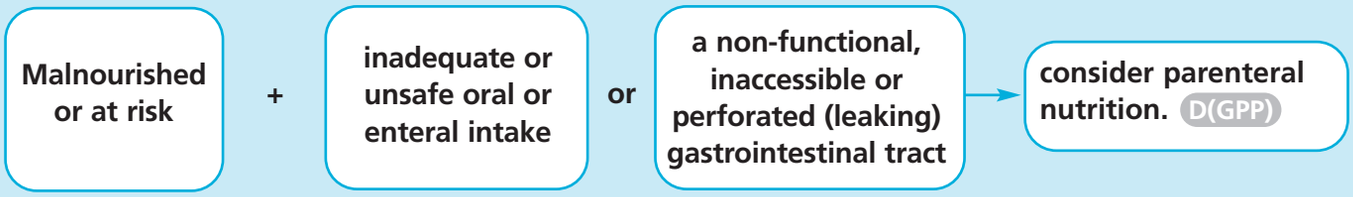
Do not give enteral tube feeding to general surgical patients within 48 hours of surgery unless these circumstances are met. A

Support in the community

- Ensure care is delivered by a coordinated multidisciplinary team, which includes input from dietitians, district, care home or homecare company nurses, GPs, community pharmacists and other allied healthcare professionals (for example, speech and language therapists) as appropriate. D(GPP)
- Provide an individualised care plan which includes monitoring and overall aims. D(GPP)
- Train patients and carers to: D(GPP)
  - manage tubes, delivery systems, procedures and the regimen
  - recognise risks
  - troubleshoot common problems.
- Give patients and carers: D(GPP)
  - routine and emergency telephone numbers
  - information on the delivery of equipment, ancillaries and feed
  - contact details for any homecare company involved
  - an instruction manual.

- Stop enteral tube feeding when adequate oral intake is established. D(GPP)

Step 3. Treat: parenteral



Access

- In hospital, parenteral nutrition can be given via a dedicated peripherally inserted central catheter. A free dedicated lumen in a multi-lumen centrally placed catheter may also be used. B
- For short-term feeding (less than 14 days) consider feeding via a peripheral venous catheter for patients who have no need for central access. Take care in choosing catheters. Pay attention to pH, tonicity and long-term compatibility of the parenteral nutrition mixture in order to avoid administration or stability problems. B
- Tunnelling subclavian lines is recommended for long-term use (more than 30 days). D(GPP)
- Catheters do not have to be tunnelled for short-term use (less than 30 days). B

Management

- Only healthcare professionals competent in catheter placement should place catheters and they should be aware of the importance of monitoring and managing these safely.[6] D(GPP)

Delivery

- Continuous administration of parenteral nutrition should be offered as the preferred method of infusion in severely ill people who require parenteral nutrition. B
- Consider cyclical delivery of parenteral nutrition when using peripheral venous cannulae with planned routine catheter change. B
- Consider a gradual change from continuous to cyclical delivery in patients requiring parenteral nutrition for more than 2 weeks. D(GPP)

[6] Infection control: prevention of healthcare-associated infection in primary and community care. *NICE Clinical Guideline* No. 2 (2003). Available from www.nice.org.uk/CG002

Prescription

- Introduce parenteral nutrition progressively and monitor closely; at no more than 50% of estimated needs for the first 24–48 hours. D(GPP)

- Nutritional requirements should be assessed by healthcare professionals with the relevant skills and training in the prescription of nutrition support. D(GPP)

- Always add micronutrients and trace elements to parenteral nutrition; additional electrolytes and other nutrients may also be needed. D(GPP)

Support in the community

- Ensure care is delivered by a coordinated multidisciplinary team, which includes input from specialist nutrition nurses, dietitians, GPs, pharmacists and district and/or homecare company nurses. D(GPP)

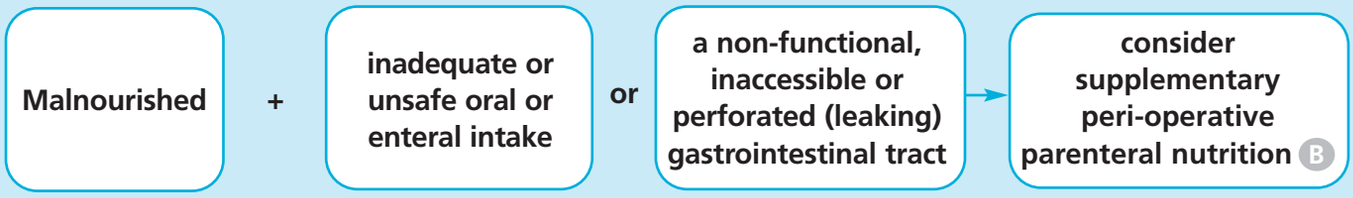
- Provide an individualised care plan which includes monitoring and overall aims. D(GPP)

- Train patients and carers to:
  - manage delivery systems, procedures and the regimen
  - recognise risks
  - troubleshoot common problems.

