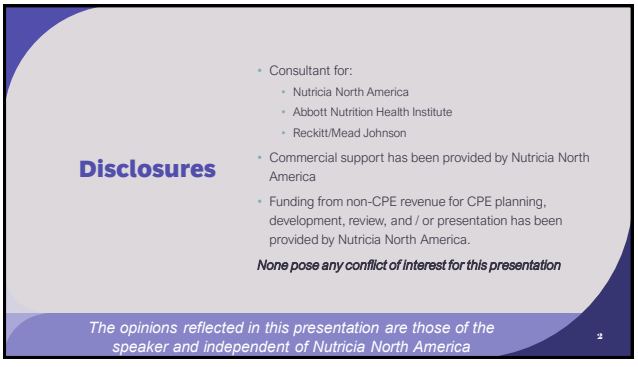
1



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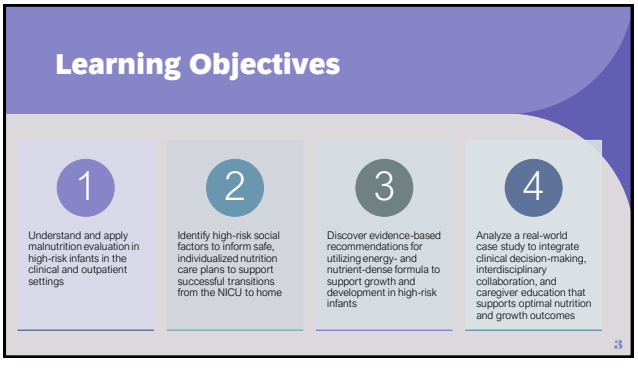


3

4

Poll Question:
Are you diagnosing malnutrition in your facility?

A. No
B. Yes, in all neonatal and pediatric patients
C. Yes, but just in pediatric patients
D. Yes, but just in neonatal patients

5

5

Neonatal Malnutrition Indicators[1]

	Indicator	Mild Malnutrition	Moderate Malnutrition	Severe Malnutrition
Single Indicator for Diagnosis	Decline in weight-for-age z-score	0.8 – 1.2	>1.2 – 2.0	>2.0
	Weight gain velocity	<75% expected weight gain velocity	<50% expected weight gain velocity	<25% expected weight gain velocity
	Nutrient intake†	≥3-5 consecutive days of protein/energy intake ≤75% of estimated needs	≥5-7 consecutive days of protein/energy intake ≤75% of estimated needs	>7 consecutive days of protein/energy intake ≤75% of estimated needs
2+ indicators for diagnosis	Days to regain birthweight†	15 – 18	19 – 21	>21
	Linear growth velocity	<75% expected weight gain velocity	<50% expected weight gain velocity	<25% expected weight gain velocity
	Decline in length-for-age z-score	0.8 – 1.2	>1.2 – 2.0	>2.0

† Indicator that may be used in the first two weeks of life

Goldberg DL, et al. J Acad Nutr Diet. 2018

6

Pediatric Malnutrition Indicators[2]

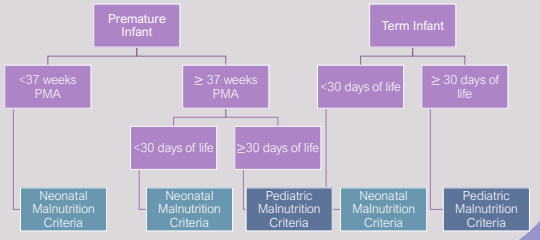
	Indicator	Mild Malnutrition	Moderate Malnutrition	Severe Malnutrition
Single Indicator for Diagnosis	Weight-for-height z-score	-1 to -1.9	-2 to -2.9	-3 or greater
	BMI-for-age z-score	-1 to -1.9	-2 to -2.9	-3 or greater
	Length/height z-score	No data	No data	-3 or greater
	Mid upper arm circumference z-score	-1 to -1.9	-2 to -2.9	-3 or greater
2+ indicators for diagnosis	Weight gain velocity (<2 years of age)	<75% expected weight gain velocity	<50% expected weight gain velocity	<25% expected weight gain velocity
	Weight loss (2 to 20 years of age)	5% usual body weight	7.5% usual body weight	10% usual body weight
	Decline in weight-for-length/height z-score	1 – 1.9	2 – 2.9	≥3
	Inadequate nutrient intake	51-75% estimated energy/protein need	26-50% estimated energy/protein need	≤25% estimated energy/protein need

Practice Tool: Nutrition Management of Term Infants with Growth Failure

[2] Becker PJ, et al. J Acad Nutr Diet. 2014.

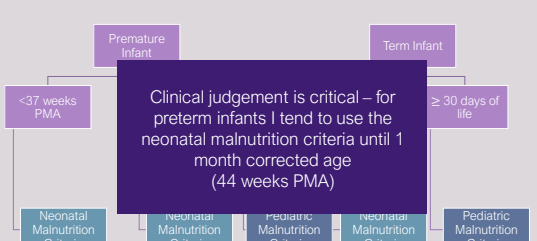
7

Which malnutrition criteria should be used?



8

Which malnutrition criteria should be used?



9

Nutrition-Focused Physical Assessment in Infants[3]

Fat mass assessment

Site/ Location	Typical	Mild/Moderate Malnutrition	Severe Malnutrition
Face/Eyes	Slightly bulging fat pads	Slight darkened circles, loose skin	Dark circles, hollow depressions, sagging skin
Cheeks/Buccal	Full, round cheeks	Flat, minimal bounce	Hollow, sunken
Chest	Full, round, ribs not visible	Ribs notable. Depressions between ribs visible.	Progressive prominence of ribs noted, with loss of intercostal tissue. Iliac crest very visible.
Buttock	Full and round	Ranging from curved to slightly curved, round to not round	Skin very wrinkled. No fat mass noted.
Legs	Full, round	Slight loose skin noted	Ample loose skin noted, fingers can separate skin from fat free mass.

[3] American Society for Parenteral and Enteral Nutrition. 2025.

10

Nutrition-Focused Physical Assessment in Infants[3]

Fat-free mass assessment

Site/ Location	Typical	Mild/Moderate Malnutrition	Severe Malnutrition
Head	Temple / neck muscle well defined	Slight depression, thin appearance, poor tone – head control	Deep hollow, very poor tone. Low muscle mass in neck and shoulders.
Arms	Rounded, good tone	Bony prominence visible. Low tone	Poor tone, bone noted. Skin and bone.
Abdomen	Good rebound to touch, soft, good bowel sounds	Firm, ribs noted. May be depressed	Maybe rounded and firm. Edema may be present.
Legs	Well rounds thigh and calf	Mild depression in thigh, kneecap maybe visible	Kneecaps visible, thin calf, no muscle definition of thigh or calf noted.

