Introductions

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 am – 8:45 am</td>
<td>Welcome and Introductions</td>
<td>Kaylee Hall</td>
</tr>
<tr>
<td>8:45 am – 9:30 am</td>
<td>Formulary Update</td>
<td>Kevin Sarb, RD, MS, MBA</td>
</tr>
<tr>
<td>9:30 am – 10:30 am</td>
<td>Soy Formula/Soy Beverages - Products and Indications</td>
<td>Heidi Edwards</td>
</tr>
<tr>
<td>10:45 am – 11:45 am</td>
<td>Feeding Behaviors - Simple Fix or Complex Feeding Issue?</td>
<td>Denise Doorlag</td>
</tr>
<tr>
<td>11:45 am – 12:45 pm</td>
<td>WHO vs. CDC Growth Charts</td>
<td>Jan Cox</td>
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</tbody>
</table>

Formula Update

Kevin Sarb, RD, MS, MBA
State Agency Consultant
WIC Division, Michigan Department of Community Health

- Good Start Nourish
- Retinol 41 Liquid - Vanilla
- Neocate Junior with Prebiotics
  - Vanilla
  - Peptamen 1.5 - Vanilla
- Peptamen 1.5 With Fiber - Vanilla
- Peptamen Peptide 1.5 - Vanilla
- Peptamen Junior with PreBio
  - Vanilla
  - Chocolate

Formulas reviewed and authorized effective November 1, 2012

For technical questions during the webinar:

Contact MPHI
517-324-8330

Please submit questions using the ASK bubble, at any point during the presentation.

Waiting for presentation to begin
Neocate Junior with Prebiotics

- Neocate Junior – Continues to be authorized
  - Unflavored
  - Chocolate
  - Tropical
- Neocate Junior with Prebiotics – Authorized 11/1/12
  - Unflavored
  - Vanilla

By authorizing Neocate Junior with Prebiotics, can provide benefits of prebiotics and additional flavor (vanilla).

Peptamen Junior with Prebio

- Peptamen Junior – Continues to be authorized
  - Unflavored
  - Vanilla
  - Strawberry
  - Chocolate – to be discontinued by manufacturer
- Peptamen Junior Fiber - Continues to be authorized
  - Vanilla
  - Chocolate

By authorizing Peptamen Junior with Prebio, can provide benefits of additional (lower) level of prebiotics and additional flavor (vanilla).

Formulas to be removed from authorized list November 1, 2012

- Portagen
- Vivonex Pediatric

Rationale
- Isolated usage over the past year
- Formulas not authorized by MI-WIC generally are authorized through Medicaid/Children’s Special Health Care Services

Policy Update

7.03 Food Package for Qualifying Conditions

- Good Start Nourish added to the list of premature and low birth weight infant post-discharge formulas (Similac NeoSure and Enfamil Enfrenac). Appropriate for infants who have reached four (4) pounds, until catch up growth is complete, or until 9 months to 1 year adjusted age.

Policy Update

7.03 Approval Process and Assurances for Local Agency with MDOC WIC Division Authorization To Approve Class III Formula

- Exhibit E has been discontinued
- Local Agencies (LAs) will verify credentials for Registered Dietitian (RD)
- Class III formula packages still must be approved by RD
- MI-WIC role designation at discretion of WIC Coordinator
- LAs continue to assure that RD credentials are maintained
- State will review credentials during Management Evaluations (MEs)

Policy Reminder

7.03 Food Package for Qualifying Conditions

16. Approval of Class I and II Formulas:
   a. The CPA shall evaluate the medical documentation for a Class I formula for a child or a Class II formula for an infant or child and approve or deny in MI-WIC.

17. Approval of Class III formulas:
   a. An authorized local agency Registered Dietitian (RD) shall evaluate the medical documentation for Class III or WIC-eligible medical foods for an infant, child, or woman and either approve or deny.

Pediatric Daily Calorie Needs

Energy needs are dependent on growth rate, body size, and physical activity. The average daily energy requirement* for:
- Toddlers is 900 – 1400 kcal/day
- Preschoolers is 1300 – 1600 kcal/day

A quick calculation would be to multiply child’s weight in kilograms by 5 to determine the daily calories needs. One kilogram equals 2.2 lbs. A child weighing 22 lbs (10 kg), needs approximately 950 calories daily.

http://www.livestrong.com/article/320333-how-to-calculate-pediatric-caloric-needs/#ixzz296dLE2a6

Daily Food Package for C1-C4

<table>
<thead>
<tr>
<th>Food</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juice, single strength</td>
<td>63</td>
</tr>
<tr>
<td>Milk</td>
<td>253</td>
</tr>
<tr>
<td>Cheese</td>
<td>57</td>
</tr>
<tr>
<td>Breakfast cereal</td>
<td>134</td>
</tr>
<tr>
<td>Eggs</td>
<td>29</td>
</tr>
<tr>
<td>Fresh fruits and vegetables</td>
<td>25-60</td>
</tr>
<tr>
<td>Whole grains</td>
<td>107</td>
</tr>
<tr>
<td>Peanut butter</td>
<td>100</td>
</tr>
<tr>
<td>Food Package</td>
<td>767-802</td>
</tr>
<tr>
<td>Pediasure (Maxium)</td>
<td>864</td>
</tr>
<tr>
<td>Food Package plus Pediasure</td>
<td>1631-1666</td>
</tr>
</tbody>
</table>

*Calories estimated using CalorieKing.com

Annual Class II and III Formula Cost Leaders

- Nutramigen Enflora LGG
- Pediasure (w/ and w/o fiber)
- Similac Neosure
- Similac Alimentum
Controlling Formulary Costs

- Current regulations – to receive whole milk, client must be on a special formula – requirement may be omitted in Final Food Package rule.
- Is the maximum always necessary (3.6 bottles per day for Pediasure)? Would it or 3X daily be appropriate?
- Do growth charts indicate a need?
- What is diagnosis, root cause analysis, etc?
- Is issued formula being fully redeemed?
- Is child consuming? How much?

