**Adult Enteral Feeding guidelines**

<table>
<thead>
<tr>
<th>Full Title of Guideline:</th>
<th>Adult Enteral Feeding guidelines – Section 11.0 Enteral feeding guideline for adult critical care (including MHDU)</th>
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</thead>
<tbody>
<tr>
<td><strong>Author (include email and role):</strong></td>
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<tr>
<td><strong>Division &amp; Speciality:</strong></td>
<td>Clinical Support (Therapy Services) Surgery (Nutrition)</td>
</tr>
<tr>
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<td>Trust Wide</td>
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<tr>
<td><strong>Explicit definition of patient group to which it applies (e.g. inclusion and exclusion criteria, diagnosis):</strong></td>
<td>All adult patients who are being considered for or are receiving enteral nutrition</td>
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<tr>
<td><strong>Changes from previous version (not applicable if this is a new guideline, enter below if extensive):</strong></td>
<td>Structural changes Some changes made in some sections based on recently published NHS Improvement documents</td>
</tr>
<tr>
<td><strong>Summary of evidence base this guideline has been created from:</strong></td>
<td>See references</td>
</tr>
</tbody>
</table>

*This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date or outside of the Trust.*
11.0 ENTERAL FEEDING GUIDELINE FOR ADULT CRITICAL CARE (INCLUDING MEDICAL HIGH DEPENDENCY UNIT (MHDU))

11.1 WHY DO WE NEED TO FEED PATIENTS?
Critically ill patients undergo a stress or inflammatory response which results in catabolism.\(^1\) Catabolism drives protein breakdown and muscle mass is lost. Critically ill patients can lose up to two per cent of their lean body mass per day during an intensive care unit stay, with the loss being more significant in patients with an increased number of failing organs.\(^2\) Malnutrition in critically ill patients is associated with increased morbidity and mortality.\(^3-6\) Nutrition support in critically ill patients is associated with improved wound healing, a reduction in metabolic response to injury, fewer complications, improved gut structure and function, reduced length of hospital stay, improved clinical outcomes and cost savings.\(^6\) Studies have shown detrimental effects of underfeeding: a cumulative negative energy intake has been associated with increased complications and infections\(^7\) and a daily energy deficit of around 1200kcalories lead to greater mortality and morbidity.\(^8\)

Recently there has been a lot of published work reviewing the protein needs for critically ill patients and the importance of meeting these. Weijs\(^9\) concluded that by meeting both energy and protein requirements adequately in the critically ill patients, mortality can be reduced by 50%. We have therefore made the decision to use a higher protein feed for the initial feed in the starter nasogastric (NG) and orogastric (OG) feeding protocol.

Despite this dramatic muscle loss, it is not the case that the more nutrition given the better, as overfeeding can lead to hyperglycaemia, increased oxygen consumption, increased carbon dioxide production, hepatic steatosis (fatty liver) and hyperlipidaemia.\(^10\)

11.2 BENEFITS OF EARLY ENTERAL FEEDING
Systematic reviews and meta-analyses have shown starting enteral feeding within 24 – 36 hours of admission to critical care is associated with fewer infections, shorter length of stay, less mortality, less incidence of pneumonia and a reduction in mortality.\(^11-13\)

11.2.1 BENEFITS OF ENTERAL NUTRITION COMPARED TO PARENTERAL
Enteral nutrition is more physiological, it helps to maintain gut integrity parenteral nutrition, the
most consistent benefit of enteral nutrition is its association with reduced infectious complications.\textsuperscript{3, 15, 16} The enteral route should be used whenever possible. To initiate enteral feeding, the patient must have a functioning gut and suitable access.

11.3 WHO’S RESPONSIBILITY?
The decision of whether to commence nutrition, and by which route, is predominately that of the individual patient’s parent medical or surgical team. The role of providing critical care patients with appropriate and adequate nutrition is shared between the intensivists, medical and surgical staff, the nursing staff, the dietitian, the pharmacist and the speech and language therapist.

