

The Use of Exempt Infant Formula in WIC Client Care



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Learning Objectives

- Explain the appropriate uses of cow milk-based, protein hydrolysate, free amino acid, preterm, and preterm discharge formulas
- Describe the efficacy of pre- and probiotics in infant formula
- Define at least 2 types of modular products



Infant Formula Indications

- As a substitute (or supplement) for human milk when infant's mother chooses not to breastfeed (or not exclusively)
- As a substitute for human milk in infants for whom breastfeeding or human milk is contraindicated
- As a supplement for breastfed infants who are not gaining weight adequately



Formula Composition

- Must meet requirements of Infant Formula Act of 1980 (revised in 1986)
 - Protein, fat
 - Vitamins, minerals, trace elements
- Designed to “mimic” human milk
 - Pre- and probiotics
 - Oligosaccharides
 - Lactobacillus and Bifidobacterium bifidum
 - GRAS



Infant Formula Categories

- Cow Milk-based
- Protein Hydrolysate
- Free Amino Acid (Elemental)
- Preterm (Preemie)
- Preterm Discharge or Transitional



Cow Milk-Based/Standard

- Standard cow milk-based formula is the feeding of choice for term infants when breastfeeding is not initiated or is discontinued
- Primary Carbohydrate (CHO) = Lactose
- Typical Caloric Distribution
 - CHO: 43-45%
 - Protein: 8-9% (Casein and whey)
 - Fat: 46-49%



Cow Milk-Based/Specialty

- Modified cow milk-based formulas indicated for infants who have specific nutritional needs
 - Enfamil AR LIPIL
 - Similac PM 60/40
 - Enfaport Lipil
 - Monogen



Infant with frequent spit up

- A 2 month-old with frequent spit up and poor weight gain is seen at his WIC appointment. Dad states that his niece had similar symptoms and was recently started on Enfamil AR with good improvement. He is wondering if this would be a good formula for his child. How would you proceed?



Enfamil A.R.

- AR = Added Rice starch
 - Replaces portion of lactose
 - Thickens the formula
 - Maintains nutrient composition
- Physician should medically evaluate patient first in order to determine diagnosis
- Contains GOS and polydextrose
- Not for premature infants or to be mixed > 24 calories per ounce



What is a Prebiotic?

- Nondigestible food ingredients that promote the growth of “good” bacteria
- Examples:
 - Fructooligosaccharides (FOS)
 - Galactooligosaccharides (GOS)
 - Polydextrose



Criteria for Prebiotic

- Nondigestible by the upper GI tract
- Used by beneficial microflora in the colon
- Alters the microflora in the colon to a healthier composition
- Induces beneficial effects



Infant with Chronic Kidney Dz

- A 3-month old infant arrives as his WIC appointment with his mother. She is concerned that he is not gaining weight and after plotting his growth on the WHO charts you notice he has dropped from the 25th to the 10th %ile weight-for-age. He is currently on 27 kcal/oz Similac PM 60/40. What next steps could you discuss?



Similac PM 60/40

- Protein modification: 60% whey & 40% casein
- Indicated for infants whose condition requires lower amounts of certain electrolytes & minerals
 - Chronic Kidney Disease (CKD)
 - Serum calcium disorders
- Decreased amounts of calcium, phosphorus, potassium and iron
- Most infants will require iron supplementation on this formula



Increasing Caloric Density

- Indications:

- Rapidly growing preterm infants
- Suboptimal growth or FTT
- Increased metabolic needs (i.e. lung disease or congenital heart disease)
- Inability to consume adequate volume of 20 or 22 kcal/oz formula (or breast milk) to support growth
- Fluid restriction



Increasing Caloric Density

- Concentrating breast milk or formula to 24 or 27 kcal/oz using only powder or liquid concentrate is usually well tolerated among infants
- Infants with mature renal function may tolerate concentration up to 30 kcal/oz
- If protein, vitamin and mineral needs are met with feeding volume but growth is inadequate, use (non-protein) modulators



Modulars

- Powder or liquid suspensions that may be mixed with formula (or food) to increase the total caloric or protein content
 - CHO only
 - CHO and fat
 - Fat only
 - Protein only



CHO Modular

- Polycose
 - Glucose polymers
 - Available only in powder
 - 1 tsp powder = 8 calories
 - Dissolves well when added directly to formulas

Fat Modulars

- Vegetable Oils
 - Corn
 - Safflower
 - Canola
- 1 Tbsp (15 mL) = 120 calories
- 1 mL = 8 calories





Fat Modulars

- Microlipid
 - Fat emulsion (safflower oil)
 - Mixes well with formulas
 - 1 Tbsp (15mL) = 68 calories



Infant with Chylothorax

- A 6-month old recently had cardiac surgery and developed a post-op chylothorax. She was sent home on 24 kcal/oz Enfaport LIPIL and was told by cardiologist to continue this for 6 weeks. Mom has specific questions about the fat in the formula. She is also wondering if she can start infant solids. What advice can you give her?