Retail vs. Institutional Formulas

- Retail Products
  - Are generally found on the shelf at the retail center
  - Easier to find at the big box retailers
  - Usually will scan at register with other WIC foods.
- Institutional Products
  - Need to purchase at the Pharmacy
  - Most often need to be ordered, usually not stocked
  - Require 2-7 days lead time; urge clients to procure one week prior to benefit end date.

Retail vs Institutional Formula Example

- Boost Kid Essentials (8.25 oz) – Retail (Authorized)
  - Usually found on the shelf
  - Available in a 4 pack or case of 4 (4 packs)
  - All four packs in case should equal 10 (formula maximum is 10)
- Boost Kid Essentials (8 oz) – Institutional (Not Authorized)
  - 17 8 oz drink boxes per case
- Boost Kid Essentials 1.5 (8 oz) – Institutional (Authorized)
  - Needs to be ordered through pharmacy if not in stock
  - Available in individual cases if pharmacy will break or in full case of 17 drink boxes
  - Four cases of 17 would equal 68 (formula maximum is 70)

Soy Formula Products and Indications

Heidi Edwards, RD
October 30, 2012

Objectives

- Soy formula
  - Have been available for almost 100 years
  - Meets AAP guidelines for feeding term infants and US Food and Drug Administration
  - From WIC: Enfamil ProSobee
  - Phytoestrogens, including one group called isoflavones. Concern over their potential negative effects on sexual development and reproduction, neurobehavioral development, immune function, and thyroid function.

- Current research on soy formula
  - American Academy of Pediatrics
  - National Toxicology Program Center for the Evaluation of Risks to Human Reproduction (NTP-CERHR) expert panel
  - Published papers

- AAP Report
  - "There is no conclusive evidence from animal, adult human, or infant populations that dietary soy isoflavones may adversely affect human development, reproduction, or endocrine function."
  - Appropriate for infants with galactosemia or primary lactase deficiency. Or when a vegetarian diet is preferred.
  - Controlled trials of cow milk and soy protein-based formulas have demonstrated a significant benefit from soy for colic.

Please submit Questions?
Red Flags

- Not recommended for preterm infants due to increased risk of osteopenia
- Not recommended for sucrase-isomaltase deficiency and in hereditary fructose intolerance if sucrose is carbohydrate source
- Congenital hypothyroidism: close monitoring and possible need for increased dose of levothyroxine: refer to MD
- Mothers with hypothyroidism: may need additional doses of thyroid hormone: refer to MD

**Red Flags**

- Infantile food protein-induced enterocolitis caused by cow milk protein, 30-64% of infants also had soy-induced enterocolitis.
- AAP concludes soy protein-based formulae are not indicated in the management of. Formula from hydrolyzed protein or synthetic amino acids should be used.
- For infants with cow milk protein allergy, extensively hydrolyzed protein formula should be considered
- 10-14% of infants will also have a soy protein allergy
- No proven value in the prevention of atopic disease in healthy or high-risk infants

**NTP-CERHR Report**

- Lack of clarity on whether studies in experimental animals treated with genistein only can be extrapolated to infants fed soy infant formula
- Interpretation of findings from experimental animals as demonstrating adverse effects
- Limited number of studies where experimental animals were treated only during the relevant life stage of birth to weaning
- A number of studies in experimental animals and one study in humans reported effects related to the reproductive system and this elevates the concern from "negligible" to "minimal"
- Lack of sufficient quality studies in humans

**Medical documentation**

Children who need to have soy beverage substituted for milk due to a milk allergy, severe lactose maldigestion, vegetarian/vegan diet, or other qualifying medical condition.

**How and when to transition from soy formula to soy beverage**

- Can begin transition around 12 months of age
- Doing so earlier can prevent infant from receiving necessary nutrients from infant formula
- Give soy beverage in sippy cup
- Mix soy beverage with infant formula (half and half)

**Soy Beverages and WIC**

<table>
<thead>
<tr>
<th>Brand/Soy Beverage</th>
<th>Calories</th>
<th>Protein (gm)</th>
<th>Calcium (mg)</th>
<th>Phosphorus (mg)</th>
<th>Vitamin D (IU)</th>
<th>Iron (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th Continent High Protein</td>
<td>80</td>
<td>8</td>
<td>340</td>
<td>125</td>
<td>100</td>
<td>1.08</td>
</tr>
<tr>
<td>8th Continent Vanilla</td>
<td>100</td>
<td>8</td>
<td>340</td>
<td>125</td>
<td>100</td>
<td>1.44</td>
</tr>
<tr>
<td>Pacific Natural Ultra Soy Plain</td>
<td>140</td>
<td>8</td>
<td>300</td>
<td>250</td>
<td>100</td>
<td>1.8</td>
</tr>
<tr>
<td>Pacific Natural Ultra Soy Vanilla</td>
<td>140</td>
<td>8</td>
<td>300</td>
<td>250</td>
<td>100</td>
<td>1.8</td>
</tr>
<tr>
<td>Whole cow's milk</td>
<td>149</td>
<td>8.1</td>
<td>276</td>
<td>205</td>
<td>124</td>
<td>0.07</td>
</tr>
<tr>
<td>2% cow's milk</td>
<td>122</td>
<td>8.1</td>
<td>285</td>
<td>224</td>
<td>120</td>
<td>0.05</td>
</tr>
</tbody>
</table>