Additional advice can also be sought from:
- The Nutrition Nurses- Bleep 780 6993 or Ext 56754 for the City Campus and Bleep 780 6417 or Ext 61036 for the QMC Campus
- The Nutrition Team (City Campus). Use NotIS to make a referral.
- The Clinical Nutrition Unit (CNU) (Ext 62119) for advice about parenteral nutrition at QMC.
- The acute GI SpR via switchboard

11.4 NUTRITIONAL SCREENING OF PATIENTS IN CRITICAL CARE
The Malnutrition Universal Screening Tool (MUST) is not used within Adult Critical Care as it is not a validated tool for these patients and all of these patients are deemed at risk of malnutrition. Many trauma patients may be well nourished prior to injury. However, those individuals sustaining injury with associated drug or alcohol abuse may have a poor pre-injury nutritional status. Similarly, obesity can mask poor nutritional intake and the potential risk of malnutrition. The dietitians visit the critical care units every day and liaise with the nursing staff about whether dietetic input is required. Nursing staff should highlight any nutritional concerns to the dietitian.

Current service provision is dietitians are available Monday to Friday. During bank holiday weekends, there is a dietitian available for at least one of the days during the period to ensure that there is no break of dietetic cover of over 48 hours.

All patients receiving artificial nutrition need to be referred to the dietitian. To help determine whether a patient who is able to have oral intake needs to be referred to the dietitian, please refer to the pathway below. Nursing staff should document the plan in the NUH Risk Assessment booklet.
PATIENTS ABLE TO HAVE ORAL INTAKE

Does the nutritional plan documented in the medical notes state that the patient can safely eat and drink?

**Yes**
- Commence a food chart
  - Use a red tray system for all patients
  - Protect meal times

**No**
- If there is no documented nutritional plan for the patient, discuss this with the doctors and dietitian.
- Consider if a referral to speech and language therapists is appropriate.
- Refer to the rest of these guidelines for information and advice about non-oral nutrition.

Can the patient eat and drink independently?

**No**
- Provide assistance +/- adapted cutlery as required and monitor.

**Yes**
- Document type of diet required
  - Food service assistant to order meals
  - Refer to the dietitian if necessary including anyone needing a modified texture diet

Does the patient require a special diet?

**Yes**
- Document type of diet required
  - Food service assistant to order meals
  - Refer to the dietitian if necessary including anyone needing a modified texture diet

**No**
- If there is no documented nutritional plan for the patient, discuss this with the doctors and dietitian.
- Consider if a referral to speech and language therapists is appropriate.
- Refer to the rest of these guidelines for information and advice about non-oral nutrition.

Does the patient have a pressure ulcer graded stage 2 or above?

**Yes**
- Refer to the dietitian

**No**
- How much per mealtime does the patient eat?
  - More than half
    - Continue to monitor patient’s intake
  - Half or less
    - Has the patient eaten half or less of their meals for 48 hours?
      - Yes
        - Refer to the dietitian
      - No
        - Has the patient eaten half or less of their meals for 48 hours?
          - Yes
            - Refer to the dietitian
          - No
            - Continue to monitor patient’s intake

- Consider offering a non-prescribable supplement (e.g. Meritene, Complan or Build Up) twice a day (NB if the patient has renal disease contact the dietitian for advice about the suitability of these).
- Establish causes e.g. nausea, lack of appetite and discuss with doctors and dietitian as appropriate.
11.5 NUTRITIONAL PLAN
Once the decision of when and by which route(s) to feed the patient has been made, this information must be documented in the patient’s medical records.
A nutritional plan must be documented in the patient’s records about whether the patient is receiving artificial nutrition, eating and drinking or is nil by mouth.

11.6 FEEDING ROUTE(S)
Various factors should be considered when making the decision about when and by which route(s) to start feeding. These include:

- Has the patient got a functioning gut?
- What is the patient’s nutritional status?
- Is the patient surgical or medical?
  ➢ If they are a surgical patient:
    - it is worth noting that small bowel motility usually returns within 12 hours after an operation
    - did the surgery involve the gastro-intestinal tract?
    - was the surgery an elective or an emergency procedure? An elective patient will be metabolically different to an emergency patient. Generally an elective post-op patient will be more stable than an emergency post-op patient.
- What are the possible routes for commencing nutrition? If the patient was a surgical patient was a feeding jejunostomy tube inserted in theatre?

