Identification and Management of Re-Feeding Syndrome

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

This guideline has been developed to advise all healthcare professionals involved in providing nutritional support to malnourished patients.

This guideline explains re-feeding syndrome and outlines identification of individuals at risk. It discussed the main considerations when providing nutritional support in patients thought to be at risk of re-feeding syndrome.

For advice on patients starting the out of hours emergency enteral feed regimen please see the 'Out of Hours Emergency Enteral Feeding Guideline' WAHT-NUT-008

For advice on patients at risk of re-feeding syndrome who require parenteral nutrition regimens please also contact Pharmacy and refer to 'Parenteral Nutrition Guideline' WAHT-NUT-007.

Please be aware that re-feeding syndrome can also occur in patients receiving oral nutrition support, i.e. oral nutritional supplement drinks.

This guideline is for use by the following staff groups :

Qualified Doctors, qualified Nurses, Pharmacists and Dietitians.

Lead Clinician(s)

Dr Thea Haldane	Consultant Gastroenterologist
Approved by Nutrition and Hydration Committee on: (Noted by Medicines Safety Committee and Trust Management Executive)	14th December 2021
Review Date: This is the most current document and should be used until a revised version is in place	10th May 2026

Key amendments to this guideline

Date	Amendment	By:
January 2009	Approved by Nutrition Steering Committee (nutrition and hydration committee) and Medicines Safety Committee	
March 2011	Who is at risk? Section amended and minor amendment to Re-feeding Syndrome flowchart	Jo Brown
June 2011	Reformatting of protocol for prevention of re-feeding syndrome chart	Jo Brown
March 2013	Guideline expiry extended whilst under review	Jo Brown
May 2013	Guideline expiry extended whilst under review	Jo Brown
June 2013	Guideline expiry extended whilst under review	Jo Brown
August 2013	Guideline expiry extended whilst under review	Jo Brown
29/10/2013	Guideline has been extended for 6 months whilst under major review	Nalinee Owen
25/3/2014	Guideline extended for 3 months	Nalinee Owen
24/11/2014	Guideline extended for 3 months	Nalinee Owen
28/01/2015	Guideline extended until 30th April 2015	Jo Brown
24/04/2015	Guideline extended until 30th June 2015	Jo Brown
24/06/2015	Guideline extended until 30th September 2015	David Aldulaimi
Sept. 2015	Amendments to re-feeding syndrome protocol in line with NICE & BAPEN.	Dr Haldane and the nutrition team
October 2017	Document extended for further two years, no changes	Dr Haldane
December 2017	Sentence added in at the request of the Coroner	
17/09/2019	Document extended for 6 months to ensure current guidelines are adapted to new national guidelines	Dr Haldane
6th May 2020	Document extended for 6 months during COVID period	
October 2020	Document extended for 6 months whilst review process is completed	Sarah Pritchard
21st May 2021	Document extended for 6 months whilst review process is completed	Sarah Pritchard
November 21	Document reviewed and edited. Introduction, who is at risk, biochemical consequences, clinical symptoms, pathogenesis and recommendations sections edited and amended for clarification. Flow chart remains the same.	DR Haldane and Hollie Rossiter
November 2025	Document extended for 6 months to allow for Consultant review	Andrea Milton

Identification and Management of Re-Feeding Syndrome

IDENTIFICATION AND MANAGEMENT OF RE-FEEDING SYNDROME

INTRODUCTION

This guideline has been developed to advise all healthcare professionals involved in providing nutritional support to malnourished patients. This guideline explains re-feeding syndrome and outlines how to identify individuals at risk. It discusses the main considerations when providing nutritional support in patients thought to be at risk of re-feeding syndrome. In 2006 NICE published a comprehensive guidelines on the management of refeeding syndrome, this was updated by BAPEN in 2012.

Re-feeding syndrome can be defined as the potentially fatal shifts in fluid and electrolytes that may occur in malnourished patients on refeeding following a period of starvation (NICE, 2006). This is particularly common in patients receiving artificial refeeding, but also occurs with oral feeding, especially if oral nutritional supplements are prescribed.

