1. Introduction

1.1 This clinical guideline provides advice and information on starting the administration of nutrition via an enteral feeding tube (EFT) in adult inpatients out of hours (normal dietetic service working hours Monday-Friday, 8am-4pm). This is at weekends, bank holidays, out of normal working hours or when there is no ward Dietitian available to undertake an individual nutritional assessment, estimate nutritional requirements and design an enteral feeding regimen.

2. Scope

2.1 This guideline applies to all types of EFT but is most applicable to patients who have a nasogastric tube (NG) inserted. Staff must follow the relevent tube checks in the Insertion and Management of Nasogastric and Orogastric Tubes in Adults Policy (Trust Ref B39/2005) before commencing any feed. When a NG tube is inserted, the appropriate NG pathway on Nerve Centre must be completed.

2.2 It also applies to other EFT types e.g. PEG, RIG, Jejunostomy where the patient has a known EFT in situ and it is appropriate to recommence nutrition. If the EFT has just been placed, please refer to the Pre and Post Insertion Management of Gastrostomy and Jejunostomy Adult Policy (Trust Ref B2/2012) for guidance on when the EFT can first be accessed.

2.3 This guideline is for use by Medical and Nursing teams to enable them to start an enteral feed on an adult inpatient (over 16 years old) when a Dietitian is unavailable to provide a feeding regime. This is **not** to be used for inpatients under 16 years of age.

2.4 This guideline does not apply to the following areas who have their own guidelines to follow. Discussions must be held with the Consultant teams in these areas prior to starting a feed:

- Adult inpatients with chronic kidney disease 3-5 or acute kidney injury on a renal ward only (Trust Ref C2/2015)
- Adult inpatients on critical care (Trust ref B42/2016)

2.5 For community patients admitted with an existing EFT and receiving enteral nutrition in the community (i.e. home, nursing home, residential home), the managing Consultant/medical team must use their clinical judgement and assess appropriateness of continuing the patients usual feeding regimen in an acute hospital setting.

Areas of concern which may contraindicate continuing with the patients usual feeding regimen would include but is not limited to:

- Enteral feeding tube displacement
- Unclear feeding regimen
- Symptoms including vomiting, aspiration, bowel obstruction
- No enteral feed for 5 days placing patient at risk of refeeding syndrome

If there is any uncertainty, the managing Consultant/medical team must consider following the processes laid out in this out of hours guideline.

If the enteral feed used by the patient in the community is not stocked by University Hospitals of Leicester (UHL), the patient or their relative/carer can bring in their usual

enteral feed from home as long as there is well reasoned clinical rationale for this. Checks need to take place at ward level by the nursing staff to ensure the enteral feed brought in from home is within the expiry date and is not damaged or spoiled.

If there are any issues with using the patients usual feed, the processes laid out in this out of hours guideline must be followed instead.

The Consultant/medical team will need to document the details of the enteral feeding regimen in the patients medical notes and also when prescribing the non formulary enteral feed on eMeds.

2.6 The types of patients who are identified as in need of enteral feeding over a weekend and/or bank holiday period may often be very under-nourished. Re-feeding problems can occur when starting an enteral feed in this vulnerable group of patients if it is not identified and treated appropriately.

2.7 Each patient will require risk assessment (appendix 2) for re-feeding syndrome and procedure for enteral feeding (appendix 3) to be completed prior to commencing the enteral feed.

2.8 It can also be used to assess re-feeding risk in a patient with any sort of EFT. For more information on re-feeding syndrome, see appendix 4.

2.9 This clinical guideline does not replace an individual dietetic assessment and referral to the Dietitian is required as soon as possible for assessment and ongoing monitoring. Referrals must be made via ICE (electronic referral system) and can be made at any time of the day. Dietitians will respond promptly to a referral but it is not always possible on the same day. The standard response time is 2 days from receipt of referral.

2.10 Feeds must not be started in patients on specialised diets such as those on Ketogenic diets for intractable epilepsy, or an inherited metabolic disease/disorder e.g. Phenylketonuria until assessed by a Dietitian who will advise on feeding in these patient groups.