There will be some occasions when nutrition needs to be delivered by more than one feeding route.

Nutrition can be given via the following route(s):

- Oral
- Orogastric tube (OGT)
- Nasogastric tube (NGT)
- Naso-jejunal tube (NJT)
- Gastrostomy tube either: Percutaneous Endoscopic Gastrostomy (PEG) tube or Radiologically Inserted Gastrostomy (RIG) tube
- Gastrostomy with jejunal extension
- Jejunostomy
- Parenteral Nutrition -
patients for whom the enteral route is not suitable or successful, parenteral
● nutrition (PN) should be considered [Critical Care Pharmacy Drugs Guidelines Folder p81]

See the main NUH EF guidelines about the indications for the different types of feeding tubes.

11.6.1 ABSOLUTE CONTRA-INDICATIONS TO ANY ROUTE OF ENTERAL FEEDING
These include:

● Haemodynamically unstable patients
● Obstructed bowel
● Ileus
● Spinal cord injury (SCI) if the patient is in spinal shock. These patients are at risk of ileus which may continue for a minimum of 48 hours following injury but can be prolonged. Hence enteral nutrition is contraindicated during the first 48 hours following a SCI if the patient is in spinal shock and only initiated once there are no obvious signs of spinal shock or ileus. Please refer to the Sheffield Spinal Protocol.
● Proximal gut fistulae.

11.6.2 RELATIVE CONTRA-INDICATIONS TO SOME OR ALL ROUTES OF ENTERAL TUBE FEEDING
These include:

● Upper GI surgery (proximal to the DJ flexure) – NG feeding may be contra-indicated, consider jejunal feeding.
● Upper GI anastomotic leak/ perforation – seek advice from surgeons about the most appropriate route for feeding.
● Distal small bowel and colon fistulae may require parenteral support liaise with surgeons and Nutrition Team for advice
● Insufficient working bowel / small bowel disease with possible failure to absorb/ short bowel – liaise with Nutrition Team /CNU for advice.
● Emergency Open AAA repairs - it is advised by the Vascular Surgeons that patients’ who have undergone Emergency open AAA repairs are Nil by mouth/tube for 48 hours post-surgery. Then after review by the surgeons, enteral feeding can commence at 10mls per hour and built up slowly dependant on aspirates. However, the Vascular surgeons will document their feeding plan on the operation sheet so it may change dependant on the patient and findings during the operation.
● Elective AAA repairs - patients who are Elective AAA repairs, and those that are not
ventilated and awake, can have oral fluids for the first 48 hours. After review by the surgeons and if the patient is hungry, they can then eat and drink.

- Caution is required for patients receiving non-invasive BiPAP/CPAP via a full face mask especially if they have high NG losses, high gastric residual volumes (GRVs) and/or vomiting. In these patients if this method of respiratory support is needed only for a short period of time (e.g. a few days) – it may be considered safest not to NG feed as there could be an increased risk of aspiration with gastric distension. If this type of respiratory support is needed for more than a few days in a malnourished patient or for more than 7-10 days in a well nourished patient and they are showing evidence of delayed gastric emptying, an alternative to NG feeding should be considered e.g. NJ feeding or PN if NJT placement is not possible.

- Also a patient does not need to start on a tube feed if they have been assessed and are expected to be able to have adequate oral intake e.g. after extubation.

11.7 COMMENCING ENTERAL FEEDING

During the dietitian’s working hours an individualised enteral feeding regimen will be written by the critical care dietitian. Outside of the dietitian’s working hours there are starter regimens for nasogastric (NG) and oro-gastric (OG) feeding which can be commenced. However, it is important to note that there are some clinical reasons and other feeding routes where it would be preferable to introduce enteral feeding at a slower rate, if the dietitian is not available, please liaise with the patient’s parent team for advice about this. Feeding may also need to be introduced more slowly if the patient is at risk of refeeding syndrome – see below.