[3] American Society for Parenteral and Enteral Nutrition. 2025.

11

Nutrition-Focused Physical Assessment in Infants[3]

Oral cavity assessment

Site/Location	Possible nutrient deficiency/etiology	Non-nutrition related causes
Mouth lesions	Zinc, vitamin C	Trauma, irritation from medical equipment, GVHD, allergy
Dry mucous membranes	Dehydration, vitamin A, C, D	Side effect of medication/treatment
Dental decay	Nursing bottle syndrome	Genetic anomaly
Green teeth		Neonatal hyperbilirubinemia
Pale mucosa	Iron, folate, B6, B12	Low flow state
Inflammation of tongue, lips, mucosa	B vitamins	Infection, GVHD

GVHD, Graft-versus-Host Disease

[3] American Society for Parenteral and Enteral Nutrition. 2025.

12

Nutrition-Focused Physical Assessment in Infants[3]

	Site/ Location	Description	Possible nutrient deficiency/ etiology	Non-nutrition related causes
Skin assessment	Dermatitis	Swollen, red, raised/inflamed	Zinc, EFAD	Allergy, eczema, medication, diaper dermatitis
	Flaky paint dermatitis	Generalized shiny, enamel-like, hyperpigmented scales in an irregular pattern that may peel (like old paint), often with underlying hypopigmentation	Protein malnutrition	Environmental reaction
	Pallor	Atypical paleness	Iron, folate, B6, B12	Low mean arterial pressure
	Pellagrous dermatitis	Appears on sun-exposed areas of skin, appears like sunburn then progresses to rough, scaly, hyper-pigmented plaques	Niacin, tryptophan	Burns
	Petechiae	Small, pin-point, hemorrhagic (red/purple) papillae	Vitamins C, K	GVHD
	Poor wound healing		Zinc, Vitamins C, A, protein, EFAD	Dehydration, infection
	Xerosis	Dry, flaky, scaly	Zinc, EFAD, hydration	Allergy, atopic dermatitis, medication

EFAD, essential fatty acid deficiency; GVHD, Graft-versus-Host Disease

[3]American Society for Parenteral and Enteral Nutrition. 2025.

13

Malnutrition Diagnosis Criteria in Infants Need Re-evaluation

- Current neonatal malnutrition indicators have differing diagnostic behavior[4]
- Growing evidence to support modification of existing indicators:
  - Time to regain birthweight[5]
  - Change in weight-for-age z-score[6,7]
  - Growth-based indicators[8]
- Pediatric Malnutrition Indicator (AIMMp) tool did not achieve predictive validity[9]

[4] Merlino Barr S, et al. JPEN J Parenter Enteral Nutr. 2024.; [5] Valentine GC, et al. J Perinatol. 2024.; [6]Rochow N, et al. Pediatr Res. 2016; [7] Salas AA, et al. J Pediatr. 2024.; [8] Fenton TR. Paediatr Perinat Epidemiol. 2025. [9]Jimenez EY, et al. J Pediatr. 2025.

14

14

Another Tool for your Toolbox: Newborn Weight Loss Nomograms[10]

Newborn Weight Tool

[10]Flaherman VJ, et al. Pediatrics. 2015.

15

15

Creating a Discharge Plan for a High-Risk Infant

16

16

Poll Question: What patient population do you cover?

A. Inpatient
B. Outpatient
C. Both

17

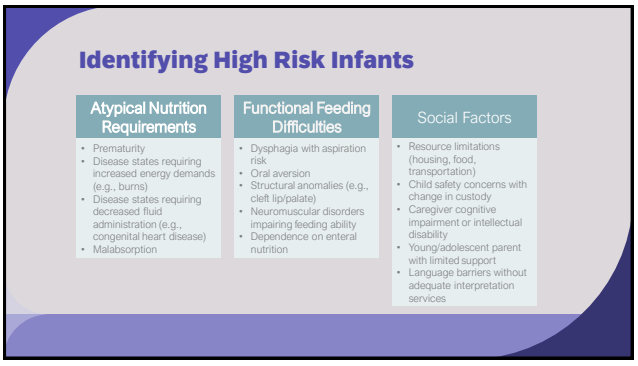
17

What I Require for a Discharge Plan

Safety	Meet Nutrition Needs	Align with family feeding goals	Feasibility

18

18



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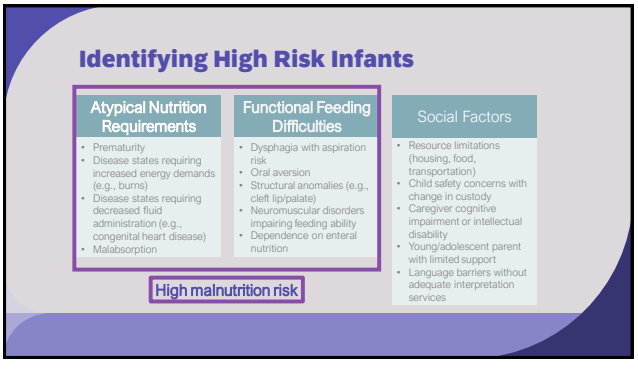

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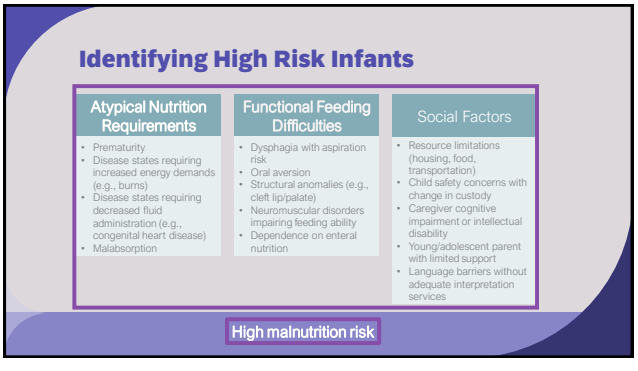


21

Nutrition-related errors are common after NICU discharge

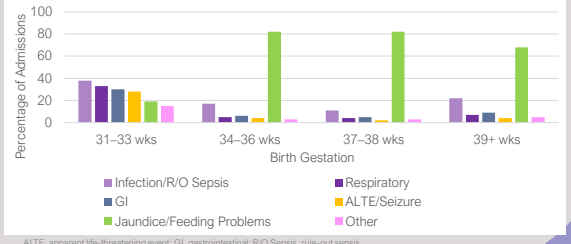
- Feeding preparation and administration errors are common[11]
- Reduce discharge readiness[12]
- Contribute to readmissions[13,14]

[11]Beard LA, et al. Pediatrics. 2025.; [12]Smith VC. Clin Pediatr (Phila). 2012.; [13]Amsalu R, et al. Hosp Pediatr. 2022.; [14]Luu TM. Arch Dis Child Fetal Neonatal Ed. 2010.

