Intensive Care Society of Ireland

Irish Society for Clinical Nutrition & Metabolism

Irish Nutrition & Dietetic Institute
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CRITICAL CARE PROGRAMME

NUTRITION SUPPORT GUIDELINE 2012 (ADULTS)

CRITICAL CARE

PSI Cumann Cógaiseoirí na hÉireann
THE PHARMACEUTICAL SOCIETY OF IRELAND
THE PHARMACY REGULATOR

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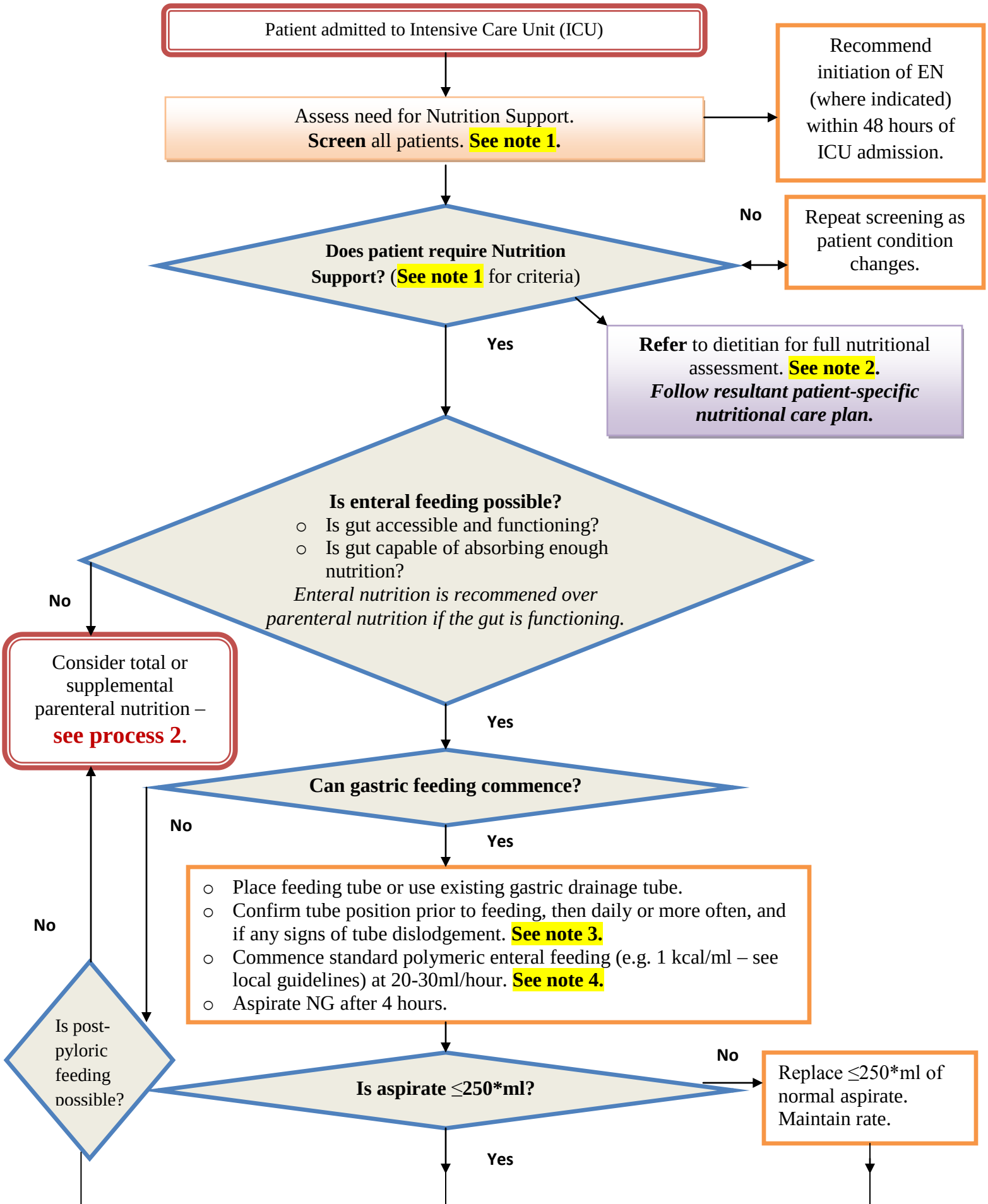
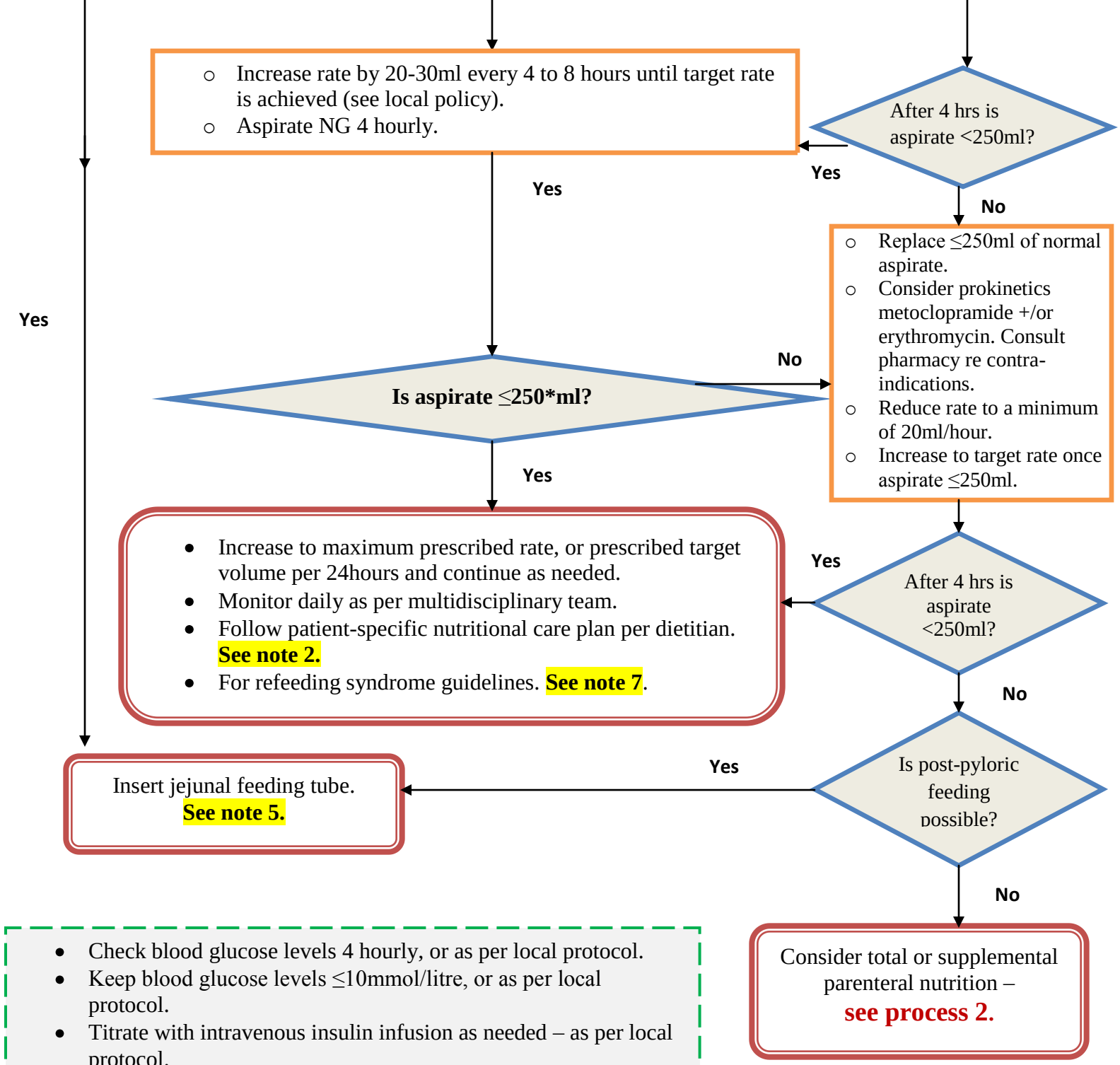
CRITICAL CARE PROGRAMME
ENTERAL (EN)/PARENTERAL (PN) GUIDELINE (ADULTS): Process 1