**Milk Allergy**

- Immunologically mediated reaction
- Can involve gastro-intestinal tract, skin, respiratory tract, or multiple systems
- Prevalence is 1 to 5%

**Milk Intolerance**

- Nonimmunologic reaction
- Disorders of digestion, absorption, or metabolism of certain cow's milk components
- Lactose intolerance (also known as lactase deficiency) has symptoms linked to the gastro-intestinal tract

**Calories Protein**

- 8th Continent High Protein: 80 g, 8 g
- 8th Continent Vanilla: 100 g, 8 g
- Pacific Natural Ultra Soy Plain: 140 g, 8 g
- Pacific Natural Ultra Soy Vanilla: 140 g, 8 g
- Whole cow's milk: 149 g, 8.1 g
- 2% cow's milk: 122 g, 8.1 g

- Children who need to have soy beverage substituted for milk due to a milk allergy, severe lactose maldigestion, vegetarian/vegan diet, or other qualifying medical condition.

- Can begin transition around 12 months of age
- Doing so earlier can prevent infant from receiving necessary nutrients from infant formula
- Give soy beverage in sippy cup
- Mix soy beverage with infant formula (half and half)
How to counsel on soy formulas and beverages

- Enfamil ProSobee vs. Enfamil Gentlease
- Enfamil ProSobee should only be indicated for milk allergy, Galactosemia, lactase deficiency, or vegetarian diet
- If client (infant or mother) has thyroid problems, refer them to primary care physician or call yourself to discuss use of soy formula/beverage
- Enfamil Gentlease is an appropriate alternative if client complains infant is fussy, has stomach ache, or is gassy
- Soy constipating
- Fussiness: Proper burping, ensured oral intake (changing diaper, proper positions, etc.)

Please Submit Questions?

Objectives

- Good Start Nourish
- Pediasure 1.5
- Vanilla
- With Fiber
- Pediasure Peptide 1.5
- Ketocal 4:1 Liquid – Vanilla
- Nascare, Jr. with Prebiotics
- Unflavored
- Vanilla
- Peptamen, Jr. with Prebio

Products Added to Formulary

- Enfamil Premium Newborn
- Nutramigen AA
- Pediasure Sidekicks (0.63 Cal/mL)
- Pediasure Sidekicks Clear
- Goodstart Premature 14 Cal
- Goodstart Premature 14 Cal High Protein
- Renastart

Products Not Added to Formulary

- Gerber Good Start Nourish

- For babies 0-12 months
- Formula intended for premature infants following hospital discharge
- Higher protein-energy ratio than standard formulas
- Higher vitamin and mineral content than standard formulas
- Partially hydrolyzed whey protein

Gerber Good Start Nourish

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Ingredient composition comparison

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Good Start Nourish</th>
<th>EnfaCare®</th>
<th>Nourish®</th>
<th>NeoSure®</th>
<th>EnfaCare®</th>
<th>Nourish®</th>
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</thead>
<tbody>
<tr>
<td>Protein</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
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<tr>
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<td>45.0</td>
<td>45.0</td>
<td>45.0</td>
<td>45.0</td>
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<tr>
<td>Phosphorus</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Nutrient Content Comparison

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Good Start Nourish</th>
<th>EnfaCare®</th>
<th>Nourish®</th>
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<tbody>
<tr>
<td>Protein</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>CHO</td>
<td>45.0</td>
<td>45.0</td>
<td>45.0</td>
<td>45.0</td>
</tr>
<tr>
<td>Fat</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Calcium</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>
Are there advantages to using partially hydrolyzed whey?

- Health claim for reduced risk of atopic disease:
  - "Very little evidence" terminology
- Should not be fed to infants who have known allergy to milk or infants with existing milk allergy symptoms
- Nourish does not meet the FDA Qualified Health Claim—studies not done in preterm infants
- Smaller molecular weight

Molecular Weight of Predominant Proteins (in Daltons)

- Human casein – 24,000
- Bovine casein – 23,000*
- Human whey – 18,440*
- Extensively hydrolyzed casein – <2,000
- Partially hydrolyzed whey – <2,000
- Amino acid based formula – 120

Case example: Nourish®

Infant history:
- 28 weeks’ gestational age at birth
- 1.2 kg birth weight

Feeding history:
- TPN day 1 - 21
- Breast milk day 1 - 56
- Human milk fortifier day 14 – 56
- Preterm discharge formula day 56 - 63

Why do premies have problems with formula tolerance?

- Small stomach size
- High nutrient needs
- Slow gastric emptying/immature motility
- Gastro-esophageal reflux and position of gastro-esophageal sphincter
- Often discharged at 35 – 36 weeks’ gestational age
- Difficult for moms to maintain breast milk supply throughout hospitalization

Case example: Nourish®

Alternatives:
- Extensively hydrolyzed formula
  - Inadequate vitamin and mineral content
  - Expensive
- Amino acid based formula
  - Inadequate vitamin and mineral content
  - Very expensive
- Standard partially hydrolyzed formula
  - Inadequate protein content
  - Inadequate vitamin and mineral content
  - Preterm discharge partially hydrolyzed formula

Pediasure 1.5 Vanilla
Pediasure 1.5 with Fiber

- Provides 50% more calories
- Provides 100% more protein
- 100% DRIs for protein and 75 nutrients
- < 8 yr - 1000 mL (1500 kcal) (nl 1100-2350 kcal)
- 9-13 yr - 1500 mL (3000 Kcal) (nl 1600-2800 kcal)
- Provides DHA Omega-3
- 1.4 g Cellulose gel, oat and soy fibers
- 1.6 g fructo-oligosaccharides