22

Nutrition-related issues are a common cause for hospital readmissions[15]

Readmission diagnoses by GA group, KPNC 2003–2012.



ALTE, apparent life-threatening event; GI, gastrointestinal; R/O Sepsis, rule-out sepsis

[15]Kuzniewicz MW. Clin Perinatol. 2013.

23

What I have seen in unsafe discharges

- Limited discharge education
- Limitations in interpretation services
- Unable to scale non-standard recipes
- Challenges getting nutrition supplies
- What is reasonable for a home environment is different from what can be done in a NICU/hospital setting

24

Registered Dietitian Nutritionists are vital for safe discharges and follow up care[16-18]

RDN FOLLOW UP VIA TELEHEALTH CAN HELP IDENTIFY AND SOLVE "SIMPLE" ISSUES

MULTIDISCIPLINARY CARE INCLUDING A RDN IMPROVES CARE

SYSTEM-LEVEL PROBLEMS SHOULD BE ADDRESSED

[16]Bathgate J, et al. Adv Neonatal Care. 2025.; [17]Feehan K, et al, Matern Child Health J. 2020.; [18]Glick AF, et al. Pediatrics. 2023.

25

Registered Dietitian Nutritionists are needed to support nutrition plans to promote human milk[19]

Infants with feeding difficulties tend to have less breast milk and less direct breastfeeding

Factors associated with breast milk availability

- Maternal age
- Substance use disorder
- Length of time from reaching full PO to discharge

Factors associated with direct breastfeeding

- IVH
- HIE
- PMA at full PO feeding

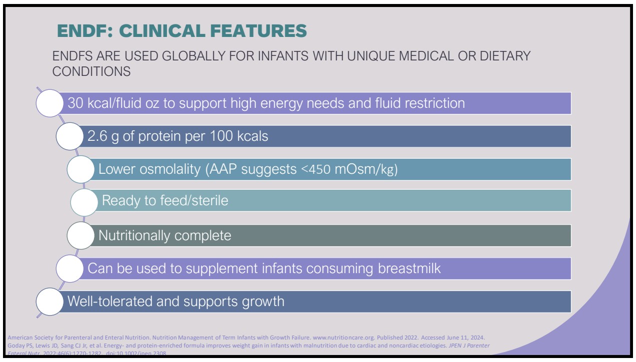
[19]Bala F. Breastfeed Med. 2024.

26

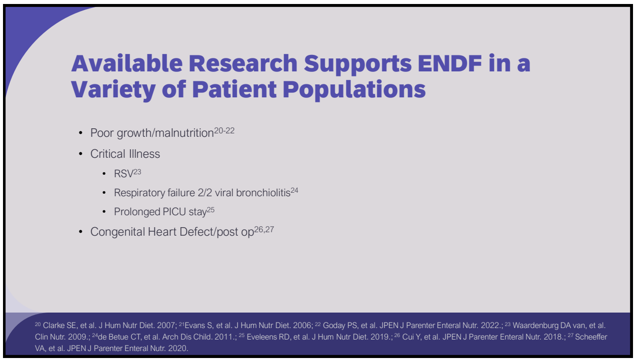
An important tool in my toolbox:

Energy- and nutrient-dense formula (ENDF)

27


ENDF: CLINICAL FEATURES
ENDFS ARE USED GLOBALLY FOR INFANTS WITH UNIQUE MEDICAL OR DIETARY CONDITIONS
30 kcal/fluid oz to support high energy needs and fluid restriction
2.6 g of protein per 100 kcals
Lower osmolality (AAP suggests <450 mOsm/kg)
Ready to feed/sterile
Nutritionally complete
Can be used to supplement infants consuming breastmilk
Well-tolerated and supports growth
American Society for Parenteral and Enteral Nutrition. Nutrition Management of Term Infants with Growth Failure. www.nutritioncare.org. Published 2022. Accessed June 11, 2024.
Goday PS, Lewis JD, Sang CJ Jr, et al. Energy- and protein-enriched formula improves weight gain in infants with malnutrition due to cardiac and noncardiac etiologies. JPEN J Parenter Enteral Nutr. 2022;46(6):1270-1282. doi:10.1002/jpen.2308

28


Available Research Supports ENDF in a Variety of Patient Populations
Poor growth/malnutrition[20-22]
Critical Illness
RSV[23]
Respiratory failure 2/2 viral bronchiolitis[24]
Prolonged PICU stay[25]
Congenital Heart Defect/post op[26,27]
[20] Clarke SE, et al. J Hum Nutr Diet. 2007; [21]Evans S, et al. J Hum Nutr Diet. 2006; [22] Goday PS, et al. JPEN J Parenter Enteral Nutr. 2022.; [23] Waardenburg DA van, et al. Clin Nutr. 2009.; [24]de Betue CT, et al. Arch Dis Child. 2011.; [25] Eveleens RD, et al. J Hum Nutr Diet. 2019.; [26] Cui Y, et al. JPEN J Parenter Enteral Nutr. 2018.; [27] Scheeffer VA, et al. JPEN J Parenter Enteral Nutr. 2020.

