

Infant (1501-2500 gram) Feeding Pathway

Pathway Purpose: To reduce practice variation for feeding infants in the intermediate care nursery (ICN) and neonatal intensive care unit (NICU) to accelerate feeding advancement, promote GI maturity, and improve overall enteral nutrition.

Inclusion Criteria:

- $\geq 32+0/7$ weeks gestation
- Birthweight 1501-2500 grams
- Clinically ready to initiate enteral feeds
- Admitted to ICN or NICU

Exclusion Criteria:

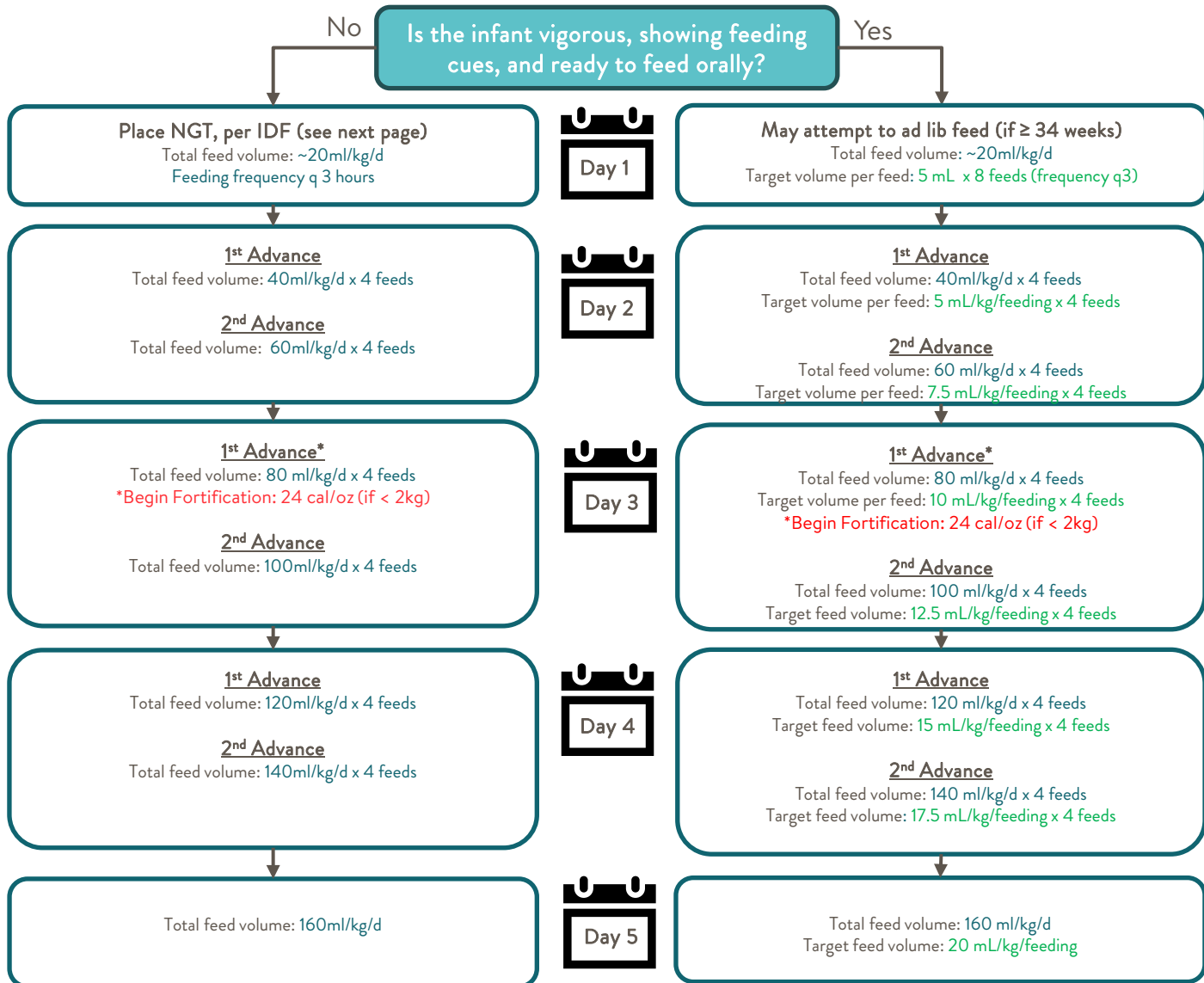
- Major congenital anomalies
- Ill / septic infant
- Infant requiring abdominal surgery