Ingredient composition comparison

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Pediasure 1.5</th>
<th>Pediasure 1.5 with Fiber</th>
<th>Carnation Instant Breakfast®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>12 g</td>
<td>10 g</td>
<td>12 g</td>
</tr>
<tr>
<td>Fat</td>
<td>17 g</td>
<td>8.6 g</td>
<td>10 g</td>
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<tr>
<td>Sucrose</td>
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<tr>
<td>Fructose</td>
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<td>35 g</td>
<td>35 g</td>
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<tr>
<td>Lactose</td>
<td>12 g</td>
<td>12 g</td>
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<tr>
<td>Fiber</td>
<td>1 g</td>
<td>1 g</td>
<td>12 g</td>
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<tr>
<td>DHA</td>
<td>12 mg</td>
<td>12 mg</td>
<td>0 mg</td>
</tr>
<tr>
<td>ARA</td>
<td>12 mg</td>
<td>12 mg</td>
<td>0 mg</td>
</tr>
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</table>

Nutrient Content Comparison per serving

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Pediasure 1.5</th>
<th>Pediasure 1.5 with Fiber</th>
<th>Carnation Instant Breakfast®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>56 g</td>
<td>56 g</td>
<td>56 g</td>
</tr>
<tr>
<td>Protein</td>
<td>12 g</td>
<td>10 g</td>
<td>12 g</td>
</tr>
<tr>
<td>Fat</td>
<td>17 g</td>
<td>8.6 g</td>
<td>10 g</td>
</tr>
<tr>
<td>Sucrose</td>
<td>36 g</td>
<td>39 g</td>
<td>33 g</td>
</tr>
<tr>
<td>Fructose</td>
<td>35 g</td>
<td>35 g</td>
<td>35 g</td>
</tr>
<tr>
<td>Lactose</td>
<td>12 g</td>
<td>12 g</td>
<td>10 g</td>
</tr>
<tr>
<td>Fiber</td>
<td>1 g</td>
<td>1 g</td>
<td>12 g</td>
</tr>
<tr>
<td>DHA</td>
<td>12 mg</td>
<td>12 mg</td>
<td>0 mg</td>
</tr>
<tr>
<td>ARA</td>
<td>12 mg</td>
<td>12 mg</td>
<td>0 mg</td>
</tr>
</tbody>
</table>
Pediasure Peptide 1.5
- Protein:
  - 70% whey protein hydrolysate
  - 30% hydrolyzed casein
- Fat:
  - 50% MCT/50% LCT
  - No DHA/ARA
- Carbohydrate:
  - 77% maltodextrin
  - 20% sucrose
  - 2.9% fructo-oligosaccharides (prebiotic/fiber)

Ketocal 4:1 Liquid - Vanilla
- 4:1 fat:carbohydrate:protein energy
- Dietary fiber
- No trans-fats
- Aspartame-free (may trigger seizures in some individuals) (contains sucralose)
- No DHA/ARA
- No need for gram scale
- In addition to the Ketocal 4:1 powder
- Ketocal 1:3 offers no benefit over using the 4:1 powder with added protein or carbohydrate from the diet

Products Not Added to Formulary
- Enfamil Premium Newborn
- Nutramigen AA
- Pediasure Sidekicks (0.63 Cal/mL)
- Pediasure Sidekicks Clear
- Goodstart Premature 24 Cal
- Goodstart Premature 24 Cal High Protein
- Renastart

Enfamil Newborn
How does this formula compare?
- 400 IU of Vitamin D
  - In 27 oz. vs. 33 oz. standard formula
  - At 4.7 kg vs. 5.7 kg
  - At 4 months vs. 5½ months of age
- 80:20 whey:casein ratio
  - Bovine milk whey ≠ human milk whey
  - 80:20 ratio is present first 3-5 days not months
  - Standard formula is 60:40 ratio

Enfamil Newborn
Why is this formula not added to formulary?
- Minimal added value.

Gerber Goodstart Premature 24
Goodstart Premature 24 High Protein
How do these formulas compare to other premature infant formulas?
- Similar nutrient content
- Standard
- High protein
- Similar ingredient composition with one distinction: protein = 100% whey, partially hydrolysed

Ingredient Composition Comparison

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Similac Special Care®</th>
<th>Enfamil Premature®</th>
<th>Gerber Goodstart Premature®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>60% whey, 40% casein</td>
<td>40% whey, 60% casein</td>
<td>100% whey, partially hydrolysed</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>50% lactose, 50% corn syrup</td>
<td>60% corn syrup, 40% corn syrup</td>
<td>50% lactose, 50% corn maltodextrin</td>
</tr>
<tr>
<td>Fat</td>
<td>48% LCT, 0.6% DHA/ARA</td>
<td>40% MCT, 1% DHA/ARA</td>
<td>58% LCT, 0.6% DHA/ARA</td>
</tr>
</tbody>
</table>