- Check blood glucose levels 4 hourly, or as per local protocol.
- Keep blood glucose levels ≤10mmol/litre, or as per local protocol.
- Titrate with intravenous insulin infusion as needed – as per local protocol.

***Gastric aspirate/residual volume cut-off levels of 250-500ml have been advocated for critically ill patients. Discard abnormal aspirates (e.g. faecal, curdled, blood stained). Stop feeding if aspirate is >500ml (discard aspirate) and inform the ICU team.**
DO NOT aspirate gastrostomy, or jejunostomy tubes.

Patients at risk of dysphagia (e.g. patients with a tracheostomy, those post-prolonged intubation and those with an underlying medical/surgical diagnosis known to increase risk of dysphagia) should be referred to the speech and language therapist for a swallow assessment before PO diet is considered.

CRITICAL CARE PROGRAMME
ENTERAL (EN) /PARENTERAL (PN) GUIDELINE (ADULTS): Process 2

Patient admitted to Intensive Care Unit (ICU) and identified as needing nutrition support **(see process 1)** - but enteral nutrition (EN) is considered impossible or inadequate:
gut is inaccessible, or not functioning, or not capable of absorbing enough nutrition.

Recommend Parenteral Nutrition (PN) initiation within 72 hours, where EN is insufficient or contraindicated.

Refer to dietitian for full nutritional assessment. **See note 2.**
Follow resultant patient-specific nutritional care plan.
Refer to specialist nutrition nurse where available.
Inform pharmacist. **See note 6.**

- Use dedicated port on existing CVAD (central venous access device), or place new CVAD. Confirm position before use.
- Avoid femoral vein for PN access where possible.

- Commence standard PN regimen- see local protocol.
- Infuse over 24 hours.
- Commence daily intravenous vitamins and trace elements if not part of PN regimen.
- Monitor glycaemic control (see below).
- Start PN to provide lower requirement range or below, if haemodynamically unstable or refeeding risk. **See note 7**.
- Increase PN to full requirements as clinical condition allows. **See note 8**.
- Adjust PN prescription based on nutritional, biochemical and metabolic monitoring by the multidisciplinary team.
- Consider glutamine supplemented PN, or supplementation with intravenous glutamine infusion.
- Consider lipid source - avoid pro-inflammatory lipids where possible. Check fat clearance.
- Consider additional micronutrient supplementation if high requirement, or excess loss, e.g. large drain outputs, fistula losses, large wounds, or high output stomas. Avoid toxicity especially in the presence of significant hepatic and renal insufficiency.

Combine PN with low rate enteral feeding where possible.
Reassess daily for enteral feeding eligibility. See process 1.

- **Once appropriate to commence EN, transition from PN to EN**, weaning down PN while increasing EN, as per dietitian's patient-specific nutritional care plan.
- Discontinue PN once **full** EN target rate is achieved.

- Check blood glucose levels 4 hourly, or as per local protocol.
- Keep blood glucose levels ≤10mmol/litre, or as per local protocol.
- Titrate with intravenous insulin infusion as needed – as per local protocol.

Note 1: Nutritional screening for all ICU patients

Screen all ICU admissions to assess need for nutrition support. Screening should be performed by a suitably qualified multidisciplinary team member, e.g. intensive care dietitian, anaesthetist, or nurse. Consider nutrition support for:

- Malnourished, or hypercatabolic patients, or those at risk of malnutrition.
- Ill patients with expected ICU stay of ≥3 days.
- PO diet not expected for ≥5 days.

Note 2: Refer to dietitian

Nutritional intervention by dietetic staff as part of the intensive care multidisciplinary team has been associated with better provision of nutrition support, and may be associated with improved patient outcomes.

Note 3: Confirming enteral feeding tube position

- Only use radio-opaque tubes for enteral feeding.
- Obtain radiographic confirmation that any blindly-placed tube (small or large bore) is properly positioned in the GI tract prior to its initial use for administration of feed or medications. Bedside pH checks can also be used to check position – **see local guidelines**. Gastric acid suppression therapy may affect pH readings.
- Mark the exit site of a feeding tube at the time of initial placement. Observe for a change in the external tube length during feeding.
- In adult patients do not rely on the auscultatory method to differentiate between gastric and respiratory placement of feeding tube.

Note 4: Feed type, feed administration guidelines and miscellaneous

- Standard polymeric feeds can be used for most ICU patients. Standard ICU feeds can be 1kcal/ml up to 1.5kcal/ml. Consider use of more specialised feeds, as clinically indicated, such as:
  - feed containing fish oil, borage oil, and supplemented with anti-oxidants for patients with ARDS (acute respiratory distress syndrome), or ALI (acute lung injury);
  - renal feed for patients with AKI (acute kidney injury) not on continuous renal replacement therapy, or CKD (chronic kidney disease) with electrolyte abnormalities.
- Consider additional micronutrient supplementation.
- Consider enteral glutamine supplementation in burns and trauma patients.
- Closed enteral feeding systems should be used where possible.
- Administration sets for closed system enteral nutrition formulas should be changed per manufacturer guidelines. Giving sets for open systems should be changed at least every 24 hours.
- Use sterile water for flushing tubes or for enteral water infusion.
- Sterile liquid formulas should be used in preference to powdered reconstituted feeds.
- Closed-system enteral nutrition formulas can hang for 24 hours.
- Sterile decanted formulas should have a maximum 8 hour hang-time.
- Reconstituted powdered feeds should have a maximum 4 hour hang-time.
- Store unopened liquid enteral feeds as per manufacturer's guidelines and use before expiry date.
- Consider fine bore NG when patient is stable on NG feeds and all aspirates are normal.
- Enteral nutrition prescriptions should include: patient identifiers, the feed formula, the enteral access device/site, and the administration method and rate.
- A head-of-bed elevation of 30-45^{o} is recommended during feeding, unless contra-indicated.
- Enteral nutrition can commence in surgical patients without waiting for flatus or a bowel motion.
- **For bowel management issues – see local guidelines.**
- **For fasting times for procedures and surgery – see local guidelines.**
- **For drug administration via enteral feeding tubes – see local guidelines.**