2.11 For patients who have a known or suspected food allergy and or food hypersensitivty/intolerance, please use appendix 1 and see section 2.2 and 2.3 to assess feed suitability **before** starting enteral feed.

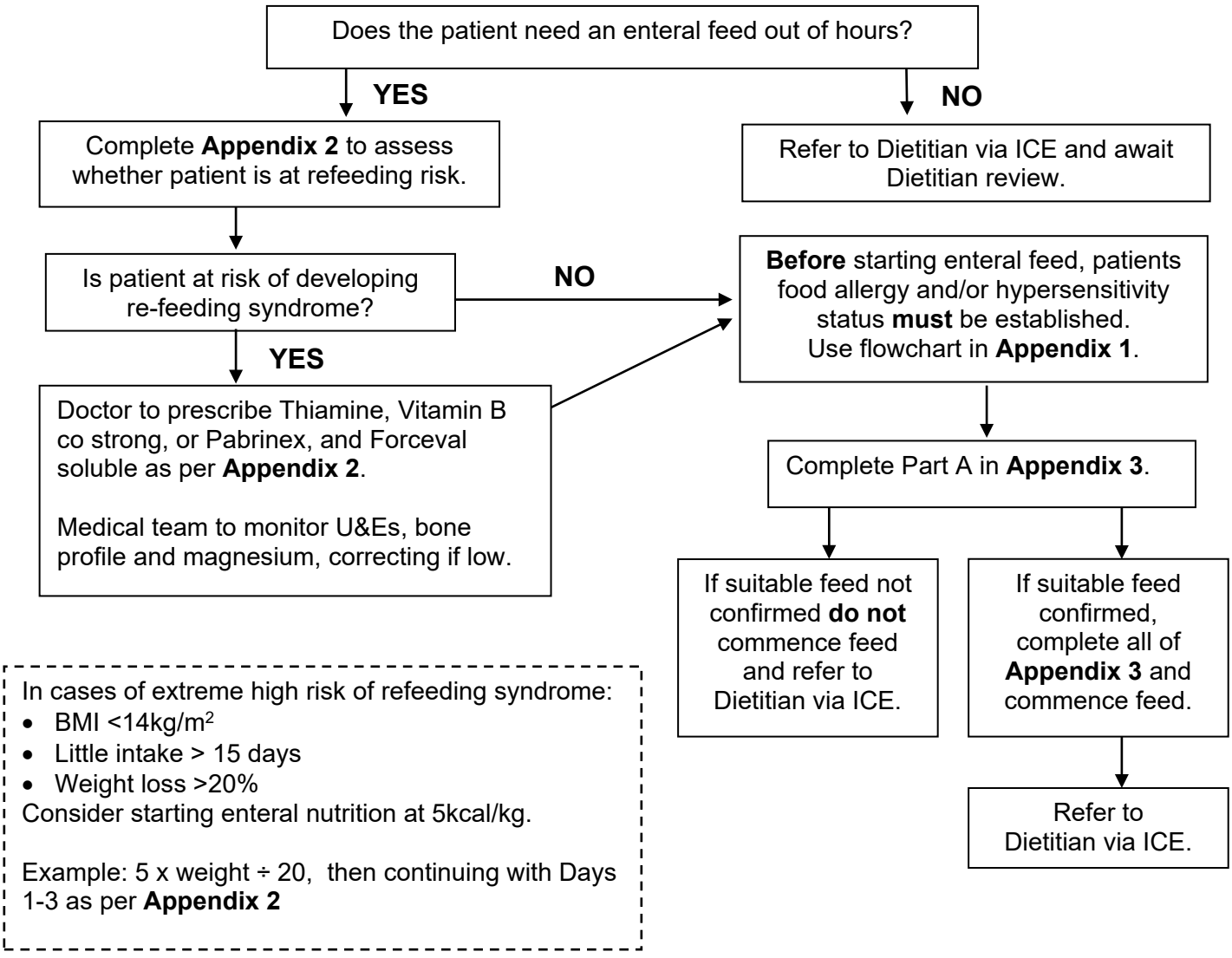
2.12 If Nutrison Soya enteral feed is used and stock is not available on the ward, ward staff to liaise with ward/adult oncall Pharmacist to order in a supply of Nutrison Soya enteral feed overnight via wholesaler for next day delivery or be signposted to another ward/unit on the hospital site/in the Trust where a supply can be accessed.