Nutrient Content Comparison per 100 kcal

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Similac Special Care® (HP)</th>
<th>Enfamil Premature® (HP)</th>
<th>Gerber Goodstart Premature® (HP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>3.0 (3.3)</td>
<td>3.0 (3.5)</td>
<td>3.0 (3.6)</td>
</tr>
<tr>
<td>CHO</td>
<td>10.3</td>
<td>11.0</td>
<td>10.5</td>
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<tr>
<td>Fat</td>
<td>5.4</td>
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<td>5.2</td>
</tr>
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<td>Calcium</td>
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<td>Phos</td>
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<tr>
<td>Vit D</td>
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<tr>
<td>Zinc</td>
<td>1.5</td>
<td>1.5</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Gerber Goodstart Premature 24
Goodstart Premature 24 High Protein
Why are these products not added to formulary?
- Very little use of other premature infant formulas after hospital discharge
- Premature infant formulas are not recommended after reaching 5½ to 8 pounds
- Note: Goodstart Nourish 22, premature infant discharge formula is added to formulary
Nutramigen AA

How does this formula compare?
- Protein source: amino acids
- Hypoallergenic
- Sole nutrition up to 6 months
- Major source of nutrition up to 24 months
- Includes DHA/ARA

Ingredient Composition Comparison

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Nutramigen AA</th>
<th>Elecare Infant®</th>
<th>Neocate Infant®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>100% amino acids</td>
<td>100% amino acids</td>
<td>100% amino acids</td>
</tr>
<tr>
<td>CHO</td>
<td>100% corn syrup solids</td>
<td>100% corn syrup solids</td>
<td>100% corn syrup solids</td>
</tr>
<tr>
<td>Fat</td>
<td>100% LCT</td>
<td>DHA/ARA 67% LCT</td>
<td>DHA/ARA 65% LCT</td>
</tr>
</tbody>
</table>

Nutrient Composition per 100 kcal

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Nutramigen AA</th>
<th>Elecare Infant®</th>
<th>Neocate Infant®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (g)</td>
<td>1.9</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Fat (kcal)</td>
<td>5.5</td>
<td>6.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Carbohydrate (kcal)</td>
<td>58</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Total kcal</td>
<td>58</td>
<td>58</td>
<td>58</td>
</tr>
</tbody>
</table>

Nutramigen AA

Why is this product not added to formulary?
- Less versatile
- No MCT
- Lower in mineral content
- Lower in some vitamin/trace minerals
- Same name as extensively hydrolyzed protein formula – risk for error using hydrolyzed product when amino acid product is needed

Pediasure Sidekicks

0.63 kcal/mL

- Same micronutrient content as standard Pediasure, but low energy content
- 100% DRIs for protein and 25 nutrients
- < 8 yr: 1000 mL (590 kcal) (12100-2590 kcal)
- 9-13 yr: 1500 mL (945 kcal) (1600-2800 kcal)
- Prebiotic fiber
- 12.7 g in 1000 mL
- 19 g in 1500 mL

Pediasure Sidekicks Clear

- 120 kcal and 6 g protein/200 mL (6.8 oz)
- 19 essential vitamins and minerals
- Low lactose
- No artificial colors, flavors, preservatives

Pediasure Sidekicks Clear

Why is this product not added to formulary?
- Resource Breeze higher in energy
- Resource Breeze comparable in other nutrients
- Resource Breeze 3 flavors
- Not a high enough use to warrant additional product

Nutrient Composition per 200 mL

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Pediasure Sidekicks Clear</th>
<th>Resource Clear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (g)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>54</td>
<td>72</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>120</td>
<td>198</td>
</tr>
</tbody>
</table>
Renastart

- Designed for use birth to 10 years
- Stage 4, 5 renal disease (≤ 15-30% eGFR)
- Protein: 1.5 g/dL (standard 1.4 g/dL)
- Contains ARA/DHA
- Phosphorus 18 mg/dL (standard 50 mg/dL)
- Potassium 23 mg/dL (standard 80 mg/dL)

Renastart

Why is this product not added to the formulary?
- Very specialized product
- Potentially harmful if follow-up is not specific
- Authorized through Medicaid/Children’s Special Health Care Services

Why increase nutrient intake?
- Inadequate nutrient intake related to:
  - Suck/swallow problem
  - Chewing problem
  - Oral aversion
  - Social environment problem
- Increased nutrient need related to:
  - Malabsorption
  - Increased energy expenditure

Inadequate nutrient intake

- Suck/swallow problem
- More nutrition in a smaller volume
- Thicker fluids
- Chewing problem
- More nutrition in a smaller volume
- Oral aversion
- Tube feeding
- Social/environmental problem
- More nutrition in a smaller volume is an attempt to treat the symptom rather than the problem

More nutrition in a smaller liquid volume

- Increase calorie density of infant formulas
- Add more powder to same volume of water
- Add less water to powder
- Increase calorie density of whole milk
- 1 TBSP instant breakfast = 65 kcal, 5 g protein
- 1 TBSP ice cream = 100 to 150 kcal
- 1 TBSP mashed or strained banana = 90 kcal
- 1 TBSP powdered milk = 90 kcal, 9 g protein
- 2 TBSP whipping cream = 164 kcal

Insure adequate fluid intake

- Infants:
  - 1½ - 2 oz. per pound of body weight
  - 8 lbs: 12 – 16 oz
  - 12 lbs: 18 – 24 oz
  - 18 lbs: 27 – 36 oz

- Toddlers:
  - 1¼ oz. per pound of body weight
  - 20 lbs: 27 – 36 oz
  - 35 – 39 lbs: 38 – 48 oz
  - 40 – 45 lbs: 47 – 56 oz

More nutrition in a smaller volume using food (kcal in 1 TBSP)

- Infant formula powder 49
- Powdered milk 18
- Cheese spread 55
- Cream cheese 57
- Whipping cream 53
- Avocado 53
- Mashed/strained banana 41
- Infant cereal 19 – 35
- Margarine 86
- Vegetable oil 120

Increased nutrient need: Increased expenditure vs. Malabsorption or multiple food allergy