Note 5: Post-pyloric feeding

- Do not aspirate jejunal tubes. Otherwise follow the feeding guidelines above, or see local guidelines.
- Watch for abdominal distension, or significant feed appearance in *gastric* aspirate, as signs of feed intolerance when feeding via post-pyloric route.
- Nasoenteric feeding tubes can be placed successfully via endoscopy or fluoroscopy. Success rates of bedside placement can be increased using aids such as an electromagnetic guidance system.

Note 6: Inform pharmacist

- Manufacture and supply of PN should be co-ordinated with pharmacy staff.
- Early liaison with a pharmacist will help ensure that provision of PN to a patient is optimised, especially with regard to supplementation with macro/micronutrients.
- Pharmaceutical input may be required for supply and administration of specific micronutrient supplements.

Note 7: **Refeeding syndrome:** is a life threatening condition encompassing acute micronutrient deficiencies, fluid and electrolyte imbalances, and disturbances of organ function and metabolic regulation that may result from over-rapid or unbalanced nutrition support provision to malnourished patients.

NICE 2006 criteria for determining which patients are at high risk of developing refeeding problems

One or more of the following:	Two or more of the following:
BMI less than 16 kg/m^2	BMI less than 18.5 kg/m^2
Unintentional weight loss greater than 15% within the last 3–6 months	Unintentional weight loss greater than 10% within the last 3–6 months
Little or no nutritional intake for more than 10 days	Little or no nutritional intake for more than 5 days
Low levels of potassium, phosphate or magnesium prior to feeding.	A history of alcohol abuse, or drugs including recent chemotherapy.

Nutrition support in patients at high risk of refeeding syndrome

- Start nutrition support at 10 kcal/kg/day, increase levels slowly to meet or exceed full requirements by day 4 to 7 (consider 5 kcal/kg/day in extreme cases, eg. anorexia nervosa patients).
- Restore circulatory volume and monitor fluid balance and overall clinical status closely.
- Providing immediately before and during the first 10 days of feeding: oral thiamin 200–300 mg daily, or full dose daily intravenous vitamin B preparation, Pabrinex IVHP ® 1 and 2, one to two pairs once to three times daily for 3 to 5 days (use the higher more frequent dose for chronic alcohol abusers). Give a balanced multivitamin/trace element supplement once daily.
- Provide oral, enteral or intravenous supplements of potassium, phosphate and magnesium unless pre-feeding plasma levels are high (in accordance with local hospital protocols on electrolyte replacement).

Note 8: **Recommended macronutrient requirements for use in ICU**

Nutrient	Recommendation *(per kg recommendations infer per kg per 24 hours)*	Guideline Source
Energy	Individualise. Use validated equations, in the absence of indirect calorimetry.	PENG 2007 NSIG 2010
	Use 25-30kcal/kg, or predictive equations, or indirect calorimetry.	ASPEN 2009
	20-25kcal/kg in acute phase of critical illness. 25-30kcal/kg in recovery phase.	ESPEN 2006
	25kcal/kg	ESPEN 2009
	Consider hypocaloric feeding in critically ill obese (BMI >30kg/m^2), e.g. 60-70% of target energy requirements, or 11-14kcal/kg actual body weight, or 22-25kcal/kg ideal body weight.	ASPEN 2009
Protein	1.3-1.5g protein/kg.	ESPEN 2009
	1.2-2.0g protein/kg if BMI<30kg/m^2. 2g/kg ideal weight if BMI 30-40kg/m^2. 2.5g/kg ideal weight if BMI >40kg/m^2.	ASPEN 2009
	Caution with excess nitrogen in severely ill.	NICE 2006
Glucose*	Minimum 2g/kg	ESPEN 2009
	Maximal glucose oxidation rate is 4-7 mg/kg/minute/24hours. Ideally keep to ≤5mg/kg/minute/24hours.	ESPEN 2009
	3-5 (maximum 7) g/kg.	ESPEN 2006
Fat/lipid*	0.7-1.5g/kg.	ESPEN 2009
	0.8-1g/kg in sepsis/SIRS.	PENG 2007
	Consider lipid source.	CPG 2009

***Do not exceed the maximum handling capacity for carbohydrate or lipid. Consider all lipid sources, e.g. propofol, and carbohydrate sources, e.g. glucose infusions and dialysate solutions, when calculating energy provision.*