- Give patients and carers:
  - routine and emergency telephone numbers
  - arrangements for the delivery of equipment, ancillaries and feed
  - contact details for any homecare company involved
  - an instruction manual. D(GPP)

- Stop parenteral nutrition when adequate oral and/or enteral support is established. Withdrawal should be planned and stepwise with a daily review of the patient's progress. D(GPP)

Surgical patients



If intestinal tolerance persistently limits enteral tube feeding in surgical or critical care patients, use parenteral nutrition to supplement or replace enteral tube feeding. B

Step 3. Treat: prescription

- Ensure total intake of prescribed nutrition support accounts for: D(GPP)
  - energy, protein, fluid, electrolyte, mineral, micronutrients[7] and fibre needs
  - activity levels and the underlying clinical condition – for example, catabolism, pyrexia
  - gastrointestinal tolerance, potential metabolic instability and risk of refeeding problems
  - the likely duration of nutrition support.

Total intake includes intake from any food, oral fluid, oral nutritional supplements, enteral and/or parenteral nutrition support and intravenous fluid.

- For people who are not severely ill or injured, nor at risk of refeeding problems, nutritional prescription should usually provide: D(GPP)
  - 25–35 kcal/kg/day total energy[8,9]
  - 0.8–1.5 g protein (0.13–0.24 g nitrogen)/kg/day
  - 30–35 ml fluid/kg
  - adequate electrolytes, minerals, micronutrients and fibre, if appropriate.

- Review prescription according to progress. D(GPP)

- Take care when: D(GPP)
  - using food fortification which tends to supplement energy and/or protein without adequate micronutrients and minerals
  - using feeds and supplements that may not provide adequate micronutrients and minerals when only used in a supplementary role
  - using pre-mixed parenteral nutrition bags that have not had tailored additions from pharmacy.

Seriously ill or injured people

Introduce enteral or parenteral nutrition cautiously in seriously ill or injured people. D(GPP)

Start at no more than 50% of the estimated target energy and protein needs and build up to meet full needs over the first 24–48 hours. Provide full requirements of fluid, electrolytes, vitamins and minerals from the outset. D(GPP)

[7] The term 'micronutrient' is used throughout to include all essential vitamins and trace elements.

[8] This level may need to be lower in people who are overweight, BMI >25.

[9] When using parenteral nutrition it is often necessary to adjust total energy values listed on the manufacturer's information which may not include protein energy values.

Refeeding problems

- People who have eaten little or nothing for more than 5 days should have nutrition support introduced at no more than 50% of requirements for the first 2 days. Increase feeding rates to meet full needs if clinical and biochemical monitoring reveals no refeeding problems. D(GPP)

High risk of developing refeeding problems if:

one or more of the following:

- BMI less than 16 kg/m^2
- unintentional weight loss greater than 15% within the last 3–6 months
- little or no nutritional intake for more than 10 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 3–6 months
- little or no nutritional intake for more than 5 days
- a history of alcohol abuse or drugs including insulin, chemotherapy, antacids **or diuretics.**

- People at high risk of developing refeeding problems should be cared for by healthcare professionals who have skills and training and expert knowledge of nutritional requirements and nutrition support. D(GPP)

- Prescription for people at high risk of developing refeeding problems – consider: D(GPP)
  - starting nutrition support at a maximum of 10 kcal/kg/day, increasing levels slowly to meet or exceed full needs by 4–7 days
  - using only 5 kcal/kg/day in extreme cases
  - restoring circulatory volume and monitoring fluid balance and overall clinical status closely
  - providing immediately before and during the first 10 days of feeding: oral thiamin 200–300 mg daily, vitamin B co strong 1 or 2 tablets, three times a day (or full dose daily intravenous vitamin B preparation, if necessary) and a balanced multivitamin/trace element supplement once daily
  - providing oral, enteral or intravenous supplements of potassium (likely requirement 2–4 mmol/kg/day), phosphate (likely requirement 0.3–0.6 mmol/kg/day) and magnesium (likely requirement 0.2 mmol/kg/day intravenous, 0.4 mmol/kg/day oral) unless pre-feeding plasma levels are high. Pre-feeding correction of low plasma levels is unnecessary.