11.8 REFEEDING SYNDROME

This is defined as the severe fluid and electrolyte shifts and related metabolic implications in malnourished patients undergoing refeeding, either by the oral, enteral or parenteral route.

Patients at particular risk include those with cancer, anorexia nervosa and alcohol dependency. If the patient is identified as being at risk of refeeding, seek medical and dietetic advice before commencing feed. Refeeding guidelines

11.9 NASOGASTRIC TUBES FOR ENTERAL FEEDING

If the decision has been made to commence NG feeding in a level 1 or level 2 a fine bore Enfit compliant NG tube is usually used to provide the access for the feed, unless advised otherwise by
the patient’s parent team.

If the decision has been made to commence NG feeding in a level 3 patient, a wide bore Enfit compliant NGT is usually used to provide the access for the feed, unless advised otherwise by the patient’s parent team.

11.10 VERIFYING NASOGASTRIC TUBE POSITION

Following the NPSA (2011) patient safety alert of misplaced NG tubes, all NG tubes used for the purpose of feeding need to be radio-opaque throughout their length and have externally visible length markings.\(^\text{17}\)

NG tubes should not be flushed, nor any liquid/feed introduced through the tube following initial placement until the tube tip is confirmed by x-ray, to be in the stomach. This must be documented in the patient’s records by the doctors. There is a pre-printed NGT insertion sticker in some of the NGT packs which can be used to do this.

The position of the NG tube must be checked and tube position clarified and documented prior to use and each time the tube is used for feeding, flushing or administration of medication. The verification of this must be documented on the ‘Checking and confirming the position of wide bore nasogastric and orogastric tubes, fine bore nasogastric tubes and nasojejunal tubes’ sheet.

11.11 GASTRIC RESIDUAL VOLUMES

If a fine bore NG tube is insitu for feeding, the patient will not have their gastric residual volumes checked. If a wide bore NGT is insitu for feeding the patient will have their gastric residual volumes (GRVs) checked six hourly. The method of measuring GRVs has limitations and volumes obtained can vary depending on the size of the enteral feeding tube, the distal position of the feeding tube and the patient’s position.\(^\text{18-20}\) A one off high GRV is rarely significant.\(^\text{21}\) A GRV of 400ml has been shown not to increase the risk of aspiration\(^\text{22}\) and also accounts for the stomach’s intrinsic secretions. It should be acknowledged that gastric and salivary secretions can be up to 4500ml per day.\(^\text{23}\)

11.12 STARTING OG/NG FEEDING

Outside of the dietitian’s working hours orogastric or nasogastric feeding can be built up as per the starter regimens shown below. Use Figure 1 for level 1 & 2 patients and use in Figure 2 for level 3 patients. NB if a level 1 or a level 2 patient has a wide bore NGT, Figure 2 can be used to
commence feeding.

11.12.1 CHECKLIST BEFORE STARTING FEED:

- Has the decision been made to start enteral feeding and has this been documented in the medical notes?
- Have the contraindications been considered?
- Should the feed be introduced more slowly than the starter regimen? e.g. on the advice of surgeons and / or because the patient is at risk of refeeding?
- NB All Nutricia tube feeds are gluten free and lactose free and are therefore suitable for patients with coeliac disease and/or lactose intolerance.
- Nutrison Protein Plus is gluten free, wheat free and egg free. It is suitable for people following a kosher or a halal diet.
- Nutrison Protein Plus does contain fish products and milk products.
- Nutrison Protein Plus is not classed as being suitable for vegetarians as it contains fish oils.
- Nutrison Soya is gluten free, wheat free and egg free. It is also free from fish products and milk products. It is suitable for people following a vegetarian diet. It is not suitable for people following a strict vegan diet as the vitamin D is prepared from the wool of healthy living sheep.
FIGURE 1: STARTER REGIMEN FOR NG OR OG FEEDING FOR LEVEL 1 and 2 PATIENTS

NB if a level 1 or 2 patient has a wide bore feeding tube, use Figure 2

Does the patient have an allergy to fish and/or milk protein? Is the patient vegetarian?