2.13 For specific medical conditions (see appendix 1), an alternative enteral feed to standard Nutrison feed may be clinically indicated. If Nutrison Advanced Peptisorb enteral feed is used and stock is not available on the ward, ward staff to liaise with ward/adult oncall Pharmacist to order in a supply of Nutrison Soya enteral feed overnight via wholesaler for next day delivery or be signposted to another ward/unit on the hospital site/in the Trust where a supply can be accessed.

3. Recommendations, Standards and Procedural Statements

3.1 The following flow chart details the procedure to follow for patients before starting an enteral feed.

Flow chart: Procedure to assess the patient before starting an enteral feed on an adult inpatient



To complete the above, you will need to use the following:

- Appendix 1 – Further information on assessing allergy status and feed suitability
- Appendix 2 – Refeeding risk assessment form
- Appendix 3 – Procedure for enteral feeding

Follow all tube checks in UHL Policy:

- Insertion and Management of Nasogastric and Orogastric Tubes in Adults Policy (Trust Ref B39/2005)
- Management of Naso-jejunal Enteral Feeding Tubes in Adults Policy (Trust Ref B6/2019)

3.2 Food allergies and enteral feeds

a) Appendix 1 **must** be followed and used to assess patient allergy status and therefore, enteral feed suitability prior to starting enteral feeding. Care must be taken in patients who are known or suspected of being food allergic or food hypersensitive/intolerant.

b) Approximately 11-26 million people in Europe are thought to have a food allergy (Pawankar, 2013).The most common allergens are nuts, peanuts, sesame seeds, fish, shellfish, cow's milk and eggs (Wright 2007).

c) **It is crucial to check the patients food allergy status.**

d) Specifically in respect of enteral feeds used in UHL (manufactured by Nutricia), this is in respect of cow's milk protein, fin fish, soya and pea legume food allergies/hypersensitivity but a patient may be hypersentistive/intolerant to other ingredients such as colourants, salicylate, sulphites etc.

e) Appendix 2 and 3 should then be followed to commence enteral feeding and assess tolerance.

f) As part of Flowchart in 2.1, reference should be made to Appendix 2 and 3 to guide assessment and management of refeeding syndrome risk with slower rate enteral feeding, serum electrolyte monitoring and supplementation with additional vitamins and minerals.

3.3 Cultural and Religious preferences

a) If a patient, relative or carer requests an enteral feed suitable for vegetarian or alternative cultural or religious dietary restriction, the restriction and the ingredients/contents of enteral feeding products as recommended in Appendix 1 should be discussed with the patient/relative and they can decide if the enteral feed is suitable for them.

b) If a strict vegan diet is followed, it will not be possible to provide nutritionally complete enteral feeding with the products available in the hospital. Appendix 1 should be used to discuss with the patient/relative and they can decide if the enteral feed may be unsuitable for them.

c) If there is any doubt or concern, refer to the Dietitian at the earliest opportunity for further advice.

3.4 Likely requirements for supplementation of potassium, phosphate and magnesium

As re-feeding syndrome can cause shifts in electrolytes (potassium, phosphate and magnesium) resulting in decreased plasma levels, these should be monitored daily and corrected if indicated. Consultant/medical team should follow UHL guidelines where applicable or liaise with their ward Pharmacist.

3.5 Procedure for Starting the Enteral Tube Feed on an Adult Inpatient

a) Refer to and complete appendix 2 and 3.