The shifts in fluid and electrolytes may cause serious clinical consequences which are described later in this document. The hallmark biochemical feature is hypophosphataemia, however the syndrome is complex and may also feature abnormal sodium and fluid balance, changes in glucose, protein and fat metabolism, thiamine deficiency, hypokalaemia and hypomagnesaemia. In practice electrolyte disturbances are often observed but with no adverse clinical symptoms. This is often referred to as ‘biochemical refeeding’ whilst refeeding syndrome with clinical symptoms is often referred to as ‘symptomatic refeeding’.

Re-feeding syndrome can occur when initiating all forms of nutrition support in malnourished or starved patients. For example patients who have had no or little nutrition for 5 or more days may become intracellularly depleted of potassium, magnesium and phosphate and deficient in B vitamins (especially thiamine).

WHO IS AT RISK?

Establish BMI, degree of unplanned weight loss in the last 3-6 months, period of little or no nutritional intake, potassium, magnesium and phosphate levels and any history of: Anorexia nervosa, Crohns disease, small bowel obstruction, poorly controlled diabetes, pneumonia, dysphagia, bariatric surgery, alcohol dependence and malignancy.

Has the patient had any **one** of the following:

1. BMI<16kg/m²
2. Unplanned weight loss of >15% over the last 3-6 months
3. Poor nutritional intake for >10 days
4. Low electrolytes (phosphate, potassium or magnesium)

Has the patient had any **two** of the following:

1. BMI<18.5kg/m²
2. Unplanned weight loss >10% over the last 3-6 months
3. Poor nutritional intake for >5 days
4. A history of alcohol misuse or drugs including insulin, chemotherapy, antacids or diuretics.