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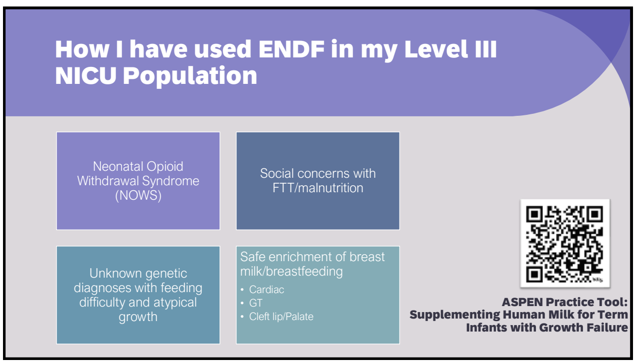

How I have used ENDF in my Level III NICU Population
Neonatal Opioid Withdrawal Syndrome (NOWS)
Social concerns with FTT/malnutrition
Unknown genetic diagnoses with feeding difficulty and atypical growth
Safe enrichment of breast milk/breastfeeding
Cardiac
GT
Cleft lip/Palate
ASPEN Practice Tool: Supplementing Human Milk for Term Infants with Growth Failure

30

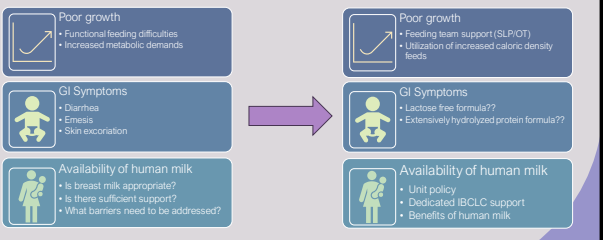
Use of ENDF in Cleft Lip/Palate Patients[28-30]

- Limited evidence in how to feed infants
- Feeding is a high source of stress for caregivers
- Growth challenges are common
- Breastfeeding/providing breast milk is challenging
- Multidisciplinary care is best practice

[28]Bessell A, et al. Cochrane Database Syst Rev. 2011; [29]Lindberg NE, et al. Cleft Palate Craniofac J. 2025; [30]Prescott K, et al. Cleft Palate Craniofac J. 2025.

31

Nutrition in NOWS can be Complicated![31-34]



[31]Kaplan HC, et al. Pediatrics. 2020; [32]McGlothen-Bell K, et al. Adv Neonatal Care. 2023; [33]Nagy S, et al. J Perinat Neonatal Nurs. 2023; [34]Pandey R, et al. J Perinatol. 2021.

32

Evidence behind formula selection and NOWS is limited[31,34-36]

Low lactose formula

- Pandey R, 2021 (MetroHealth study) – RCT no difference in LOS, length of treatment, growth, NAS scoring between standard and low lactose formula

Extensively hydrolyzed formula (EHF)

- Gallegos JA, 2024 (U of Louisville) – retrospective chart review, found that infants on EHF were infants with more severe withdrawal presentation

High calorie formula

- Bogen DL, 2018 (UPMC) – RCT of 20 vs 24 kcal/oz formula found increased weight gain in 24 kcal/oz group, but similar days to nadir weight, days to regain birthweight, and maximum % weight loss
- Kaplan HC, 2020 (Ohio Perinatal Quality Collaborative) – high calorie formula associated with decreased length of stay

[31]Kaplan HC, et al. Pediatrics. 2020; [34]Pandey R, et al. J Perinatol. 2021.; [35]Gallegos JA, et al. Am J Perinatol. 2024. [36]Bogen DL, et al. Hosp Pediatr. 2018.

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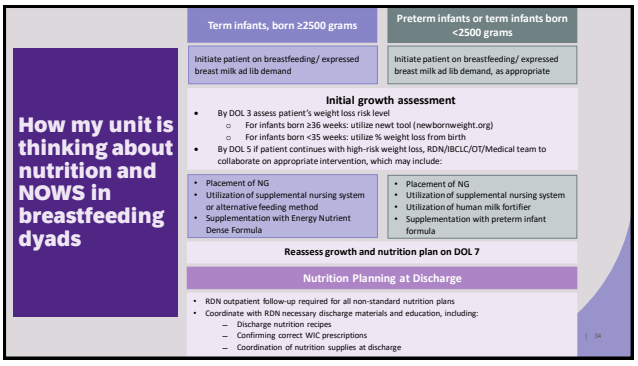
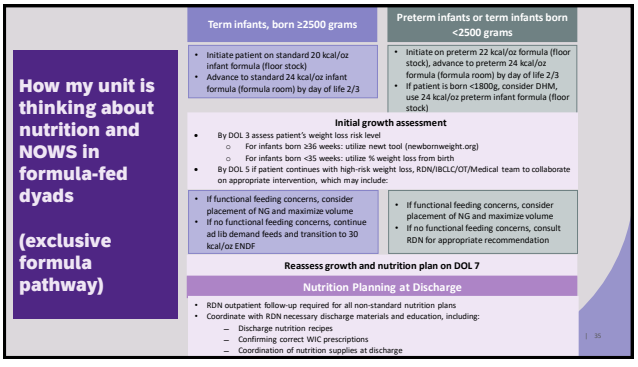
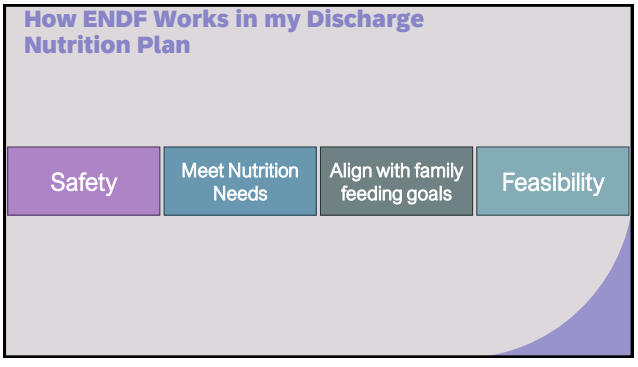

How my unit is thinking about nutrition and NOWS in breastfeeding dyads
Term infants, born ≥2500 grams
Preterm infants or term infants born <2500 grams
Initiate patient on breastfeeding/ expressed breast milk ad lib demand
Initiate patient on breastfeeding/ expressed breast milk ad lib demand, as appropriate
Initial growth assessment
By DOL 3 assess patient's weight loss risk level
For infants born ≥36 weeks: utilize newt tool (newbornweight.org)
For infants born <35 weeks: utilize % weight loss from birth
By DOL 5 if patient continues with high-risk weight loss, RDN/IBCLC/OT/Medical team to collaborate on appropriate intervention, which may include:
Placement of NG
Utilization of supplemental nursing system or alternative feeding method
Supplementation with Energy Nutrient Dense Formula
Placement of NG
Utilization of supplemental nursing system
Utilization of human milk fortifier
Supplementation with preterm infant formula
Reassess growth and nutrition plan on DOL 7
Nutrition Planning at Discharge
RDN outpatient follow-up required for all non-standard nutrition plans
Coordinate with RDN necessary discharge materials and education, including:
Discharge nutrition recipes
Confirming correct WIC prescriptions
Coordination of nutrition supplies at discharge
34