Yes to either or both

Use Nutrison Soya feed

No to both

Use Nutrison Protein Plus

Commence feed at 20ml/h for 12 hours. Monitor if the patient tolerates the feed – see * below.

Is the patient tolerating the feed?

Yes

Increase feed to a rate of 40ml/h for 12 hours. Is the patient tolerating the feed? See * below

Yes

Increase feed to a rate of 60ml/h** for 24 hours and refer to the Dietitian for an individualised feeding regimen. Continue to monitor if the patient is tolerating the feed.

No

Consider possible reasons for this and refer to the ‘Things to consider when a patient does not tolerate the feed’ section and liaise with medical staff and/or a dietitian. Consider restarting the feed.

No

Is the patient tolerating the feed? See * below.

Yes

Continue at the final feeding rate.

No

*When determining if the feed is being tolerated, consider if there is regurgitation, nausea, vomiting and/or abdominal distension. If any of these occur, consider possible reasons for these symptoms and refer to the ‘Things to consider when a patient does not tolerate the feed’ section.**NB If the patient’s weight is less than 60kg keep the feed rate at 40ml/h until the patient is assessed by the dietitian. If the patient’s weight is less than 40kg keep the feed rate at 20ml/h until the patient is assessed by the dietitian.
FIGURE 2: STARTER REGIMEN FOR NG OR OG FEEDING FOR LEVEL 3 PATIENTS

NB if a level 3 patient has a fine bore feeding tube, use Figure 1

<table>
<thead>
<tr>
<th>Does the patient have an allergy to fish and/or milk protein? Is the patient vegetarian?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes to either or both</td>
</tr>
<tr>
<td>Use Nutrison Soya feed</td>
</tr>
<tr>
<td>Feed at 20ml/h. Aspirate the NG or OG tube after 6 hours. Is the gastric residual volume (GRV) greater than 400ml?*</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Return 400ml and continue feed at 20ml/h. Repeat aspirate after 6 hours. Is the GRV greater than 400ml?*</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Return any GRV and increase rate by 20ml/h. Repeat GRV checks every 6 hours.*</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>If bowel obstruction has been excluded doctors to prescribe Metoclopramide and Erythromycin Critical Care Pharmacy Drugs Guidelines Folder Repeat GRV checks every 6 hours. Is the GRV greater than 400ml?*</td>
</tr>
<tr>
<td>Return 400ml</td>
</tr>
<tr>
<td>If the GRV is less than 400ml return any GRV and increase rate by 20ml/h every 6 hours until a rate of 60ml/h** or as stated on the dietitian’s regimen is reached.</td>
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<tr>
<td>If the GRV is greater than 400ml on one occasion, return 400mls and continue current feed rate and recheck in 6 hours.*</td>
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<tr>
<td>Yes</td>
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<tr>
<td>NB if vomiting or the GRVs are greater than 400ml on 2 consecutive occasions return 400ml and reduce feed rate to 10ml/h</td>
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<tr>
<td>No</td>
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<tr>
<td>No</td>
</tr>
<tr>
<td>Keep feed at 10ml/h. Continue to measure GRVs 6 hourly. If the patient has not responded to prokinetic treatment after 72 hours, stop Metoclopramide and Erythromycin and consider alternative feeding route such as jejunal feeding or parenteral nutrition</td>
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<tr>
<td>Yes</td>
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<tr>
<td>Continue feed. If the patient is receiving prokinetics, stop these after the patient has tolerated full feeding rate for 24hours. Prokinetics should not be continued for more than 7 days.</td>
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*When determining if the feed is being tolerated, in addition to the gastric residual volume also consider if there is regurgitation, nausea, vomiting and/or abdominal distension. If any of these occur, consider possible reasons for these symptoms and refer to the ‘Things to consider when a patient does not tolerate the feed’ section. If the GRV is less than 400ml do not stop or reduce the feed rate even if the patient is receiving a low rate of feed unless there are other symptoms which are indicating the patient is not tolerating the feed. **NB if the patient’s weight is less than 60kg keep the feed rate at 40ml/h until the patient is assessed by the dietitian. If the patient’s weight is less than 40kg keep the feed rate at 20ml/h until the patient is assessed by the dietitian.
11.12.2 MANAGEMENT OF ENTERAL FEEDING

Check if the patient has a tailored feeding regimen written by the dietitian and if not contact the dietitian at the earliest opportunity.