- Protein
- Whole protein
- Hydrolyzed whey or casein
- Amino acids
- Carbohydrate
- Glucose polymer
- Fat
- MCT oil vs. LCT oil

Social Environment Problems

- Meal frequency/length
- Regular meal times/structure
- Distractions during meal times
- Social interaction during meal times
- Realistic expectations
- Parenting classes
- Social services referral
Client Education
- Teach Me 3®
  - What is my problem?
  - What do I need to do?
  - Why is it important?
- Reading level
- Use plain language
- Limit passive tense
- Choose words with fewer syllables
- Write sentences with fewer words
- Personalize
- Timely

Summary
- Breast feeding is preferred over formula.
- Food is preferred over supplements.
- When a supplement is needed:
  - 'More nutrition in less volume?'
  - 'Different nutrition?'
- Social/environmental issues require different solutions
- Education must be meaningful, individual, and timely

Feeding Behaviors
Quick Fix or Complex Feeding Issue
Denise Doorlag, OTR/L

Objectives

Feeding Success
Reliant upon:
- Developmental level and skills
- Experiences provided to use skills
- Environment: parents, mealtime structure

Behavior as Communication
- Children use behavior as their way to communicate.
- Misunderstanding of what the behaviors are indicating can affect a child's ability to progress with feeding.
- Usually begin when some aspect of feeding makes the child uncomfortable.

Behavior as Communication
Simple problems may become more complex depending on the response to the behaviors

Infant Feeding Behaviors
Our relationship with food begins at birth.

Infant Cues/Behaviors
Infants begin giving cues as soon as they are born. Cues are behaviors:
- Rooting
- Crying
- Hands to face
- Sucking
### Misunderstanding of Cues

If parents are unable to pick up on cues it can affect a baby’s feeding success:
- New and/or young parents
- Premature or sleepy baby
- Irritable baby
- Can lead to underfeeding or overfeeding

### Red Flag Behaviors

- Gurgling, coughing or choking when bottle feeding
- Crying and pulling away from bottle
- Breath holding when bottle feeding
- Does well at breast but has difficulty with bottle feeding

These behaviors can indicate a problem with coordination and/or swallowing.

### Simple Fix or Complicated Issue

**Simple Fix**
- Nipple flow rate
- External pacing
- Side-lying position
- Paced Feeding Method

**Complicated Issue**
- Not resolved by flow rate change or pacing
- Frequent respiratory illnesses
- Inadequate intake

### Red Flag Behaviors

- Feedings take a long time
- Not waking to eat
- Falling asleep after just a few minutes of feeding
- Difficulty getting milk out of the bottle

These behaviors can indicate a problem with strength and/or endurance.

### Simple Fix or Complicated Issue

**Simple Fix**
- Awareness of cues
- Nipple flow rate
- Increase calories
- Schedule frequency
- Limit feeding time
- Supplemental tube feeding

**Complicated Issue**
- Inadequate intake
- Failure to thrive
- Supplemental tube feedings

### Red Flag Behaviors

- Crying/ irritability during or after feeds
- Arching and extension during or after feeds
- Gagging/Retching/Vomiting
- Food limiting or refusal
- Putting fingers in mouth or throat
- Decreased appetite

These behaviors may indicate a problem with reflux.

### Simple Fix or Complicated Issue

**Simple Fix**
- Positioning
- Smaller, more frequent feeding (every 2 hours)
- Avoid overfeeding
- Thickened feedings
- Enfamil A+ or
- Thickened

**Complicated Issue**
- Respiratory issues
- Failure to Thrive
- Oral Aversion
- Medication
- Surgery-Fundoplication

### Red Flag Behaviors

- Chewing up food then spitting it out.
- Grazing
- Only eats certain foods
- Holding food in mouth
- Excessive drinking between bites
- Gagging/vomiting
- Putting fingers in mouth/throat

These behaviors can indicate swallowing issues or reflux.

### Simple Fix or Complicated Issue

If these behaviors are occurring in toddler years, it should automatically be considered a more complicated issue.

**Simple Fix**
- Continue with reflux treatment
- Consider swallow/feeding evaluation
Red Flag Behaviors

- Eating very few foods
- Eating only specific foods
- Acting out at mealtime
- Refusal to advance textures
- Gagging when pushed to take food

These behaviors indicate a picky or problem eater

Picky vs. Problem Eater

**Picky Eater:**
- Limited diet of about 30 foods
- Usually will eat at least one food from each texture group
- Will tolerate a new food on their plate
- Neophobia beyond 2-3 years
- Typically get enough nutrition for adequate growth

**Problem Eater:**
- Less than 20 foods
- May eliminate whole texture or flavor groups
- Will not eat a lost food
- Restricted foods may not have a logical explanation
- May take foods based on color, brand name, or texture
- Has strong aversions
- May have meltdowns if faced with new food

Picky vs. Problem Eater

- Not bribable
- Gags if pushed to try foods
- May not grow well due to restrictions
- May have rigid behaviors in other areas and around mealtime routines
- Very aware of imperfections in foods
- May have had difficulty with texture transition as infant
- May have underlying anxiety issues

Picky vs. Problem Eater

- Simple Fix vs. Complicated Issue
  - No real simple fix—It's important to get to the underlying issue
  - You can be a big help to parents with matching textures/types of food to increase calories/nutrition
    - Encourage a feeding evaluation

Recommendations for Parents

- Set limits at mealtime:
  - Time limit
  - Routines
  - Eat or don't eat (no 2nd menu)
  - Schedule meals and snacks (no grazing)
- Give permission to spit it out
- Food
  - Exposure—continue to offer rejected foods
  - Offer foods in fun, new ways—be creative
  - Make sure there is diversity on the plate
  - Make sure food is manageable
- Environment
  - No power struggles
  - Watch environment for appropriate distractions

Popular Approaches

- Food Chaining
- SOS approach—Sequential Oral Sensory Approach
  - 5 step approach
  - Basic model: 1. Tolerate
  - 2. Interact
  - 3. Smell
  - 4. Touch
  - 5. Taste
  - 6. Eat

Criteria for Referral

When do feeding problems require intervention?