Step 4. Monitoring

- Healthcare professionals with the relevant skills and training in nutritional monitoring should undertake monitoring. D(GPP)
- Review the indications, route, risks, benefits and goals of nutrition support at regular intervals. D(GPP)
- Refer to the protocols in Tables 1 and 2 when monitoring people who are in hospital. D(GPP)
- Review people having parenteral nutrition in the community every 3–6 months at a specialist hospital clinic. D(GPP)
- Monitor people having oral nutrition support and/or enteral tube feeding in the community every 3–6 months or more frequently if there is any change in their clinical condition. D(GPP)
- Train patients and carers to recognise and respond to adverse changes in both their well-being and in the management of their nutritional delivery system. D(GPP)
- Some clinical observations may be checked by patients or carers. D(GPP)

Table 1 Protocol for nutritional, anthropometric and clinical monitoring of nutrition support

Parameter	Frequency	Rationale
Nutritional		
Nutrient intake from oral, enteral or parenteral nutrition (including any change in conditions that are affecting food intake)	Daily initially, reducing to twice weekly when stable	To ensure that patient is receiving nutrients to meet requirements and that current method of feeding is still the most appropriate. To allow alteration of intake as indicated
Actual volume of feed delivered*	Daily initially, reducing to twice weekly when stable	To ensure that patient is receiving correct volume of feed. To allow troubleshooting
Fluid balance charts (enteral and parenteral)	Daily initially, reducing to twice weekly when stable	To ensure patient is not becoming over/under hydrated
Anthropometric		
Weight*	Daily if concerns regarding fluid balance, otherwise weekly reducing to monthly	To assess ongoing nutritional status, determine whether nutritional goals are being achieved and take into account both body fat and muscle
BMI*	Start of feeding and then monthly	
Mid-arm circumference*	Monthly, if weight cannot be obtained or is difficult to interpret	
Triceps skinfold thickness	Monthly, if weight cannot be obtained or is difficult to interpret	
GI function		
Nausea/vomiting*	Daily initially, reducing to twice weekly	To ensure tolerance of feed
Diarrhoea*	Daily initially, reducing to twice weekly	To rule out any other causes of diarrhoea and then assess tolerance of feeds
Constipation*	Daily initially, reducing to twice weekly	To rule out other causes of constipation and then assess tolerance of feeds
Abdominal distension	As necessary	Assess tolerance of feed
Enteral tube – nasally inserted		
Gastric tube position (pH less than or equal to 5.5 using pH paper – or noting position of markers on tube once initial position has been confirmed)	Before each feed begins	To ensure tube in correct position
Nasal erosion	Daily	To ensure tolerance of tube
Fixation (is it secure?)	Daily	To help prevent tube becoming dislodged
Is tube in working order (all pieces intact, tube not blocked/kinked)?	Daily	To ensure tube is in working order

Parameter	Frequency	Rationale
Gastrostomy or jejunostomy		
Stoma site	Daily	To ensure site not infected/red, no signs of gastric leakage
Tube position (length at external fixation)	Daily	To ensure tube has not migrated from/into stomach and external over granulation
Tube insertion and rotation (gastrostomy without jejunal extension only)	Weekly	Prevent internal overgranulation/prevention of buried bumper syndrome
Balloon water volume (balloon retained gastrostomies only)	Weekly	To prevent tube falling out
Jejunostomy tube position by noting position of external markers	Daily	Confirmation of position
Parenteral nutrition		
Catheter entry site*	Daily	Signs of infection/inflammation
Skin over position of catheter tip (peripherally fed people)*	Daily	Signs of thrombophlebitis
Clinical condition		
General condition*	Daily	To ensure that patient is tolerating feed and that feeding and route continue to be appropriate
Temperature/blood pressure	Daily initially, then as needed	Sign of infection/fluid balance
Drug therapy*	Daily initially, reducing to monthly when stable	Appropriate preparation of drug (to reduce incidence of tube blockage). To prevent/reduce drug nutrient interactions
Long-/short-term goals		
Are goals being met?*	Daily initially, reducing to twice weekly and then progressively to 3–6 monthly, unless clinical condition changes	To ensure that feeding is appropriate to overall care of patient
Are goals still appropriate?*	Daily initially, reducing to twice weekly and then progressively to 3–6 monthly, unless clinical condition changes	To ensure that feeding is appropriate to overall care of patient

People at home having parenteral nutrition should be monitored using observations marked *.

