Refeeding Syndrome Pathway: ED/IP/PICU Management

For use in patients > 28 days of life at risk of refeeding complications

May 2026

INCLUSION CRITERIA – Any One of the Following Signs or Symptoms

- Weight loss > 10% < 3 months time frame
- Plateau in weight or height over several months
- BMI Z-score of -2 or lower for children > 12 months of age. For those < 12 months use a BMI Z-score of -2.5 or lower (and use weight-for-length z-score under 24 months of age)
- Intake less than 50% of expected for 5 days or more
- Evidence of malnutrition on physical exam including loss of subcutaneous fat or muscle mass

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- Obtain weight, and if feasible, length/ height (board length or height on a scale preferred), orthostatic vital signs (if > 8 years of age), baseline labs[1] and EKG

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ADMIT

- Consider PICU if any of the following:
  - Phos < 2.5 OR K < 2.7 OR Mag < 1.3 OR iCal < 3
  - Prolonged QTc > 450
  - Severe bradycardia
  - Hypotension for age

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- Start thiamine supplementation[2] and continue for 5-7 days - see Appendix B
  - Consider risks of IVF in refeeding syndrome
- Obtain CMP with Phos and Mag daily starting with first day of refeeding:
  - age ≥ 12 months: for a minimum of 5 days
  - age < 12 months: daily for 2-3 days; if abnormal, then continue testing for full 5 days
    - If initial labs abnormal (i.e. high risk), obtain labs q12 hours
    - If labs remain normal over the 5 days of refeeding, decrease monitoring to twice/week
- Start MVI - see Appendix B
- Consult clinical nutrition

CONDITIONS WITH A RISK OF REFEEDING COMPLICATIONS

- Malnutrition
- Failure to Thrive
- Eating Disorders
- Inflammatory Bowel Disease
- Malabsorption
- Cystic Fibrosis
- Child Neglect or Abandonment
- Pancreatitis
- Oral Mucositis
- Bariatric Surgery Patients
- Patients on GLP-1 medications
- Lymphedema

BASELINE SCREENING LABS[1]

- CBC with differential
- CMP, Mg, Phos, iCal by VBG
- 25-OH Vitamin D level when feasible – do not delay refeeding or supplementation while pending

MONITORING

- Cardiac monitoring (continuous overnight)
- Telemetry for those with a prolonged QTc

THIAMINE SUPPLEMENTATION[2]

- If patient is critically hypoglycemic, give IV glucose
- If giving glucose containing IVF or feeds (oral or enteral), order thiamine to *start within 6 hrs of glucose administration*
  - Thiamine dose: 2mg/kg IV or oral (max 100mg)
  - Thiamine can be given safely to infants over 6 weeks of age (note: infants are at lower risk of Wernicke's

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Initiation of Feeds

Careful nutritional rehabilitation minimizes risk of refeeding syndrome and may shorten the length of stay

- If patient meets criteria for the Eating Disorder pathway, then use that guidance
- For patients with growth faltering or other signs of malnutrition, while waiting on a clinical nutrition consult, initiate nutrition through IVF, oral, or tube-mediated feeds
  - Initiate calories at 40-50% of goal (consider glucose from IVF in total calories)
  - Supplement electrolytes as needed based on labs - see Appendix B
  - Advance calories by 33% of goal every 1-2 days if electrolytes remain stable
- If utilizing enteral feeds - see Appendix C for formula and advancement recommendations

TIPS

- Calcium can impair phosphorus absorption
  - May need to wait until phosphorous supplementation is completed before supplementing with calcium
- Corrected calcium = serum calcium + 0.8 x (4 - serum albumin)
- Antacids and iron infusions can impair phosphorus absorption
- Hypomagnesemia can contribute to refractory hypokalemia
- Consult nutrition when available
  - After hours: consult PHM or GI

DISCHARGE CRITERIA

- Nutritional rehabilitation complete and patient at goal feeds
- Stable electrolytes
- Stable VS for age.
- Ensure patients on the Eating Disorder pathway meet the guidelines for discharge
- Education provided to the family regarding the current diet plan

Appendix A

Table 2. Signs and Symptoms of Severe Refeeding Syndrome.[a]