- Safety issues
- Growth issues
- Diet does not match developmental level or child is not progressing
- Diet is becoming more limited
- Mealtime behaviors are becoming unmanageable

Where to Refer

- Outpatient OT and/or Speech Therapy
- Feeding Clinics
- Feeding Programs
  - Will need a physician order for treatment
What are the WHO’s?

WIC Formulas, Growth, and Feeding
October 30, 2012
Jan Cox, MS, RD, CSP

Objectives

- Why do we look at growth?
  - Important indicator of health and wellness
  - Assess adequacy of nutrition
  - Screen for inadequate growth that might indicate presence of adverse health conditions, focusing on undernutrition
  - More recently, screen for overweight and obesity

Accuracy of measurements/plotting

- Use standard measuring techniques
- Calibrated/standard weight accuracy test 2 to 3 times/year
- At 24 months, change from recumbent to standing and expect a difference of -0.8 cm (¼”)
- Make sure data is entered/plot correctly
- When plot falls outside norm or doesn’t seem to match what you see, re-plot and/or re-measure
- 51% of all newborns change growth channel (catch-up or lag-down) within the first 6 months
- Use age corrected for preterm birth until 12 months

Cross-sectional vs. Longitudinal

- Cross-sectional data
  - Refers to data collected by observing many individuals at the same point of time, without regard to differences over time
  - Describes that population, at that one point in time
  - Growth reference—describes the growth achievement, not the dynamic process of growth in a cohort/group of children in the past
- Longitudinal data
  - Follows one subject’s changes over the course of time
  - Includes observations on multiple phenomena observed over multiple time periods for the same individuals
  - Growth standard—how healthy children should grow in ideal conditions

NCHS Growth Charts - 1977

- Replaced the Starving Children Growth Charts
- White children from Iowa City, Iowa and Boston, Massachusetts
- Cross-sectional data collected from 1930-1945
- Smoothed percentile lines were drawn by hand
- National Center for Health Statistics Growth Charts
- White middle class children from southwest Ohio
- Cross-sectional data from (1929-1975)
- Birth and 1 month
- Every 3 months from 3 to 12 months
- Every 6 months from 12 to 36 months
- Almost all formula fed
- Difficulty in assessing linear growth from 24 to 36 months
- Lack of data > 18 years

CDC Growth Charts - 2000

- Birth data
  - Height, weight and axillary skinfold thickness
  - Length, weight and occipital-frontal head circumference
  - Birth to age 24 months
  - Height and weight in centimeters and kilograms
  - Head circumference in centimeters
  - At 24 months, height in centimeters
  - At 24 months, weight in kilograms

When changing from NCHS to CDC

- Infant classification changes
  - More often underweight
  - Less often overweight
  - Less often short length for age
  - Less often small head circumference
- Children classification changes
  - More often large head circumference
- Birthweight-percentiles at age 1 month
- Weights in CDC charts higher than NCHS
- All
- Girls
- Longer stature

World Health Organization Hypothesis

All young children have the potential to grow similarly, regardless of their ethnic group or place of birth, if they are in a healthy environment and receive adequate nutrition.
World Health Organization Growth Charts

- Multicenter Growth Reference Study (MGRS)
- Data gathered between 1997 and 2003
- Published in 2006
- Total sample size: 8,440 infants and young children
- Widely different ethnic backgrounds
- Widely different cultural settings

WHO Multicenter Growth Reference Study (MGRS)—Sites (population)

- Pelotas, eastern Brazil (321,000)
- Accra, coastal Ghana (nearly 2,000,000)
- Delhi, northern India (12,260,000)
- Oslo, southern Norway (just < 600,000)
- Muscat, northeast coastal Oman (800,000)
- Davis, north central California (66,000)

WHO Multicenter Growth Reference Study (MGRS)—Community Criteria

- Socioeconomic status that does not constrain growth
- Low altitude (<1,500 m or 4,921 ft—roughly 0.9 mile)
- Low population mobility to allow 2 year follow-up
- At least 20% of mothers willing to follow international feeding recommendations
- Existence of a breastfeeding support system (typically lactation consultants)
- Existence of a research institution capable of conducting the study

International Feeding Recommendations

- Breastfeeding:
  - Exclusively or predominantly breast fed to 6 months
  - Continuous breastfeeding to 11 months (some of participants)
- Introduction of complementary foods
  - At least by 6 months
  - Not before 4 months
- Counseling
  - Breast feeding support
  - Complementary feeding: timing, energy density, feeding frequency, micronutrient content

Exclusion Criteria

- Maternal smoking during pregnancy or lactation
- Birth < 37 weeks gestation or ≥ 42 weeks gestation
- Multiple birth
- Substantial morbidity (perinatal or child health)
- Low socioeconomic status
- Unwillingness to follow feeding criteria
- Breast feeding < 12 months
- Introduction of complimentary food < 4 or > 6 months of age
- Weight for length measurements > 3 SD from overall study median were considered outliers and excluded

Data for 0-24 months WHO charts

- Longitudinal measurements of weight and length for each of 882 distinct children at:
  - Birth
  - 3, 4, 6, 9, 12 weeks
  - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months of age
  - 14, 16, 18, 20, 22, and 24 months of age
- 18,973 observations for 882 distinct children (vs 4,697 observations for CDC)

Data for 24-59 months WHO charts

- Same communities as 0-24 months of age
- Exclusion criteria similar
- Feeding criteria less stringent
- No assistance to ensure children received optimal nutrition
- Longitudinal measurements of weight and height for each of 882 distinct children at:
  - Birth
  - 3, 6, 9, 12 months
  - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months of age
  - 18,973 observations for 882 distinct children (vs 4,697 observations for CDC)

Why use WHO growth standards for 0 to 2 years of age in the U.S?