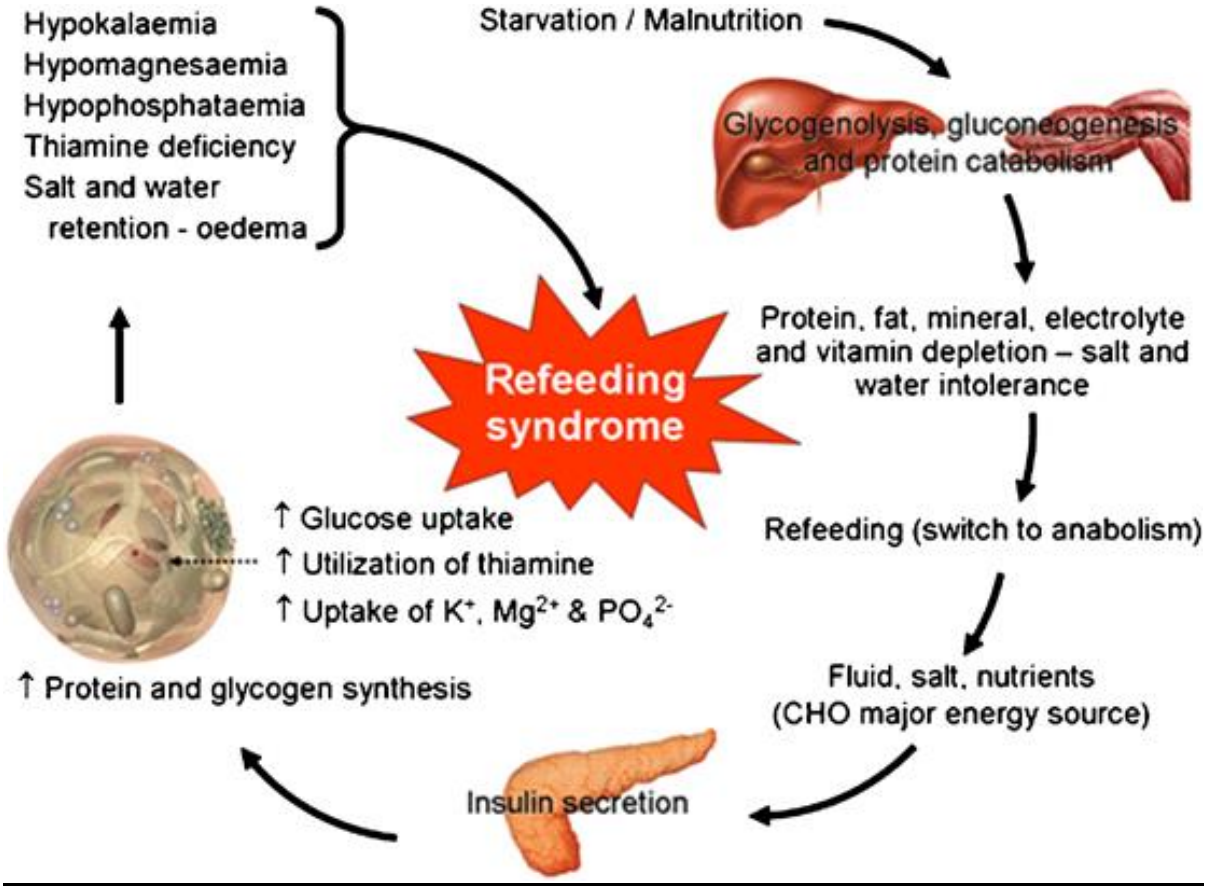
BIOCHEMICAL CONSEQUENCES OF INTRACELLULAR SHIFTS IN RE-FEEDING SYNDROME

- Hypophosphataemia
- Hypokalaemia
- Hypomagnesaemia
- Altered glucose metabolism
- Fluid balance abnormalities
- Vitamin deficiencies (thiamine)

CLINICAL SYMPTOMS OF REFEEDING SYNDROME

- Cardiac: arrhythmias, congestive cardiac failure
- Respiratory: acute respiratory failure, respiratory depression, pleural effusions
- Hepatic: liver dysfunction
- Renal: acute renal failure
- GI: diarrhoea/constipation, ileus
- Neuromuscular: lethargy, weakness, confusion, tremors, ataxia, coma and death

PATHOGENESIS OF RE-FEEDING SYNDROME



Picture taken from Nutrition in clinical practice – The refeeding syndrome: Illustrative cases and guidelines for prevention and treatment. Stanga Z et al. (2008)

RECOMMENDATIONS TO MANAGE AND PREVENT REFEEDING SYNDROME

- To increase awareness of what re-feeding syndrome is and who the 'at risk' patients are.
- To mandate MUST scores for all patients on admission.
- To ensure that blood tests are taken to check electrolytes including: phosphate, magnesium, potassium, before commencing nutrition support.
- To replace electrolytes as necessary whilst commencing and progressing nutritional support (whether this is via the oral, enteral or parenteral route).
- To continue to monitor electrolytes and replace electrolytes (unless otherwise indicated) daily for a minimum of 4- 7 days, until the patient is receiving their target nutritional support and their electrolytes are stable and in the normal range.
- To provide immediately before and during the first 10 days of feeding: oral thiamine 200mg daily or pabrinex (1pair) daily and vitamin supplementation e.g. forvecal one tablet for 10 days.
- Start nutrition support at a maximum of 10-20 kcal/kg/day, increasing levels slowly to meet or exceed full needs by day 4-7.

The re-feeding syndrome protocol can be seen overleaf which also appears on the reverse of the 'out of hours' feeding regimen (please refer to **WAHT-NUT-008 Out of Hours Enteral Feeding Guideline**) and on all enteral feed regimes provided by the Dietitians across the trust.

In those patients whom have a diagnosis of Anorexia Nervosa there are specific 'Guidelines for ward staff managing re-feeding in patients with anorexia nervosa' outlined in the MARSIPAN: Management of Really Sick Patients with Anorexia Nervosa (2014). Please refer to these with this specific patient group.