Hypophosphatemia	Hypokalemia	Hypomagnesemia	Thiamin Deficiency	Sodium Retention
Neurological	Neurological	Neurological	Encephalopathy	Fluid overload
Paresthesias	Paralysis	Weakness	Lactic acidosis	Pulmonary edema
Weakness	Weakness	Tremor	Nystagmus	Cardiac decompensation
Delirium	Cardiac	Muscle twitching	Neuropathy	
Disorientation	Arrhythmias	Changed mental status	Dementia	
Encephalopathy	Contraction changes	Tetany	Wernicke's syndrome	
Areflexic paralysis	Respiratory failure	Convulsions	Korsakoff psychosis	
Seizures	Gastrointestinal	Seizures	Wet and dry beriberi	
Coma	Nausea	Coma		
Tetany	Vomiting	Cardiac		
Cardiac	Constipation	Arrhythmias		
Hypotension	Other	Gastrointestinal		
Shock	Rhabdomyolysis	Anorexia		
Decreased stroke volume	Muscle necrosis	Nausea		
Decreased mean arterial Pressure		Vomiting		
Increased wedge pressure Pulmonary		Constipation		
Diaphragmatic weakness				
Respiratory failure				
Dyspnea				
Hematologic				
Hemolysis				
Thrombocytopenia				
Leukocyte dysfunction				

Reference: Da Silva et al (2000) Aspen Consensus Recommendations for Refeeding Syndrome, PMID 3211-5791

Appendix B-1

Pediatric Electrolyte Replacement Prescribing Guidelines

Medication	Indication	Dosage	Max Dose	Comments
Calcium (Ca)				
Calcium Carbonate (Asymptomatic)	Hypocalcemia	30-75 mg/kg/day **PO** divided QID (ordered in elemental Ca)	1 g elemental Ca/dose	Calcium carbonate 1000 mg = 400 mg elemental Ca
Calcium Gluconate (Symptomatic)	Mild-Moderate hypocalcemia (iCal < 3.5 mg/dL; corrected Ca < 8.5 mg/dL)	50-125 mg/kg/dose **IV** Q6H (ordered in Ca gluconate)	2 g Ca gluconate/dose	Calcium gluconate 1000 mg = 93 mg elemental Ca VESICANT – **do not exceed 100 mg/min** Central line preferred Recheck level 4-6 hours after infusion complete
	Severe hypocalcemia (tetany, seizures) (iCal < 3 mg/dL; corrected Ca < 8 mg/dL)	100-200 mg/kg/dose **IV** x 1 dose over 30-60 min		
Magnesium (Mg)				
Magnesium Oxide	Mild hypomagnesemia (Mg 1.6-1.8 mg/dL)	10-20 mg/kg/dose **(elemental Mg) PO** BID – QID Magnesium oxide tab (ordered in Mg oxide) Magnesium oxide Plus Protein tab (ordered in elemental Mg)	800 mg Mg oxide/ dose	**Product** / **Ordered dose** / **Elemental Mg** Magnesium oxide tab — 400 mg (1 tablet) — 241.3 mg Magnesium oxide Plus Protein tab — 133 mg (1 tablet) — 133 mg
Magnesium Chloride		10-20 mg/kg/dose **PO** BID – QID **(ordered in elemental Mg)**	250 mg elemental Mg/ dose	Magnesium chloride solution — 24.3 mg (1 mL) — 24.3 mg/mL
Magnesium Sulfate	Severe hypomagnesemia (Mg < 1.6 mg/dL)	25-50 mg/kg/dose **(ordered in Mg sulfate) IV** Q6H x 3 doses; infuse over 1-2 hours	2 g Mg sulfate/ dose	Recheck level 2 hours after infusions complete