Feeding advance

- “Day 1” is first day infant is ready to feed: 5mL/feed x 8 feeds
- Advance feeds every 12 hours, starting on Day 2
- Move to left side of pathway if needing NG tube

PAUSE FEEDING ADVANCE:

Bilious emesis, increased frequency of emesis, new onset of emesis, concerning abdominal exam



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Associated Order Set: pending

Associated Policies: N/A



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Additional Considerations

NG Tube Feeding

Consider Placement of Nasogastric tube:

- Lethargic
- Poor feeding cues
- Hypoglycemia
- <34 weeks
- Unable to meet feeding goals in 12-24 hours

When placing NG, move to left side of pathway

PO + NG feedings

- Refer to [Infant Driven Feeding Protocol](#)

Removal of NGT

- Consider once taking >80% of feeds PO for 1-2 days

Adjunct therapies

IV fluids

It is not necessary to routinely start IVF or PPN in this patient population.

- Reasons to start:
 - Persistent hypoglycemia
 - Respiratory support
- Starting IVF: D10W @60-80 ml/kg/day.

Vitamins and Iron

- See [appendix](#) for specific dosing recommendations based on gestational age, type of milk / formula, and weight

Definitions

DHM – Donor Human Milk

EHM – Expressed Human Milk

HMF – Human Milk Fortifier

PPN – Peripheral Parenteral Nutrition

BWt – Birthweight

Nutrition

Choice of Milk

- Breastmilk (expressed or donor) EHM/DHM
- If the family declines DHM:
 - <34 weeks GA: Preterm formula (e.g. Similac Special Care 24 kcal/oz -High Protein version)
 - 34-34 6/7 weeks GA: Transitional formula (e.g. Similac Neosure 22-24 kcal/oz)
 - ≥35 weeks AND <2 kg: Transitional Formula (eg: Neosure 22cal/oz)
 - ≥35 weeks AND >2 kg: Standard Term infant formula
- Stopping DHM: > 2 weeks of age & >34 weeks PMA or preparing for discharge (or if mom does not plan to BF)

Fortification

Early fortification improves developmental outcomes and improves growth.

- ***Fortify using HMF to 24 kcal/oz**
 - If BWt < 2kg, start fortification on Day 3
 - If BWt ≥2kg, consider fortification if not meeting expected weight gain once on full feeds
- Confer with RD on when to discontinue

Breastfeeding

- See [Lactation Risk Standards](#)
- Encourage birth parent to hand express or pump 8x/day
- Start with 1-2 direct breastfeeds/day and increase based on baby's ability

Growth

Expected weight loss

- 5-14% of BWt (ideally 10%)

Expected weight gain

- Regain BWt by 10-14 days of life (ideally 7-10 days)
 - <2000 grams: 15-20 grams/kg average/day
 - ≥2000 grams: 20-30 grams average/day
 - OFC/Length: 0.5-1 cm/week

Discharge Planning

- Home feeding plans based on maternal milk production, infant growth, and breastfeeding ability.
- Goal is unfortified EHM at least 170-180 ml/kg/day
 - If poor weight gain on full feeds, fortify to 22 cal/ounce or 2-3 feeds transitional formula (22 cal/oz) per day
- Transition to home feeding plan at 35 weeks or ready for discharge in 2-3 days.
 - Adequate EHM+Good growth: EHM ad lib
 - Adequate EHM+Slow Growth: EHM + 2 feeds of Transition Formula 22 kcal/day
 - Inadequate EHM: EHM + Transition Formula 22 or 24 kcal as needed
- Be sure to incorporate breastfeeding frequency and timing in home feeding plan

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Infant Driven Feeding Algorithm

Quality Score	Direct Breastfeeding Time	Amount Supplemented*
1-5	0-5 minutes	Gavage all
1-3	5-10 minutes	Gavage 2/3
1-3	10-15 minutes	Gavage 1/3
1-3	>15 minutes	No gavage

*Per RN discretion, i.e. EBM production and audible swallows

Outcomes:

- Day of life birthweight regained
- Compliance with pathway (% of eligible infants being enrolled and successfully completing feeding pathway)
- Length of stay

Balancing Measures:

- Percent of eligible infants who develop NEC
- Readmission rate for failure to gain weight or poor feeding

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13. CPQCC GAIN 10.9 Collaborative

NICU Vitamin and Iron Supplementation Guide

Stanford Medicine Children's Health

General Vitamin and Iron Guidelines

- Initiate iron supplementation on DOL 14 AND once tolerating goal enteral feeds
- Initiate Vitamin D or multivitamin supplementation once tolerating goal enteral feeds
- Dosing recommendations below are a guideline; please refer to RD note for individualized vitamin / iron dosing as caloric concentration and volumes of feeding regimens may vary.