Establish BMI, degree of unintentional weight loss in the last 3-6 months, period of little or no nutritional intake, potassium, magnesium and phosphate levels and any history of excess alcohol or drugs such as insulin, chemotherapy, antacids and diuretics.

Has the patient had any one of the following:

- BMI<16kg/m²
- Weight loss of >15% over the last 3-6 months
- Poor nutritional intake for 10 days
- Low electrolytes.

Has the patient had any two of the following:

- BMI<18.5kg/m²
- Weight loss >10% over the last 3-6 months
- Poor nutritional intake for 5 days
- Drug history as above

Patient is at risk of re-feeding syndrome – follow the flow chart below and refer immediately to the Dietitian

- Prior to commencing nutrition prescribe thiamine to be given at least 30 minutes before and during the first 10 days of feeding: high dose thiamine (200-300mg/day) orally or via NGT/PEG or IV Pabrinex - one pair of intravenous high potency ampoules in 100ml sodium chloride 0.9% over 15-30 minutes (this contains 250mg of Thiamine).

*NB: if patient is not deemed at risk of re-feeding syndrome please follow the appropriate feeding regimen over page

Starting to Feed Safely - In Patients at risk of Re-feeding Syndrome

Step 1:
Commence enteral nutrition as per appropriate feeding regimen over page (if there are any concerns with swallow please refer to speech and language therapy).

Step 2:
Measure electrolytes: even if normal, replace potassium, phosphate and magnesium (see appendix 1 / discuss with pharmacy for guidance on electrolyte replacement). Only withhold supplementation if levels are high.

Step 3:

- Monitor potassium, magnesium, phosphate, calcium and sodium daily until bloods are normal and stable and the patient is receiving their target nutritional support, then continue to check bloods on a weekly basis.
- Continue to replace potassium, phosphate and magnesium (unless high) until the patient is receiving their target nutritional support.

Step 4:

- Monitor blood glucose levels (BMs) four times daily, as per BM chart.
- Monitor daily fluid balance.
- Doctors to assess the need for additional / replacement fluids on an individual basis. Unless contraindicated aim for 20-30ml/kg/day taking into account current fluid intake.

NB. The more rapidly calories are delivered and the rate of feed increased, the greater the demand on circulating electrolytes; thus there will be an increased risk of re-feeding.

MONITORING TOOL

This should include realistic goals, timeframes and measurable outcomes.

How will monitoring be carried out?

Who will monitor compliance with the guideline?

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	Were patients commenced on the appropriate out of hours feed regimen according to their re-feeding risk? Was the feed regimen followed signed by a Doctor? Was thiamine / Pabrinex / prescribed appropriately? Were re-feeding bloods measured while patient was deemed at risk. Were re-feeding bloods monitored at appropriate intervals?	Foundation year 1 and 2 training session discussing nutrition, re-feeding and parenteral guidelines. Retrospective audits	Annually Annually	Senior dietitian and senior pharmacist Dr Haldane and the nutrition team	Results of the audit will be reported back to members of the nutrition and hydration committee. Audit results will also be reported back to appropriate directorates as necessary via Dr Haldane.	Annually

REFERENCES

BAPEN (2012) Re-feeding Syndrome: Identification of those at risk – decision tree, http://www.bapen.org.uk/pdfs/decision-trees/refeeding-syndrome.pdf (last accesses 20/02/15 26.10.21)

Birmingham et al Division of Internal Medicine. University of British Columbia, Vancouver. A.N: Re-feeding and hypophosphataemia. International Journal of Eating Disorders 20 (2) 211 – 3 1996 September.