Only a dietitian should write on the front page of the enteral feeding regimen. If a change to the feeding regimen is made by a doctor outside of the dietitian’s working hours, the change should be documented in the medical notes by the doctor stating the reason for the change and the dietitian should be informed of this as soon as possible. However, if the critical care doctors want a patient to receive water via a pump into an enteral feeding tube, it is agreed that they should write the water on the enteral feeding chart.

Giving sets should be changed every 24 hours. Label the giving set with the date and time when it is due to be changed.

An enteral feed may need to be stopped prior to some procedures or transfers e.g. before a tracheostomy insertion, a bronchoscopy, extubation or because the patient needs to leave the unit e.g. for transfer to CT scan or theatre. If there are guidelines about when to stop an enteral feed prior the specific event follow these, if not seek guidance from a doctor. For example the Trust policy for the ‘Insertion and management of tracheostomies within adult critical care’ states “if the patient is NG fed then feeding should be discontinued and the NG tube aspirated prior to the procedure.” Insertion and management of tracheostomies within Adult Critical Care.

Consider if a fluid replacement is required whilst the feed is off. If the feed is stopped and the patient is on sliding scale insulin, ensure that either the insulin is stopped or that the patient is receiving an IV glucose source e.g. IV dextrose. After the procedure has taken place, recommence feed immediately unless medical guidance differs.

11.12.3 THINGS TO CONSIDER WHEN A PATIENT DOES NOT TOLERATE THE FEED:

If the patient has large or increasing gastric residual volumes/ regurgitation of feed / nausea/ vomiting consider:

- Has anything changed clinically? Recheck if there are any contra-indications for NG feeding
- Is the patient receiving sedatives, paralysing agents, opioids or inotropes/vasopressors (e.g noradrenaline, adrenaline, dopamine)? These will decrease gut motility – could these infusions be reduced or stopped?
- Is the rest of the gut working? Review if the patient’s bowels have opened or if the stoma is functioning? Could the patient have an ileus or a bowel obstruction?
- Is the patient supine? Could the patient be repositioned into the semi-recumbent position at 30 - 45°?
- Recheck the position of the feeding tube.
- If a fine bore NG tube is in situ consider changing this to a wide bore NGT.
- Consider starting prokinetics if this has not already been done.

Critical Care Pharmacy Drugs Guidelines  Folder p102
- Nausea and vomiting can be related to a range of factors not just GI function.
Consider other possible causes such as side effects of medications

If the patient has abdominal distension consider:

- If the patient has a possible ileus. If so stop the enteral feed.
- Is the patient constipated? Treat if possible – see Guidelines for the use of Laxatives

Critical Care Pharmacy Drugs Guidelines  Folder
- If a fine bore NGT is insitu consider changing this to a wide bore NGT
- Could the diarrhoea be caused by medications (especially antibiotics), an infection or be disease related? If so, review medications (especially antibiotics) and / or send a stool sample.
- If stools are watery – consider the possibility of overflow diarrhoea.

11.13 PATIENTS TRANSFERRED TO ANOTHER CRITICAL CARE OR A WARD

When patients are transferred to another Adult Critical Care area or a ward within NUH, the nutritional plan should be included as part of the medical and nursing handover.

For patients who are receiving artificial (enteral or/and parenteral) nutrition, the details of the nutrition plan should be documented in the medical notes by the dietitian.

If this has not happened and artificial nutrition is continuing on the ward please contact the ward dietitian at the earliest convenience.

Ward areas should carry out a MUST score following transfer.
REFERENCES