Preterm Infants (<37 weeks GA at birth)

Birth Weight	Feeding Regimen (160 mL/kg)	Iron* (as ferrous sulfate)	Vitamin D (as cholecalciferol)	Multivitamin (Tri-Vi-Sol or Poly-Vi-Sol; 1 mL = 400 units cholecalciferol)
<1500 g BW	EHM/DHM + Enfamil HMF Standard 24 kcal/oz or Similac Special Care 24 kcal/oz	1.5 mg/kg/d	Current Weight <1.5 kg: 200 units BID Current Weight >1.5 kg: 200 units daily	N/A
1500-2500 g BW	EHM/DHM + Enfamil HMF Standard 24 kcal/oz or Similac Special Care 24 kcal/oz	N/A	200 units daily	N/A
	EHM	2 mg/kg/d	N/A	1 mL daily

**Iron dose expressed in terms of elemental iron using ferrous sulfate drops; standard iron dosing (adjust dose per labs as indicated)*

Discharge Regimens for Preterm Infants (<37 weeks GA at birth)

Feeding Regimen (160 mL/kg)	Iron* (as ferrous sulfate)	Vitamin D (as cholecalciferol)	Multivitamin (Tri-Vi-Sol or Poly-Vi-Sol; 1 mL = 400 units cholecalciferol)
EHM + supplemental feeds of Neosure	2 mg/kg/d	N/A	1 mL daily
Similac Neosure 22/24 kcal/oz	N/A	400 units daily	N/A
EHM	2 mg/kg/d	N/A	1 mL daily

**Iron dose expressed in terms of elemental iron using ferrous sulfate drops*

Term Infants (>37 weeks GA at birth)

Feeding Regimen (160 mL/kg)	Iron* (as ferrous sulfate)	Vitamin D (as cholecalciferol)	Multivitamin (Tri-Vi-Sol or Poly-Vi-Sol; 1 mL = 400 units cholecalciferol)
EHM	N/A; start 1 mg/kg/day at 4 months if >50% of feeds are EHM	400 units daily	N/A
Term Infant Formula	N/A	400 units daily (may discontinue once taking >1 L/day at standard concentration of 20 kcal/oz)	N/A

**Iron dose expressed in terms of elemental iron using ferrous sulfate drops*

Appendix:

Recommended Iron and Vitamin D Intakes

	Iron*	Vitamin D
Preterm <1500 g BW	3-4 mg/kg/d	400-1000 units daily
Preterm >1500 g BW	2-3 mg/kg/d	400-1000 units daily
Preterm at Discharge	2 mg/kg/d	400 units daily
Term	1 mg/kg/d (starting at 4 months of age if exclusively or partially breastfed)	400 units daily

*Total daily intake of iron (includes content of enteral feeds, supplemental iron)

Iron Provision of Common Feeding Regimens (assuming 160 mL/kg)

Feeding Regimen	Iron Provision (mg/kg/day)
EHM/DHM + Enfamil HMF Standard 24 kcal/oz	2.4 mg/kg/day
Similac Special Care 24 kcal/oz	2.3 mg/kg/day
Similac Neosure 22 - 24 kcal/oz	2.1 - 2.3 mg/kg/day
EHM + 3 feeds of Similac Neosure 24 kcal/oz	0.9 mg/kg/day

Suggested Lab Monitoring

Preterm Infants			
Lab	Frequency	Result	Action
Hemoglobin	Per MD/APP	<10 g/dL	Team to evaluate for transfusion needs per protocol
Hematocrit	Per MD/APP	<30%	Team to evaluate for transfusion needs per protocol
Ferritin*	Initially at 1 month of life then monthly thereafter; obtain with routine labs	<70 ng/mL	Increase iron by 2 mg/kg/d <u>Max Dose:</u> 6 mg/kg/d

			or 15 mg/day Decrease to standard dose for age once levels WNL or at discharge
		70-300 ng/mL	No change
		>300 ng/mL	If no inflammation is noted, hold iron and recheck in 2 weeks.

*only obtain if no signs of inflammation

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