34


How my unit is thinking about nutrition and NOWS in formula-fed dyads
(exclusive formula pathway)
Term infants, born ≥2500 grams
Preterm infants or term infants born <2500 grams
Initiate patient on standard 20 kcal/oz infant formula (floor stock)
Advance to standard 24 kcal/oz infant formula (formula room) by day of life 2/3
Initiate on preterm 22 kcal/oz formula (floor stock), advance to preterm 24 kcal/oz formula (formula room) by day of life 2/3
If patient is born <1800g, consider DHM, use 24 kcal/oz preterm infant formula (floor stock)
Initial growth assessment
By DOL 3 assess patient's weight loss risk level
For infants born ≥36 weeks: utilize newt tool (newbornweight.org)
For infants born <35 weeks: utilize % weight loss from birth
By DOL 5 if patient continues with high-risk weight loss, RDN/IBCLC/OT/Medical team to collaborate on appropriate intervention, which may include:
If functional feeding concerns, consider placement of NG and maximize volume
If no functional feeding concerns, continue ad lib demand feeds and transition to 30 kcal/oz ENDF
If functional feeding concerns, consider placement of NG and maximize volume
If no functional feeding concerns, consult RDN for appropriate recommendation
Reassess growth and nutrition plan on DOL 7
Nutrition Planning at Discharge
RDN outpatient follow-up required for all non-standard nutrition plans
Coordinate with RDN necessary discharge materials and education, including:
Discharge nutrition recipes
Confirming correct WIC prescriptions
Coordination of nutrition supplies at discharge
35

35


How ENDF Works in my Discharge Nutrition Plan
Safety
Meet Nutrition Needs
Align with family feeding goals
Feasibility

36

How ENDF Works in my Discharge Nutrition Plan

Safety

- Ready-to-feed minimizes risks of contamination
- Ready-to-feed eliminates risk of over- or under- concentration of a feed
- Reduce caregiver stress with feeding

37

How ENDF Works in my Discharge Nutrition Plan

Feasibility

- Any product that I use must be available from WIC and from local vendors
- Need rapid access at NICU discharge to fill any gap from hospital to WIC enrollment

38

How ENDF Works in my Discharge Nutrition Plan

Align with family feeding goals

- Need to individualize all discharge feeding plans, particularly with breast milk
- RTF ENDF as strategy to minimize breast milk displacement
- RTF ENDF easier to "waste" in tube feeding compared to breast milk

39

How ENDF Works in my Discharge Nutrition Plan

Meet Nutrition Needs

- Safe, tolerated as sole-source nutrition
- Useful tool for enriching/supplementing expressed breast milk

40

Discharge to Thrive: Case Studies of High-Risk NICU Discharges

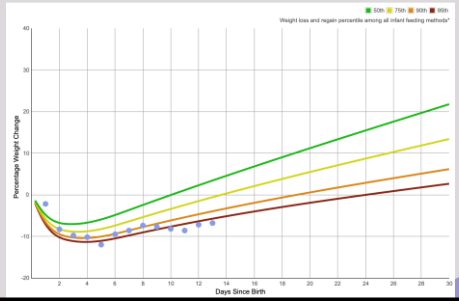
41

Case study 1: NOWS & ESC

- Baby girl AA
- Born at 39 2/7 weeks via c-section
- Birthweight 3.25 kg
- Admission to nursery
- Initial hospital course significant for: maternal substance use disorder (mom on suboxone), patient s/p ESC; respiratory distress (CPAP initially in delivery room, RA since)
- NICU RDN consulted **on day of discharge** for family education for special formula recipe preparation

42

Case study 1: NOWS & ESC



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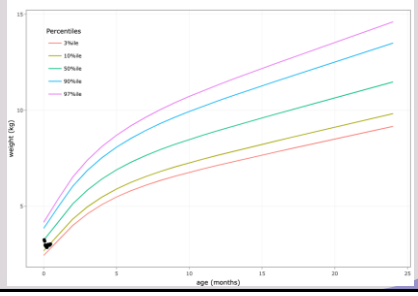
Case study 1: NOWS & ESC



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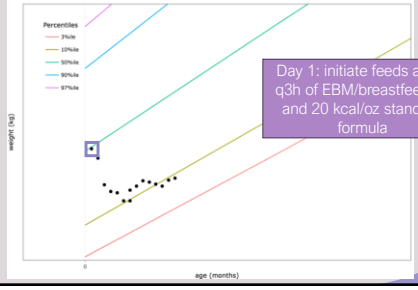
Case study 1: NOWS & ESC



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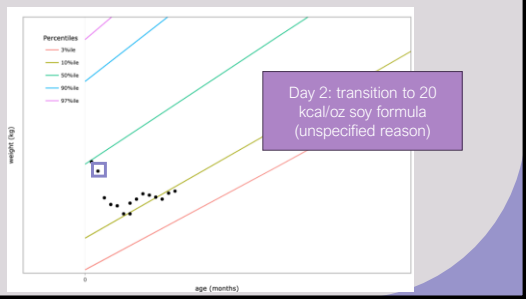
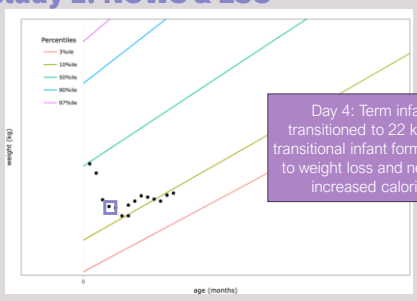
Case study 1: NOWS & ESC



Day 2: transition to 20 kcal/oz soy formula (unspecified reason)

46

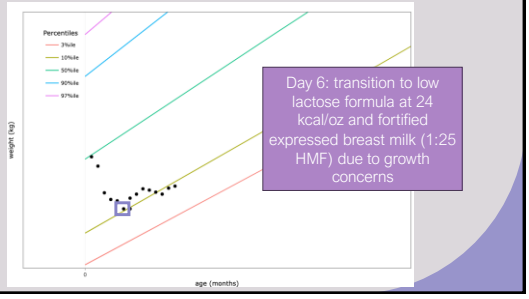
Case study 1: NOWS & ESC



Day 4: Term infant transitioned to 22 kcal/oz transitional infant formula due to weight loss and need for increased calories