High Medium Chain Triglyceride

- Indicated for defective lymphatic transport of fat as seen with chylothorax
- Used among post-op infants with Congenital Heart Disease (CHD)
- Enfaport
 - 84% of fat as MCT
 - RTF
- Monogen
 - 90% of fat as MCT
 - Powder only



Infant with milk protein allergy

- CS was breastfed for 1 month when she developed bloody stools. She stopped breastfeeding and switched him to soy formula a couple of days ago. She is wondering if she should continue with the soy formula or what would be best for CS?



Protein Hydrolysate

- Protein hydrolysis splits whole protein compounds into simpler units (oligopeptides, peptides, amino acids)
- Partially hydrolyzed
- Extensively hydrolyzed
- Casein or whey predominant



Casein Hydrolysate Formulas

- Extensively hydrolyzed
- Hypoallergenic
- More easily digested and absorbed
- Recommended for infants with cow milk protein/soy protein allergy
- Alimentum and Pregestimil may be used for infants with fat malabsorption



Casein Hydrolysates Compared

	Nutramigen with Enflora LGG	Alimentum	Pregestimil LIPIL
CHO (41% kcal)	Corn syrup solids, modified corn starch	Sucrose, corn maltodextrin or tapioca starch	Corn syrup solids, modified corn starch
Protein (11% kcal)	Casein hydrolysate, AA	Casein Hydrolysate, AA	Casein Hydrolysate, AA
Fat (48% kcal)	No MCT	33% MCT	55% MCT
Uses	Milk/soy allergy	Milk/soy allergy Fat malabsorption	Milk/soy allergy Fat malabsorption



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What is a Probiotic?

- Living microorganisms that when administered in adequate amounts exert a health benefit on the host (FAO, 2002)
- Examples:
 - *Bifidobacterium lactis*
 - *Lactobacillus rhamnosus* GG



Criteria for Probiotics

- Purified strain of microbe
- Identified to the strain level using biochemical and genetic techniques
- Show in human studies to improve some aspect of human health
- Safe for target consumers



Evidence for Probiotics

- Lactobacillus GG
 - Reduce duration of diarrheal phase of rotaviral infections by 1-3 days
 - If probiotic is administered within 60 hours of diarrhea onset can reduce LOS by 48%
 - May reduce risk of cow's milk allergy
 - May allow for faster transition to cow's milk protein tolerance



Infant with milk protein allergy

- CS has since seen a pediatric gastroenterologist and continued with poor growth on Nutramigen with Enflora LGG. What would the next step for choice in formula be?



Free Amino Acid (Elemental)

- Contain 100% free Amino Acids
- Indicated for infants and children that are intolerant or allergic to all other protein sources
- May also be used in those with severe malabsorption or short bowel syndrome (SBS)



Elemental Formulas Compared

	Neocate Infant DHA ARA	Elecare for Infants	PurAmino
CHO	Corn syrup solids	Corn syrup solids	Corn syrup solids, modified tapioca starch
Protein (100% AA)	12% of kcal	15% of kcal	11% of kcal
Fat	33% MCT	33% MCT	No MCT DHA & ARA
Other	Available with or w/o DHA & ARA		Formerly Nutramigen AA Lipil



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Term Infant with FTT

A 4-month old weighing 5kg is seen in for an appointment. He was recently at the pediatrician who was extremely concerned about poor weight gain. Dad brings a script with him for 24 kcal/oz Enfamil Premature. What concerns and suggestions would you discuss with the pediatrician?



Preterm Formulas

- Preterm: born < 37 weeks gestation
- Indicated for infants born < 34-35 weeks or BW < 2 kg if breast milk is not available
- Continue until weight of ~ 2.5 kg or near discharge from hospital
 - May be continued longer for patients with complex medical conditions and increased nutrient needs



Preterm Formulas

- Available in 20 kcal/oz, 24 kcal/oz (+ high protein) and 30 kcal/oz RTF
- Modified CHO and fat sources for easier digestion and absorption
 - Decreased lactose
 - 40-50% of fat as MCT



Preterm Formulas

- Contain higher amounts of:
 - Micronutrients
 - Calcium
 - Phosphorus
 - Vitamins A & D
 - Macronutrients
 - Calories
 - Protein (12% of calories)



Preterm Discharge Formulas

- Indicated for :
 - Preterm infants BW > 2 kg when breast milk is unavailable
 - As a transition from preterm formula in preparation for discharge home
 - As a supplement to breast milk in preterm infants with suboptimal growth
- Continue until at least postnatal age of 9 months



Preterm Discharge Formulas

- Enfamil Enfacare LIPIL
- Similac Neosure
- Good Start Nourish
- Standard caloric density = 22 kcal/oz
- Typical caloric distribution
 - 40-41% CHO
 - 11% Protein
 - 48-49% Fat (20-25% of fat from MCT)



Preterm Discharge Formulas

- Increased amounts of vitamins and minerals compared to standard infant formulas
 - Calcium
 - Phosphorus
 - Vitamin D
- Higher Ca:phos ratio



Product Info Resources

Manufacturer	Product Line	Website
Abbott	Similac	www.abbottnutrition.com
Mead Johnson	Enfamil	www.mjn.com/professional
Nestle	Gerber Good Start	www.medical.gerber.com
Nutricia	Neocate	www.nutricia-na.com
PBM Nutritionals	Bright Beginnings, Parent's Choice	www.pbmproducts.com



Questions?