Table 2 Protocol for laboratory monitoring nutrition support

Parameter	Frequency	Rationale	Interpretation
Sodium, potassium, urea, creatinine	Baseline Daily until stable Then 1 or 2 times a week	Assessment of renal function, fluid status, and Na and K status	Interpret with knowledge of fluid balance and medication Urine sodium may be helpful in complex cases with gastrointestinal fluid loss
Glucose	Baseline 1 or 2 times a day (or more if needed) until stable Then weekly	Glucose intolerance is common	Good glycaemic control is necessary
Magnesium, phosphate	Baseline Daily if risk of refeeding syndrome Three times a week until stable Then weekly	Depletion is common and under recognised	Low concentrations indicate poor status
Liver function tests including International Normalised Ratio (INR)	Baseline Twice weekly until stable Then weekly	Abnormalities common during parenteral nutrition	Complex. May be due to sepsis, other disease or nutritional intake
Calcium, albumin	Baseline Then weekly	Hypocalcaemia or hypercalcaemia may occur	Correct measured serum calcium concentration for albumin Hypocalcaemia may be secondary to Mg deficiency Low albumin reflects disease not protein status
C-reactive protein	Baseline Then 2 or 3 times a week until stable	Assists interpretation of protein, trace element and vitamin results	To assess the presence of an acute phase reaction (APR). The trend of results is important

Parameter	Frequency	Rationale	Interpretation
Zinc, copper	Baseline Then every 2–4 weeks, depending on results	Deficiency common, especially when increased losses	People most at risk when anabolic APR causes Zn ↓ and Cu ↑
Selenium[a]	Baseline if risk of depletion Further testing dependent on baseline	Se deficiency likely in severe illness and sepsis, or long-term nutrition support	APR causes Se ↓ Long-term status better assessed by glutathione peroxidase
Full blood count and MCV	Baseline 1 or 2 times a week until stable Then weekly	Anaemia due to iron or folate deficiency is common	Effects of sepsis may be important
Iron, ferritin	Baseline Then every 3–6 months	Iron deficiency common in long-term parenteral nutrition	Iron status difficult if APR (Fe ↓, ferritin ↑)
Folate, B12	Baseline Then every 2–4 weeks	Iron deficiency is common	Serum folate/B12 sufficient, with full blood count
Manganese[b]	Every 3–6 months if on home parenteral nutrition	Excess provision to be avoided, more likely if liver disease	Red blood cell or whole blood better measure of excess than plasma
25-OH Vit D[b]	6 monthly if on long-term support	Low if housebound	Requires normal kidney function for effect
Bone densitometry[b]	On starting home parenteral nutrition Then every 2 years	Metabolic bone disease diagnosis	Together with lab tests for metabolic bone disease

[a] These tests are needed primarily for people having parenteral nutrition in the community.

[b] These tests are rarely needed in people having enteral tube feeding (in hospital or in the community), unless there is cause for concern.

Implementation

- A slide set – key messages for local discussion.
- Costing tools:
  - a national costing report, which estimates the overall resource impact associated with implementation
  - a local costing template; a simple spreadsheet that can be used to estimate the local cost of implementation.
- Implementation advice – practical suggestions on how to address potential barriers to implementation.

Further information

Ordering information

You can download the following documents from www.nice.org.uk/CG032

- A quick reference guide (this document), which has been distributed to health professionals in England.
- Information for the public – a lay version produced for people who are malnourished and their carers, and for the public.
- The NICE guideline – contains the following: Key priorities for implementation; 1 Guidance; 2 Notes on the scope of the guidance; 3 Implementation in the NHS; 4 Research recommendations; 5 Other versions of this guideline; 6 Related NICE guidance; 7 Review date. It also gives details of the grading scheme used, the Guideline Development Group and the Guideline Review Panel and technical detail on the criteria for audit.
- The full guideline – all the recommendations, details of how they were developed, and summaries of the evidence on which they were based.

For printed copies of the quick reference guide or information for the public, phone the NHS Response Line on 0870 1555 455 and quote:

- N0977 (quick reference guide)
- N0978 (information for the public).

Related guidance

Chronic obstructive pulmonary disease: management of chronic obstructive pulmonary disease in adults in primary and secondary care. *NICE Clinical Guideline* No. 12 (2004). Available from www.nice.org.uk/CG012

Eating disorders: core interventions in the treatment and management of anorexia nervosa, bulimia nervosa and related eating disorders. *NICE Clinical Guideline* No. 9 (2004). Available from www.nice.org.uk/CG009

Pressure ulcer risk assessment and prevention. *NICE Inherited Clinical Guideline* No. B (2001). Available from www.nice.org.uk/guidelineb

Infection control: prevention of healthcare-associated infection in primary and community care. *NICE Clinical Guideline* No. 2 (2003). Available from www.nice.org.uk/CG002

NICE is in the process of developing the following guidance (details available from www.nice.org.uk):

- Dementia: the treatment and care of people with dementia in health and social care. *NICE Clinical Guideline* (Publication expected November 2006.)
- Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children. *NICE Clinical Guideline*. (Publication expected February 2007.)

Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin before this if significant evidence that affects the guideline recommendations is identified. The updated guideline will be available within 2 years of the start of the review process.

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