47

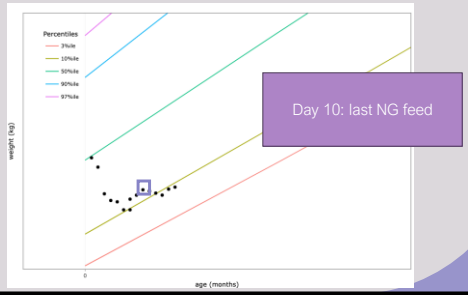
Case study 1: NOWS & ESC



Day 6: transition to low lactose formula at 24 kcal/oz and fortified expressed breast milk (1:25 HMF) due to growth concerns

48

Case study 1: NOWS & ESC



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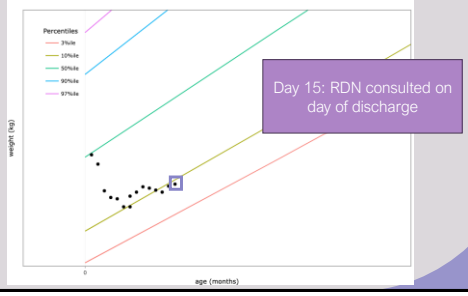
Case study 1: NOWS & ESC



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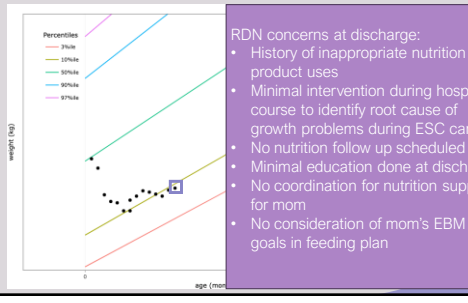
Case study 1: NOWS & ESC



51

Case study 1: What happened?

- Seen by PCP 5 days after discharge with no weight gain.
  - Told to give only formula, no breast milk
  - Patient being fed 24 kcal/oz low lactose formula

52

Case study 1: What happened?

- Seen by PCP 5 days after discharge with no weight gain.
  - Told to give only formula, no breast milk
  - Patient being fed 24 kcal/oz low lactose formula
- **Pediatric RDN appointment was scheduled**
  - **Patient no showed**

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Case study 1: What happened?

- Seen by PCP 5 days after discharge with no weight gain.
  - Told to give only formula, no breast milk
  - Patient being fed 24 kcal/oz low lactose formula
- Pediatric RDN appointment was scheduled
  - Patient no showed
- **Weight check 2 weeks later with continued minimal growth**
  - **Hospitalized for FTT**

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- **Social work consulted to assist in connecting with resources**

55

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- **Social work consulted to assist in connecting with resources**

NICU/Pediatrics team agrees: we must do better

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Creation of nutrition pathway for NOWS & breastfeeding dyads

Term infants, born ≥2500 grams	Preterm infants or term infants born <2500 grams
Initiate patient on breastfeeding/ expressed breast milk ad lib demand	Initiate patient on breastfeeding/ expressed breast milk ad lib demand, as appropriate

Initial growth assessment

- By DOL 3 assess patient's weight loss risk level
  - For infants born ≥36 weeks: utilize newt tool (newbornweight.org)
  - For infants born <35 weeks: utilize % weight loss from birth
- By DOL 5 if patient continues with high-risk weight loss, RDN/IBCLC/OT/Medical team to collaborate on appropriate intervention, which may include:

• Placement of NG • Utilization of supplemental nursing system or alternative feeding method • Supplementation with Energy Nutrient Dense Formula	• Placement of NG • Utilization of supplemental nursing system • Utilization of human milk fortifier • Supplementation with preterm infant formula

Reassess growth and nutrition plan on DOL 7

Nutrition Planning at Discharge

- RDN outpatient follow-up required for all non-standard nutrition plans
- Coordinate with RDN necessary discharge materials and education, including:
  - Discharge nutrition recipes
  - Confirming correct WIC prescriptions
  - Coordination of nutrition supplies at discharge

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Creation of nutrition pathway for NOWS & formula-fed dyads

Term infants, born ≥2500 grams	Preterm infants or term infants born <2500 grams
• Initiate patient on standard 20 kcal/oz infant formula (floor stock) • Advance to standard 24 kcal/oz infant formula (formula room) by day of life 2/3	• Initiate on preterm 22 kcal/oz formula (floor stock), advance to preterm 24 kcal/oz formula (formula room) by day of life 2/3 • If patient is born <1800g, consider DHM, use 24 kcal/oz preterm infant formula (floor stock)

Initial growth assessment

- By DOL 3 assess patient's weight loss risk level
  - For infants born ≥36 weeks: utilize newt tool (newbornweight.org)
  - For infants born <35 weeks: utilize % weight loss from birth
- By DOL 5 if patient continues with high-risk weight loss, RDN/IBCLC/OT/Medical team to collaborate on appropriate intervention, which may include:

• If functional feeding concerns, consider placement of NG and maximize volume • If no functional feeding concerns, continue ad lib demand feeds and transition to 30 kcal/oz ENDF	• If functional feeding concerns, consider placement of NG and maximize volume • If no functional feeding concerns, consult RDN for appropriate recommendation

Reassess growth and nutrition plan on DOL 7

Nutrition Planning at Discharge

- RDN outpatient follow-up required for all non-standard nutrition plans
- Coordinate with RDN necessary discharge materials and education, including:
  - Discharge nutrition recipes
  - Confirming correct WIC prescriptions
  - Coordination of nutrition supplies at discharge

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Case study 2:

improving care for NOWS infants

- Baby boy BB
- Born 39 3/7 weeks via spontaneous vaginal delivery
- Birthweight 4.25 kg
- Transferred to NICU for escalation of NOWS care
- NICU RDN consulted upon NICU admission

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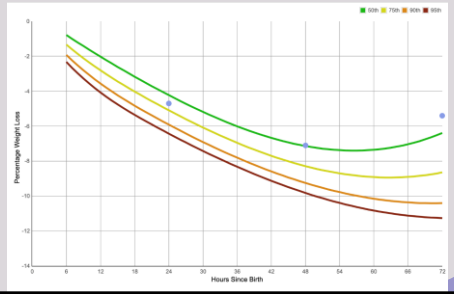
Case study 2: improving care for NOWS infants



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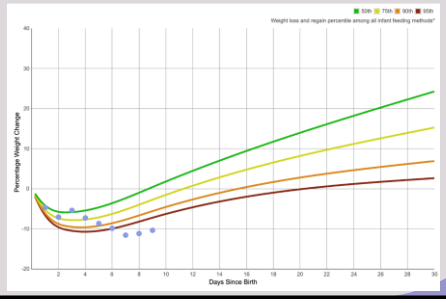
Case study 2: improving care for NOWS infants