Appendix B-2

Pediatric Electrolyte Replacement Prescribing Guidelines

Medication	Indication	Dosage	Max Dose	Comments
Phosphorus (Phos)				
K-Phos Neutral tablet/Phos-NaK powder packet	Chronic hypophosphatemia (prevention or maintenance)	2-3 mmol phos/kg/day **PO** divided BID - QID 1 tab/packet = 8 mmol Phos	2 tabs/packets (16mmol)/dose	**K-Phos Neutral 250 mg tab** Phos 8 mmol 250 mg Na 13 mEq 293 mg K 1.1 mEq 45 mg **Phos-Nak 250 mg packet** Phos 8 mmol 250 mg Na 7 mEq 160 mg K 7.1 mEq 280 mg
Potassium Phosphate/ Sodium Phosphate	Mild hypophosphatemia (Phos 2.3-2.7 mg/dL)	0.16 mmol/kg/dose **IV** over 4-6 hours up to Q6H	20 mmol phos/dose	**Potassium phosphate:** 1 mmol Phos = 1.5 mEq K **Sodium phosphate:** 1 mmol Phos = 1.33 mEq Na **Phos max concentrations by line:** **Peripheral**: 0.05 mmol/mL **Central**: 0.12 mmol/mL **Max infusion rate:** 0.2 mmol Phos/kg/hour Recheck level 1-2 hours after infusion complete
	Moderate hypophosphatemia (Phos 1.6-2.2 mg/dL)	0.24 mmol/kg/dose **IV** over 4-6 hours		
	Severe hypophosphatemia (Phos < 1.6 mg/dL)	0.36 mmol Phos/ kg/dose IV over 4-6 hours		
Potassium (K)				
Potassium Chloride	Mild – Moderate hypokalemia (K 3-3.5 mEq/L)	**PO**: 1-2 mEq/kg/day divided BID – QID **IV**: 0.25-0.5 mEq/kg/dose over 1-2 hours	40 mEq/dose	IV: Follow Potassium Chloride Policy 18.20 **Do NOT administer KCl IV PUSH** VESICANT, irritating to the veins at concentration >0.1 mEq/mL **KCl max concentrations by line:** **Peripheral:** 0.2 mEq/mL **Central:** 0.4 mEq/mL **Max infusion rate:** 0.2 mEq/kg/hr or 10 mEq/hr Cardiac monitoring required for doses of 1 mEq/kg/hr Recheck level 1-2 hours after infusion complete
	Severe hypokalemia (K < 3 mEq/L)	0.5-1 mEq/kg/dose **IV** over 1-2 hours	40 mEq/dose	

Appendix B-3

Pediatric Vitamin Prescribing Guidelines

Medication	Indication	Dosage	Comments
Vitamin D3 (Cholecalciferol)	**Daily Dose Regimen for 25(OH)D < 30 ng/mL**		1 mcg = 40 units Monitor serum 25 (OH)D levels Q3 months. If level < 30 ng/mL at 3 months, continue daily dosing or repeat high dose/Stoss dosing until > 30 ng/mL. Maintenance dosing not required following x1 Stoss dose
	25(OH)D Level	**Daily Dose**	
	20-29 ng/mL	400-800 IU (10-20 mcg) PO Daily	
	10-20 ng/mL	1000 IU (25 mcg) PO Daily	
	< 10 ng/mL	2000 IU (50 mcg) PO Daily 4000 IU (100 mcg) PO Daily (adolescents)	
	High Dose Repletion Regimen		
	Weight (kg)	**Repletion dose**	
	>40	50,000 IU (1250 mcg) PO Daily x 5 days then 50,000 IU (1250 mcg) Weekly x12 weeks	
	30-39.9	40,000 IU (1000 mcg) PO Daily x 5 days then 40,000 IU (1000 mcg) Weekly x12 weeks	
	20-29.9	30,000 IU (750 mcg) PO Daily x 5 days then 30,000 IU (750 mcg) Weekly x12 weeks	
	10-19.9	20,000 IU (500 mcg) PO Daily x 5 days then 20,000 IU (500 mcg) Weekly x12 weeks	
	Stoss Dosing Regimen		Stoss dosing has not been well studied in eating disorder patients For use in patients with noncompliance risk: make sure not to replete more often than every 3 months if a patient is readmitted within that period of time Max dose: 500,000 IU (12,500 mcg)
	Weight (kg)	**Repletion dose**	
	> 40	500,000 IU (12,500 mcg) PO x 1 dose	
	30-39.9	400,000 IU (10,000 mcg) PO x 1 dose	
	20-29.9	300,000 IU (7500 mcg) PO x 1 dose	
	10-19.9	200,000 IU (5000 mcg) PO x 1 dose	
Vitamin B1(Thiamine)	Deficiency	**PO/IV/IM**: 2 mg/kg up to 100 daily for a 5-7 day course	Infuse IV dose over 30 minutes
Multivitamin (MVI)	Maintenance	**PO:** 0-24 months: Poly-vi-sol 1 mL Qday 2-3 yrs: Cerovite Jr 1/2 tab Qday 4-12 yrs: Cerovite Jr 1 tab Qday >/= 12 yrs: Cerovite 1 tab Qday OR Centrum 15 mL Qday	Formulary Products: Poly-vi-sol with/without iron liquid, Cerovite tablet/chewable tablet, Centrum liquid