3.6 Nutritional assessment and Nutritional Monitoring

a) All inpatients receiving enteral nutrition via a EFT must be referred as soon as possible to the ward Dietitian for an individual nutritional assessment, calculation of nutritional requirements and design of enteral feeding regimen. Referral must detail when the enteral feed was started.

b) People at high risk of developing re-feeding problems must be cared for by healthcare professionals who are appropriately skilled and trained and have expert knowledge of nutritional requirements and nutrition support e.g. Dietitians and/or the Leicester Intestinal Failure Team (LIFT).

c) The above applies at all times for all patient groups.

3.7 Supporting Information: Re-feeding syndrome (more details can be found in appendix 4)

a) Patients at risk of re-feeding syndrome must commence enteral feeding at very low levels of energy and protein but with generous provision of thiamine and other B group vitamins. A balanced multi-vitamin/trace element supplement (see below) should be given since they are likely to have multiple deficits that cannot be met by low level oral, enteral or parenteral intake. Levels can then be increased over the next few days as careful monitoring reveals no problems.

b) For people at high risk of developing re-feeding problems the following must be considered:

- Starting enteral nutrition support at a maximum of 10kcal/kg/day, increasing levels slowly to meet or exceed full needs by 4-7 days.
- Restoring circulatory volume and monitoring fluid balance and overall clinical status closely.
- Providing immediately before and during the first 10 days of feeding: oral thiamine 200mg daily, vitamin B compound strong 1 tablet three times a day (or full dose daily intravenous vitamin B preparation, if necessary) and a balanced multivitamin/trace element supplement e.g. Forceval (or Forceval soluble if nil by mouth) once daily.

c) Most patients at re-feeding risk also need generous supplementation of potassium, magnesium and phosphate from the onset of feeding *unless* blood levels are already high (this may be the case in patients who have renal impairment). It is important to appreciate that patients with normal pre-feeding levels of potassium, magnesium and phosphate can still be at risk, and that many of those with high plasma levels will still have whole body depletion and may, therefore, need supplementation as re-feeding progresses and renal function improves.

4. Education and Training

Ward Dietitians are responsible for ensuring their ward areas are aware of this Clinical Guideline and offer ward based training/education as needed.

5. Monitoring and Audit Criteria

Key Performance Indicator	Method of Assessment	Frequency	Lead
On Dietitian assessment of an individual patient Dietitian to datix if out of hours guideline/process has not been followed	Datix incidents	Annual	Band 6 Senior Dietitian

6. Supporting Documents and Key References

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Stanga, Z., Brunner, A., Leuenberger, M., Grimble, R.F., Shenkin, A., Allison, S.P., Lobo, D.N. (2008) Nutrition in clinic practice – the refeeding syndrome: illustrative cases and guidelines for prevention and treatment. *European Journal of Clinical Nutrition* 62: 687-694.

University Hospitals of Leicester. Guideline for commencing nasogastric feeding in adult patients on Critical Care. Trust number: B42/2016.

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University Hospitals of Leicester. Management of Naso-jejunal Enteral Feeding Tubes in Adults Policy. Trust number: B6/2019.

Wright T (2007) Food Allergies- Enjoying life with a severe food allergy.2nd ed, Class Publishing London pages 5-9.

8. Key Words

Nasogastric, NG, feeding, re-feeding, refeeding, out of hours, enteral, emergency, nutrition

This line signifies the end of the document

This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions

DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT		
Author / Lead Officer:	Suzie Watson Hannah Starling	**Job Title:** Senior Dietitian Senior Specialist Dietitian
Reviewed by:	Suzie Watson, Senior Dietitian Hannah Starling, Senior Specialist Dietitian	
Approved by:	Julie Hogg, Chief Nurse Trust Policy and Guideline Committee	**Date Approved:** September 2022 (original) 27 October 2023 PGC – latest version

REVIEW RECORD			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
August 2022		Suzie Watson and Hannah Starling	Re-formatted in line with UHL guideline template. Adjusted monitoring frequency to annual. No changes to content as guideline remains fit for purpose.
August 2023		Hannah Starling and Rebekah Lord	Additional enteral feed product included for specified medical conditions

DISTRIBUTION RECORD:			
Date	**Name**	**Dept**	**Received**

Assessing Allergy Status and Feed Suitability
PRINT & PLACE IN PATIENTS NOTES

University Hospitals of Leicester NHS
NHS Trust

Appendix 1

Use the flowchart below **before** starting enteral feed to assess the patient's food allergy and/or hypersensitivity status and feed suitability.