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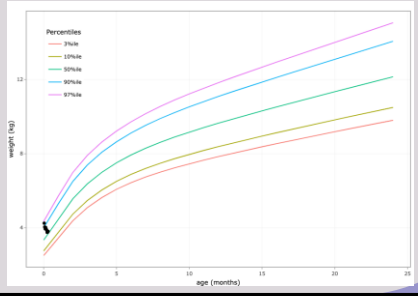
Case study 2: improving care for NOWS infants



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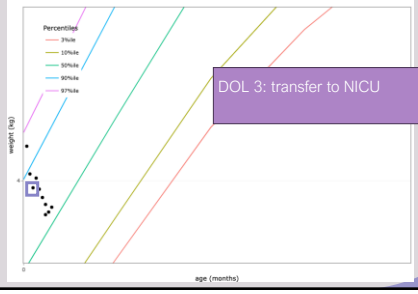
Case study 2: improving care for NOWS infants



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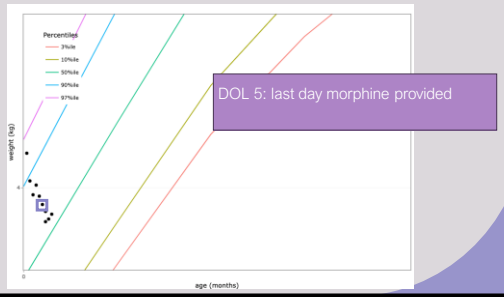
Case study 2: improving care for NOWS infants



DOL 5: last day morphine provided

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Case study 2: improving care for NOWS infants

DOL 7: lactation supports maximized, meet with family to determine plan to supplement direct breastfeeding in the setting of continued weight loss

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Case study 2: improving care for NOWS infants

DOL 8: begin providing 240 mL daily of ENDF to supplement direct breastfeeding

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Case study 2: improving care for NOWS infants

DOL 10: discharged home on direct breastfeeding + 240 mL daily of ENDF to supplement direct breastfeeding

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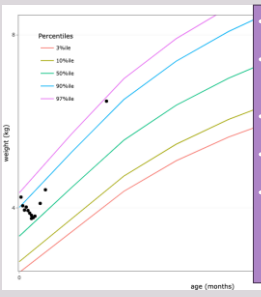
Case Study 2: what happened?



- Temporary formula supply sent by formula company
- High Risk Follow Up Clinic within 7 days of NICU discharge
  - Seen by RDN
- WIC appointment coordinated for within 72 hours of discharge
- Mom provided stores where WIC benefits could be utilized
- D/C'd ENDF by 2 months of life, patient exclusively breastfeeding
  - Weight-for-length stable @ 60-70th %ile

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Final thoughts

Malnutrition evaluation in the neonatal population requires clinical judgement, as current indicators need re-evaluation

Identifying infants at high risk for malnutrition are needed to create safe discharge plans

Discharge nutrition plans must be safe, feasible, and meet family's feeding goals in addition to meeting the patient's nutrition requirements

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Thank you!
Questions?

This concludes the educational webinar

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We welcome your feedback!

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Bibliography

1. Goldberg DL, Becker PJ, Brigham K, et al. Identifying Malnutrition in Preterm and Neonatal Populations: Recommended Indicators. *Journal of the Academy of Nutrition and Dietetics*. 2018;118(9):1571-1582. doi:10.1016/j.jand.2017.10.006
2. Becker PJ, Nieman Carney L, Corkins MR, et al. Consensus Statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: Indicators Recommended for the Identification and Documentation of Pediatric Malnutrition (Undernutrition). *Journal of the Academy of Nutrition and Dietetics*. 2014;114(12):1988-2000. doi:10.1016/j.jand.2014.08.026
3. American Society for Parenteral and Enteral Nutrition. Neonatal Nutrition Assessment. Practice Tool. September 2025. Accessed September 14, 2025. https://nutritioncare.org/wp-content/uploads/2025/08/Neonatal-Nutr-Assessment.pdf?ver=1757421988
4. Membo Barr S, Hand R, Collin M, Love T, Groh-Wargo S. Neonatal Malnutrition Criteria: Do Current Indicators Agree in Diagnosis? *Journal of Parenteral and Enteral Nutrition*. 2024;48(S1):S5-S59. doi:10.1002/jpen.2601
5. Valentine GC, Perez KM, Wood TR, et al. Time to regain birthweight and association with neurodevelopmental outcomes among extremely preterm newborns. *J Perinatol*. 2024;44(4):554-560. doi:10.1038/s41372-024-01865-
6. Rochow N, Raja P, Liu K, et al. Physiological adjustment to postnatal growth trajectories in healthy preterm infants. *Pediatr Res*. 2016;79(6):870-879. doi:10.1038/pr.2016.15
7. Salas AA, Carlo WA, Bann CM, et al. Risk Assessment of Cognitive Impairment at 2 Years of Age in Infants Born Extremely Preterm Using the INTERGROWTH-21st Growth Standards. *J Pediatr*. 2024;275:114239. doi:10.1016/j.jpeds.2024.114239
8. Fenton TR, Elmrayed S, Alshaikh BN. Fenton Third-Generation Growth Charts of Preterm Infants Without Abnormal Fetal Growth: A Systematic Review and Meta-Analysis. *Paediatr Perinat Epidemiol*. Published online June 19, 2025. doi:10.1111/ppe.70035
9. Jimenez EY, Lamers-Johnson E, Long JM, Woodcock L, Bliss C, Stoltzfus AL. Predictive Validity of the Academy of Nutrition and Dietetics/American Society for Parental Nutrition Indicators to Diagnose Malnutrition and the Screening Tool for Risk on Nutritional Status and Growth among Hospitalized Children Relative to Medical Outcomes. *The Journal of Pediatrics*. 2025;276. doi:10.1016/j.jpeds.2024.114288
10. Fleherman VJ, Schaefer EW, Kuzniewicz MW, Li SX, Walsh EM, Paul IM. Early Weight Loss Nomograms for Exclusively Breastfed Newborns. Pediatrics. 2015;135(1):e16-e23. doi:10.1542/peds.2014-1532
11. Beard LA, Ceballos KC, Staton KL, et al. Reducing NICU Discharge Care-Related Failures by Improving Discharge Safety. *Pediatrics*. 2025;156(2):e2024066305. doi:10.1542/peds.2024-066305
12. Smith VC, Dukhovny D, Zupancic JAF, Gates HB, Pursley DM. Neonatal intensive care unit discharge preparedness: primary care implications. *Clin Pediatr (Phila)*. 2012;51(5):454-461. doi:10.1177/0009922811433096
13. Amsalu R, Ohman SP, Blair RJ, Medvedev MM, Rogers EE, Jelliffe-Pawlowski L. Incidence, Risk Factors, and Reasons for 30-Day Hospital Readmission Among Healthy Late Preterm Infants. *Hosp Pediatr*. 2022;12(7):639-649. doi:10.1542/hpeds.2021-006215
14. Luu TM, Lefebvre F, Riley P, Infante-Rivard C. Continuing utilisation of specialised health services in extremely preterm infants. Published online September 1, 2010. doi:10.1136/adc.2009.173138
15. Kuzniewicz MW, Parker SJ, Schmaltz-Mahl A, Escobar GJ. Hospital Readmissions and Emergency Department Visits in Moderate Preterm, Late Preterm, and Early Term Infants. *Clinics in Perinatology*. 2013;40(4):757-775. doi:10.1016/j.clp.2013.07.008
16. Bathgate J, Barnes D, Fry J, DeRegnier RA, Machut K. Telemedicine Follow-Up Appointments After NICU Discharge May Facilitate Easier Transition to Home. *Advances in Neonatal Care*. 2025;25(3):249-
doi:10.1097/ANC.0000000000001264
17. Feehan K, Kehinde F, Sachs K, et al. Development of a Multidisciplinary Medical Home Program for NICU Graduates. *Matern Child Health J*. 2020;24(1):11-21. doi:10.1007/s10995-019-02818-0
18. Glick AF, Farkas JS, Magro J, et al. Management of Discharge Instructions for Children With Medical Complexity: A Systematic Review. *Pediatrics*. 2023;152(5):e2023061572. doi:10.1542/peds.2023-061572