British National Formulary 2021 Publications, B., 2021. Homepage - BNF Publications. [online] Bnf.org. Available at: <https://www.bnf.org/> [Accessed 26 October 2021]. Publications Ltd and the Royal Pharmaceutical Society of Great Britain

Brooks MJ. & Merrick G. The Re-feeding syndrome: an approach to understanding its complications and preventing its occurrence. Pharmacotherapy 1995 November – December 15 (6) 713 –26

Crook M. Hypophosphataemia and Hypokalaemia in Patients with Hypomagnesaemia. Br. J. Biomed. Sci. 1994 : 51: 24 – 7

Crook M. Hypophosphataemia in an Hospital Population and the incidence of concomitant Hypokalaemia. Ann. Clin. Biochem. 1992: 29: 64 – 6

Crook MA. et al Department Chemical Pathology, Guys Hospital, London. Severe hypophosphataemia related to Re-feeding. Nutrition: 12 (7-8): 538 – 9 1996 July – August.

Crook, M.A., Hally, V. Panteli, J. V. (2001) The importance of refeeding syndrome. *Nutrition* 17, 632-637

Culkin, A. White, R (2018) Refeeding syndrome. In: A Pocket Guide to Clinical Nutrition (eds V.E. Todorovic and B. Mafrici), 5th edn. British Dietetic Association

Dewar, H. and Horvath, R. (2001) Refeeding syndrome. In: A Pocket Guide to Clinical Nutrition (eds V.E. Todorovic and A. Micklewright), 2nd edn. British Dietetic Association.

Dwyer K. et al. Severe Hypophosphataemia in Postoperative Patients. Nutr. In. Clin. Practice 1992: 7: 279 – 83

Gonzalez. et al. The incidence of the Re-feeding syndrome in cancer patients who receive artificial nutrition treatment 11(2): 98 – 101, 1996 March – April. Nutrition Hospitalanna, Mexico

Hernandez-Aranda. Et al 1997 October – December 62 (4) 260 – 5 Rev. Gastroenterol mex Malnutrition and TPN: A cohort study to determine the incidence of Re-feeding syndrome.

Hodgson SF. & Hurley DL. Acquired Hypophosphataemia. Endocrin & Metab. Clin N Am. 1993: 22 (2): 397 – 409

Khan, L.U.R., Ahmed, J., Khan, S. and Macfie, J. (2011) Refeeding Syndrome: A Literature Review. *Gastroenterology Research and Practice* 410971

Klein CJ. Overfeeding macronutrients to critically ill adults: metabolic complications Journal of American Dietetic Association 1998.

Maier-Dobersberger T. & Lochs H. Enteral Supplementation of Phosphate does not Prevent Hypophosphataemia During Re-feeding of Cachectic Patients. J. Parenteral & Enteral Nutr. 1994: 18 (2): 182 – 4

Mariik PE, Bedigan MK. Re-feeding hypophosphataemia in critically ill patients in an intensive care unit. A prospective study. Department of critical care medicine, Arch Surg 1996 October 131 (10): 1043 – 7

In those patients whom have a diagnosis of Anorexia Nervosa there are specific 'Guidelines for ward staff managing re-feeding in patients with anorexia nervosa' outlined in the MARSIPAN: Management of Really

Sick Patients with Anorexia Nervosa (The Royal Colleges of Psychiatrists 2014). Please refer to these with this specific patient group.

The Royal Colleges of Psychiatrists (2014) MARSIPAN: Management of Really Sick Patients with Anorexia Nervosa. CR189. London: Royal college of psychiatrists.

Oxford Radcliffe Hospital. November 1996: Re-feeding syndrome: Guidelines, Helen Dewar, Dietitian & Rita Howarth, Chemical Pathologist

Patterson CR. Hypophosphataemia: A Dangerous Disorder. Nutr. 1996: 12: 540 – 1

Rosenberger K. Management of Electrolyte Abnormalities: Hypocalcaemia, Hypomagnesaemia and Hypokalaemia. J.Am Acad. Nurs. Practitioners. 1998: 10 (5): 209 – 17

Ryan MF. The role of Magnesium in Clinical Biochemistry an overview. Ann. Clin. Biochem. 1991: 28: 19 – 26