If a food allergy and/or hypersensitivity is known or suspected you need to identify and clarify the suspected or known food allergen(s) with the patient, their relatives or carers.

⇩

Allergens are identified in bold in the ingredients list – this is **not** a finite list as it only uses the 18 food allergens identified by the European Commission (EC).

For example, patients may have an allergy to pea protein, food preservatives etc. and these may not be listed. If the patient requires a gluten or lactose free feed, this information should be contained in the leaflet as well.

⇩

Check the ingredients listed on the leaflet attached to the pack of **Nutrison feed**.
CAUTION: Nutrison DOES contain cows milk protein, pea legume protein and fin fish as well as other allergens.
Refer to Part A of Appendix 3

⇩ **NO CONCERNS**

If there are no concerns and **Nutrison feed** is suitable, continue with completing Appendix 3

If there are no concerns you should use Nutrison feed as stated aboveunless the patient has one of the following:

- Pancreatic cancer
- Had pancreatic surgery
- Pancreatitis
- Confirmed chyle leak (fluid triglyceride >1.3mmol/l)

In this case, check the ingredients listed on the leaflet attached to **Nutrison Advanced Peptisorb**. If there are still no concerns and this feed is suitable, use this feed instead and continue with completing Appendix 3

⇩ **CONCERNS**

If there are concerns and Nutrison feed is not suitable, check the ingredients listed on the leaflet attached to the pack of **Nutrison Soya feed**

⇩ **NO CONCERNS**

If there are no concerns and **Nutrison Soya feed** is suitable, continue with completing Appendix 3

⇩ **CONCERNS**

If there are still concerns and Nutrison Soya feed is not suitable, do not start enteral feed and refer to the ward Dietitian on ICE

If in **any** doubt or the patient requires a more detailed assessment of their food allergy and/or hypersensitivity status:

DO NOT START ENTERAL FEED & REFER TO YOUR WARD DIETITIAN

Refeeding Risk Assessment Form – To be completed by the ward Doctor & Nurse prior to enteral feed
PRINT & PLACE IN PATIENTS NOTES

University Hospitals of Leicester NHS
NHS Trust

Appendix 2

N= Nurse D= Doctor			
	S Number: **Surname:** **First Name:** **Date of Birth:** *Or affix Patient ID Label here*	**Ward:** **Site:**	
	Please circle yes / no		
D	**Have potassium, bone profile and magnesium levels been checked?**	**YES**	**NO**
	IF NO - these need to be checked before completing below **If YES – proceed to complete the rest of the form**		
	Patient has <u>one or more</u> of the following:		
N/D	A Malnutrition Universal Screening Tool (MUST) score of 4 or more	**YES**	**NO**
N/D	Body Mass Index (BMI) less than 16kg/m^2 (see MUST)	**YES**	**NO**
N/D	Unintentional weight loss greater than 15% within the last 3-6 months (see MUST)	**YES**	**NO**
N/D	Little of no nutritional intake for more than 10 days	**YES**	**NO**
D	Low levels of potassium, phosphate or magnesium prior to feeding	**YES**	**NO**
	Or patient has <u>two or more</u> of the following:		
N/D	Body Mass Index (BMI) less than 18.5kg/m^2 (see MUST)	**YES**	**NO**
N/D	Unintentional weight loss greater than 10% within the last 3-6 months (see MUST)	**YES**	**NO**
N/D	Little or no nutritional intake for more than 5 days	**YES**	**NO**
D	A history of alcohol abuse or drugs including insulin, chemotherapy, antacids or diuretics	**YES**	**NO**
D	**Is patient at risk of developing re-feeding problems?**	**YES**	**NO**
D	**<u>If YES</u>** *Doctor to please document on eMeds or paper drug chart indication for these as 'refeeding management'*	**MEDICAL TEAM - Please ensure** • Immediately before and for the first 10 days of feeding the following is prescribed: – IV Pabrinex ampoules I and II once a day **Or** – Thiamine 100mg twice a day, Vitamin B co strong 1 tablet three times a day and Forceval soluble once a day • Blood potassium, magnesium & phosphate levels are checked daily until stable. Replace if necessary as per UHL guidance (found on Insite)/ liaise with ward pharmacist. *<u>Note</u>: IV high potency vitamins B and C (Pabrinex®) to be used only if parenteral route is essential as may cause serious allergic reactions during or shortly after administration. Pabrinex® ampoules to be given over 20-30 minutes, ½ hour before feed commences (see IV Monograph for Pabrinex).*	
D	**<u>If NO</u>**	• Start feeding as per Day 1, Thiamine, Vitamin B Co-strong and Forceval are not required	
Completed by Doctor (print name):		**Signature:**	
Job title:		**Date & Time:**	