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Bibliography

19. Bala F, Alshaikh E, Jadcherla SR. Factors Associated with Mother's Own Milk Feeding and Direct Breastfeeding at Discharge in Preterm Infants with Feeding Difficulties: Clinical and Research Implications. *Breastfeed Med*. 2024;19(11):827-836. doi:10.1089/bfm.2024.0231.
20. Clarke SE, Evans S, MacDonald A, Davies P, Booth IW. Randomized comparison of a nutrient-dense formula with an energy-supplemented formula for infants with faltering growth. *Journal of Human Nutrition and Dietetics*. 2007;20(4):329-339. doi:10.1111/j.1365-277X.2007.00805.x
21. Evans S, Twaissi H, Daly A, Davies P, MacDonald A. Should high-energy infant formula be given at full strength from its first day of usage? *Journal of Human Nutrition and Dietetics*. 2006;19(3):191-197. doi:10.1111/j.1365-277X.2006.00689.x
22. Goday PS, Lewis JD, Sang Jr CJ, et al. Energy- and protein-enriched formula improves weight gain in infants with malnutrition due to cardiac and noncardiac etiologies. *Journal of Parenteral and Enteral Nutrition*. 2022;46(6):1270-1282. doi:10.1002/jpen.2308
23. Waandenburg DA van, Betue CT de, Goudsbeer JB van, Zimmermann LJ, Joosten KF. Critically ill infants benefit from early administration of protein and energy-enriched formula: A randomized controlled trial. *Clinical Nutrition*. 2009;28(3):249-255. doi:10.1016/j.clnu.2009.03.005
24. de Betue CT, van Waardenburg DA, Deutz NE, et al. Increased protein-energy intake promotes anabolism in critically ill infants with viral bronchiolitis: a double-blind randomised controlled trial. *Arch Dis Child*. 2011;96(9):817-822. doi:10.1136/adc.2010.189837
25. Eveleens RD, Dungen DK, Verbruggen SC a. T, Hulst JM, Joosten KFM. Weight improvement with the use of protein and energy enriched nutritional formula in infants with a prolonged PICU stay. *Journal of Human Nutrition and Dietetics*. 2019;32(1):3-10. doi:10.1111/jhn.12603
26. Cui Y, Li L, Hu C, et al. Effects and Tolerance of Protein and Energy-Enriched Formula in Infants Following Congenital Heart Surgery: A Randomized Controlled Trial. *Journal of Parenteral and Enteral Nutrition*. 2018;42(1):196-204. doi:10.1002/jpen.1031
27. Schaeffer VA, Ricachinevsky CP, Freitas AT, et al. Tolerability and Effects of the Use of Energy-Enriched Infant Formula After Congenital Heart Surgery: A Randomized Controlled Trial. *Journal of Parenteral and Enteral Nutrition*. 2020;44(2):348-354. doi:10.1002/jpen.1532
28. Bessell A, Hooper L, Shaw WC, Reilly S, Reid J, Glenny AM. Feeding interventions for growth and development in infants with cleft lip, cleft palate or cleft lip and palate - Bessell, A - 2011 | Cochrane Library. Accessed September 8, 2025. https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003315.pub3/full
29. Lindberg NE, Kynd NM, Feragen KB, Pripp AH, Tarnseth KA. Parental Stress, Infant Feeding and Well-being in Families Affected by Cleft Lip and/or Cleft Palate: The Impact of Early Follow-up. *The Cleft Palate Craniofacial Journal*. 2025;62(5):882-893. doi:10.1177/10556656241231524
30. Prozelski K, Villarreal Acha D, Ngo TVC, et al. A Dedicated Multidisciplinary Growth and Feeding Clinic for Infants with Cleft Lip and/or Palate Demonstrates Need for Intervention. *Cleft Palate Craniofac J*. 2025;62(8):1410-1417. doi:10.1177/10556656241268497
31. Kaplan HC, et al. Pediatrics. 2020 Oct;146(4):e20190914. doi: 10.1542/peds.2019-0914.
32. McGlothen-Bell K, et al. Adv Neonatal Care. 2023 Jun 1;23(3):237-245. doi: 10.1097/ANC.0000000000001056.
33. Nagy S, et al. J Perinat Neonatal Nurs. 2023 Apr 27. doi: 10.1097/JPN.0000000000000741.
34. Pandey R, et al. J Perinatol. 2021 Mar;41(3):598-605. doi: 10.1038/s41372-020-00797-7.
35. Gallegos JA. Am J Perinatol. 2024 Oct 10. doi: 10.1055/a-2418-9886.
36. Rogen DL, et al. Hosp Pediatr. 2018 Jan;8(1):7-14. doi: 10.1542/hpeds.2017-0114.

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