Appendix B-4

Pediatric Vitamin Prescribing Guidelines			
Medication	**Indication**	**Dosage**	**Comments**
B-Complex Vitamins	Maintenance	**PO:** < 1 yr: 0.5 mL Daily 1 to 3 yrs: 1 mL Daily 4 to 8 yrs: 3 mL Daily >/= 9 yrs: 5 mL or 1 tab Daily	Formulary Products: Nephronex liquid or Nephrovite tab
Fat-Soluble Vitamins (A-D-E-K)	Maintenance	**PO:** **MVW Complete:** 1-2 capsules Daily **MVW liquid:** < 1 yr: 0.5 mL Daily > 1 yr: 1 mL Daily **MVW Chew Tab:** 1 chewable tab Daily **DEKA Plus Chew Tab:** 1-2 chewable tabs Daily **DEKA Essential Liquid**: 0.5 mL Daily	Adjust dose based on vitamin levels (annually)

Vit D dosing articles:

1. O'Donnell JEM, Leach ST, Bowcock NL, et al. Daily Vitamin D3 Versus Stoss Vitamin D3 for Correction of 25OHD Deficiency in Children with Inflammatory Bowel Disease, a Randomised Controlled Trial [published correction appears in Dig Dis Sci. 2025 May 19. doi: 10.1007/s10620-025-09061-4.]. *Dig Dis Sci*. 2025;70(5):1844-1853.

2. Tannous P, Fiscaletti M, Wood N, et al. Safety and effectiveness of stoss therapy in children with vitamin D deficiency. *J Paediatr Child Health*. 2020;56(1):81-89.

3. Shepherd D, Day AS, Leach ST, et al. Single High-Dose Oral Vitamin D3 Therapy (Stoss): A Solution to Vitamin D Deficiency in Children With Inflammatory Bowel Disease?. *J Pediatr Gastroenterol Nutr*. 2015;61(4):411-414.

4. Koçyiğit C, Çatlı G, İnce G, Özkan EB, Dündar BN. Can Stoss Therapy Be Used in Children with Vitamin D Deficiency or Insufficiency without Rickets?. *J Clin Res Pediatr Endocrinol*. 2017;9(2):150-155.

5. Bodea J, Beebe K, Campbell C, et al. Stoss therapy is safe for treatment of vitamin D deficiency in pediatric patients undergoing HSCT. *Bone Marrow Transplant*. 2021;56(9):2137-2143.

6. Lindsay KL, Revilla E, Tangpricha V, et al. Effectiveness of weight-based, weekly dosing of vitamin d3 in children with cystic fibrosis. *Pediatric Pulm.* 2013; 51: 411-411

Appendix C

Age	Formula Choices	Feeding Advancement
1 month – 12 months old	• Human Milk • Enfamil Infant • Nutramigen • Enfamil Enfacare • Usual or preferred home tube feeding formula	Start at 5 ml/hr and advance by 5 ml/hr q8hr to goal rate (goal ~3rd day) Goal rate is equal to: • 0-3 months: 150 ml/kg/d • 3-12 months: 120 ml/kg/d • Dietitian will advise clinician on both individualized goal rate and goal formula caloric density in their consult notation
1 year to 10 years old	• <u>Standard formula:</u> Pediasure 1.0 (SR or AMBH) • <u>Dairy free formula:</u> Kate Farms Pediatric Standard 1.2 • Usual or preferred home tube feeding formula	Start at 10 ml/hr and advance by 5 mL/hr q8hr to goal rate (goal ~3rd day) Goal rate is equal to: • 80% maintenance fluid rate • Or per Dietitian recommendation
>10 years old	• <u>Standard formula:</u> Ensure Original (AMBH) Osmolite 1.2 (SR) • <u>Dairy free formula:</u> Kate Farms Standard 1.0 • Usual or preferred home tube feeding formula	Start at 25 ml/hr and advance by 15 mL/hr q12hr to goal rate (goal ~ 3rd day) Goal rate is equal to: • 80% maintenance fluid rate • Or per Dietitian recommendation