First Name:	Date of Birth:	Site:

Procedure for Enteral Feeding – To be completed by the ward Doctor & Nurse prior to enteral feed
PRINT & PLACE IN PATIENTS NOTES

University Hospitals of Leicester NHS
NHS Trust

Appendix 3

PART A - CONFIRM FEED SUITABILITY - Doctor to complete using Appendix 1		
i. Using appendix 1, is Nutrison feed suitable? (circle answer)	**YES**	**NO/UNSURE**
	Use Nutrison feed (or Nutrison Advanced Peptisorb if indicated) and complete parts B, C and D	See section ii
ii. Using appendix 1, is Nutrison Soya feed suitable? (circle answer)	**YES**	**NO/UNSURE**
	Use Nutrison Soya feed and complete parts B, C and D	See section iii
iii. If NO or UNSURE - <u>DO NOT COMMENCE ENTERAL FEED</u>. Document in patient's notes, refer to Dietitian on ICE and await further advice.		

Patients weight & date: _____

PART B - ENTERAL FEEDING PLAN - Doctor & Nurse to complete before enteral feed commences		
	Feed calculation	**Name of feed (circle feed to be used)**
Day 1	**10 x weight ÷ 20 = _____ mls/hour for 20 hours**	Nutrison Nutrison Advanced Peptisorb Nutrison Soya
Day 2	**12 x weight ÷ 20 = _____ mls/hour for 20 hours**	
Day 3	**15 x weight ÷ 20 = _____ mls/hour for 20 hours**	
Nb. 100mls Nutrison/Nutrison Soya = 12.3g carbohydrate; 100mls Nutrison Advanced Peptisorb = 17.7g carbohydrate		

PART C - BEFORE STARTING ENTERAL FEED - Doctor & Nurse to complete	**Please tick & initial**
Confirm Refeeding Risk Assessment Form (appendix 2) is complete and in patient's notes.	
Check refeeding medications have been prescribed as per appendix 2 if required	
For NG's, confirm gastric placement as per UHL Policy Trust Ref B39/2005	
Discuss patient's hydration needs with Doctor as regimen may not meet fluid requirements. Document discussion in patient's notes. Commence patient on a fluid balance chart.	
Refer to Dietitian via ICE.	
****Ensure enteral feed is prescribed on eMeds.****	

IMPORTANT TO NOTE:

- **Ensure ENFit enteral feeding tube is flushed with 30mls sterile water before and after each feed and medication**
- **For patients with Diabetes please refer to the 'Diabetes Decision Support Tool' for guidance. If there are any concerns, you should contact your 'In Reach Diabetes Team'.** http://insitetogether.xuhl-tr.nhs.uk/Divisions/Corporate/CommunicationsandExternalRelations/Documents/CM/HIGGINS_ManagementofHyperglycaemiaHCBGDiabetes_21811605.pdf