Vanatta JB. et al. Efficacy of Intravenous Phosphorous Therapy in the Severely Hypophosphataemic Patient. Arch. Int. Med. 1981: 141: 885 – 7

CONTRIBUTION LIST

Key individuals involved in developing the document:

Name	Designation
Dr Thea Haldane	Consultant Gastroenterologist
Hollie Rossiter	Senior Dietitian, WRH
Carl Robinson	Dietetic team lead, WRH
Keith Hinton	Pharmacist, WRH

Circulated to the following individuals for comments:

Name	Designation
Andrew Morris	Clinical lead Dietetics
All Acute Dietitians	WAHT
Dr Cheung	Consultant Gastroenterologist, WAHT
Dr Ahmad	Consultant Gastroenterologist, WAHT
Dr Prabhakaran	Gastro Medics, ALEX
Dr Gee	Consultant Gastroenterologist, WAHT
Dr Hudson	Consultant Gastroenterologist, WAHT
Dr Elagib	Consultant Gastroenterologist, WAHT
Dr Baker	Consultant Gastroenterologist, WAHT
Dr Rees	Consultant Gastroenterologist, WAHT
Dr Bhaskar	Consultant Endocrinologist, WAHT
Mr Robinson	Consultant Surgeon, WAHT
Mr Zivetti	Consultant Surgeon, WAHT
Dr Sellors	Consultant Anaesthetics, WAHT
Dr Mitchell	Consultant Anaesthetics, WAHT

Circulated to the chair of the following committee's / groups for comments:

Name	Committee / group
Clare Hubbard	Chair of Nutrition and Hydration Committee
	Chair of Medicines Safety Committee
	Director of Critical Care, Patient Safety
	TME

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form on next page;

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	x	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
	Thea Haldane	**Consultant gastroenterologist**	
Date assessment completed			

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title:** Identification and management of refeeding syndrome				
What is the aim, purpose and/or intended outcomes of this Activity?	As per title				
Who will be affected by the development & implementation of this activity?	X X ❑ ❑	Service User Patient Carers Visitors	X ❑ ❑ ❑	Staff Communities Other _____	
Is this:	X Review of an existing activity ❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?				

What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	MDT discussion and presentation at the Nutrition and Hydration Committee
Summary of relevant findings	

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age		X		
Disability		X		
Gender Reassignment		X		
Marriage & Civil Partnerships		X		
Pregnancy & Maternity		X		
Race including Traveling Communities		X		
Religion & Belief		X		
Sex		X		
Sexual Orientation		X		
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless;		x		

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Social/Economic deprivation, travelling communities etc.)				
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)		X		

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
		.		
How will you monitor these actions?				
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)				

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	Thea Haldane
Date signed	14/12/2021
Comments:	
Signature of person the Leader Person for this activity	
Date signed	
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval

Appendix 1

Electrolyte Supplementation in Re-feeding Syndrome

ELECTROLYTE	SUPPLEMENTATION METHOD	ADDITIONAL COMMENTS
PHOSPHATE	Refer to Trust guideline WAHT-PHA-011 http://www.treatmentpathways.worcsacute.nhs.uk/EasysiteWeb/getresource.axd?AssetID=155333&servicetype=Attachment	Check calcium, potassium and phosphate levels after phosphate infusion. Use lower doses in renal impairment (consult pharmacy)
POTASSIUM	Level below 2.5mmol/l, if symptomatic or unable to take orally 20mmol in 500mls or 40mmol in 1000mls of 0.9% sodium chloride at a maximum recommended rate of 10mmol per hour. Repeat as necessary after measuring potassium levels. NB Higher concentrations are used in the ITU/HDU setting for patients with central venous access. Level above 2.5 mmol/l and able to take orally Sando-K tablets 4 to 8 tablets per day in divided doses.	
MAGNESIUM	Refer to Trust guideline WAHT-PHA-012 http://www.treatmentpathways.worcsacute.nhs.uk/EasysiteWeb/getresource.axd?AssetID=155332&servicetype=Attachment .	