PART D - DAILY CHECKLIST - Doctor & Nurse to complete **Document name, signature, date and time in the box next to each action**	**Day 1**	**Day 2**	**Day 3**
Doctor to check U&Es, bone profile and magnesium, correcting if low			
For NG's confirm gastric placement before starting enteral feed as per UHL Policy Trust Ref B39/2005			
Flush EFT with 30mls sterile water, after confirming gastric placement, before commencing enteral feed			
Check for nausea, vomiting, abdominal distension and diarrhoea. If present, discuss and ask Doctor to review			
Flush EFT with 30mls sterile water after stopping enteral feed			
Rest from feed for 4 hours			
If feed not tolerated discuss with Doctor before restarting feed			

1. Summary

1.1 Re-feeding syndrome is defined as severe fluid and electrolyte shifts and metabolic complications resulting in decreased plasma levels of phosphate, potassium and magnesium. Feeding without adequate thiamine can lead to Wernickes Encephalopathy.

1.2 Medical staff should use this information to assess if the patient is at risk of re-feeding problems or not. N.B. any inpatient who has had very little or no food for > 5 days is at some risk of re-feeding problems. (Mehnna et al 2008)

1.3 **Medical and nursing staff should assess re-feeding risk, using appendix 2.** If patients are not at risk of re-feeding problems, commence enteral feed as per appendix 3. Thiamine, Vitamin B co – strong and balanced multivitamin/trace element supplement would not be required in this case. Copies of appendix 2 and 3 should be printed out for the individual patient, completed and placed in patients notes.

2. Re-feeding Problems - Background

2.1 The definition of re-feeding syndrome is severe fluid and electrolyte shifts and related metabolic complications in malnourished patients undergoing re-feeding (Solomon et al 1990). It was first identified after the Second World War when prisoners of war were re-fed after prolonged starvation and suffered cardiac insufficiency, neurological complications, peripheral oedema, hypertension and death (Solomon et a 1990, Melchoir 1998).

2.2 In starvation, synthesis of insulin is reduced, and glucagon levels rise. This results in changes in the production of glucose from carbohydrate and an increase in protein and lipid breakdown. Patients who are starved, break down lean body mass, and become depleted in water and minerals (Nightingale 2001).

2.3 During re-feeding, metabolism is switched from lipid back to carbohydrate. Insulin is released, and there is an increased uptake of glucose, phosphorous, potassium, and water into the cells and protein is synthesised. Thiamine is an essential co-enzyme in carbohydrate metabolism and feeding without sufficient body stores of this vitamin can lead to Wernicke's encephalopathy definitions.

2.4 Re-feeding problems encompass life-threatening acute micronutrient deficiencies, fluid and electrolyte imbalance, and disturbance of organ function and metabolic regulation that may result from over-rapid or unbalanced nutrition support. They can occur in any severely malnourished individuals but are particularly common in those who have had very little or no food intake, even including overweight patients who have eaten nothing for protracted periods.

a) The problems arise because starvation causes adaptive reductions in cellular activity and organ function accompanied by micronutrient, mineral and electrolyte deficiencies. Abnormalities in malnourished individuals may, therefore, include: deficiencies of vitamins and trace elements;
b) whole body depletion of intracellular potassium, magnesium and phosphate;
c) increased intracellular and whole body sodium and water;
d) low insulin levels and a partial switch from carbohydrate metabolism to ketone metabolism to provide energy;
e) impaired cardiac and renal reserve with less ability to excrete an excess salt and water load.
f) abnormalities of liver function.

2.5 Giving nutrients and fluid to malnourished patients will reverse these changes but in doing so leads to an increase in demands for electrolytes and micronutrients, and a simultaneous shift of sodium and water out of cells. Over-rapid or unbalanced nutrition support can, therefore, precipitate acute micronutrients deficiencies and dangerous changes in fluid and electrolyte balance.

2.6 Enteral tube feeding can precipitate re-feeding problems since excessive feeding levels can be achieved easily. The problem can also be exaggerated if the products do not include adequate vitamins, phosphate or electrolytes.

2.7 Provision of intravenous fluids containing glucose may also precipitate re-feeding problems.