- Growth of breastfed infant = norm
- Growth under optimal conditions
- AAP and CDC recommend use for 0-2 years
- Allows for the usual switch to standing height at 24 months rather than continuing to measure supine length until 36 months

Why not use WHO growth standards for 2 to 5 years of age in the U.S?

- Similar to CDC charts 2-5 years
- No data beyond 5 years
- AAP recommends CDC charts 2-19 years for continuous growth assessment on the same chart, switching to standing height at 24 months/2 years of age
Use of the WHO BMI-for-age chart

- Not recommended 0-24 months
- BMI in infancy is based on recumbent length rather than stature
- Research not available:
  - BMI calculated from length during infancy
  - Consequences of high or low BMI in infancy

Biggest differences: WHO vs. CDC

- Weight for age:
  - First 6 months WHO > CDC
  - At 6 months WHO < CDC
- Length for age
  - Very similar
  - WHO somewhat taller
- Head circumference
  - Very similar
- Weight for length
  - CDC > WHO

WHO Compared to CDC for Boys Weight-for-Age Percentiles Birth to 24 Months

WHO vs. CDC for Boys 0 to 5 Years

WHO vs. CDC Girls 0 to 5 years

WHO boys 0-24 months

Center for Disease Control
National Center for Health Statistics

Typical Growth Variations

- Growth acceleration
- Normal “catch up”
- Infantile obesity
- Growth deceleration
- Normal “lag-down”
- Failure to thrive

Growth Acceleration—Normal Catch-Up

- Head circumference > weight > length
- Energy intakes up to 160 kcal/kg/day
- Sustained weight gain over 45 gm/day may be associated with higher risk for obesity, hypertension and metabolic syndrome later in life
**Growth Acceleration—Normal Catch-Up**
- Weight accelerates first
- Weight for length above 95th%ile
- May also have accelerated linear growth
- Weight/length remains high
- Head growth may or may not accelerate

**Growth Acceleration—Excess Weight Gain**
- Weight accelerates first
- Weight for length above 95th%ile
- May also have accelerated linear growth
- Weight/length remains high
- Head growth may or may not accelerate

**WHO and CDC Comparison**
- Both WHO and CDC weight-for-length charts show an upward trend.
- WHO weight-for-age chart identified high weight at an earlier age than the CDC weight-for-age chart (12 months versus 18 months).
- No evidenced-based guidelines for treating infants with high weight, early recognition of a child’s tendency toward obesity may help to trigger interventions to slow the rate of weight gain.
- Guidelines for the prevention, assessment, and treatment of child overweight and obesity indicate that weight loss is not recommended in this age group. However, measures to prevent or control excessive weight gain include specific attention to:
  - Limiting the intake of sugar-sweetened beverages.
  - Increasing the intake of fruits and vegetables.
  - Limiting television viewing.
  - Transition to reduced fat milk at one year of age.
  - Limiting the intake of energy-dense foods of low nutritional quality.

**Growth Deceleration—Lag Down**
- Simultaneous deceleration
- Weight
- Length
- Head circumference
- Weight for length is usually >10th %ile
- If weight for length is <10th %ile, but >5th %ile, they are at-risk of becoming underweight
- If weight for length is <5th %ile, they are at high-risk for underweight
- If lag down is a variant of normal, growth will then proceed at a normal rate in new channel
Normal Lag-Down

WHO vs. CDC

Growth assessment

- WHO weight-for-length growth chart = WNL
  - above the 2nd percentile curve for the first 4 months of age
  - above the 5th percentile at 6 and 9 months of age.

- CDC weight-for-length growth chart = Low weight for length
  - below the 5th percentile curve for the first 9 months of age.

Fewer children will be identified as low weight-for-length on the WHO charts resulting in potentially fewer children being referred for additional assessments.

Linear Growth: Inadequate Growth or Just Small

WHO vs. CDC

Linear Growth: Just Small

- Plotting this infant’s length-for-age on both the WHO and the CDC growth charts shows a healthy growth pattern although it is in the lower percentiles on both charts.
- Differences in length are small between the WHO and the CDC charts and clinical differences may be insignificant.
- Low length-for-age is defined as:
  - < 2nd percentile on the WHO growth charts
  - < 5th percentile on the CDC growth charts.

Transitioning from the WHO Weight-for-Length Chart to the CDC BMI-for-Age Chart at Age 2 Years

Growth Deceleration—Failure to Thrive

- Weight for age falls across 2 major percentiles
  - Over three months in infants
  - Over 6 months in children 12 months or older.
- The rate of gain in weight < the ± 2 SD value
  - during an interval ≥ two months for infants less than 6 months
  - during an interval ≥ three months for infants over 6 months of age and the weight for length ratio is less than the 5th percentile.
- Weight for age is less than the 3rd or 5th percentile, or less than 80 – 85% of the 50th percentile weight for age.

Growth Deceleration—Failure to Thrive

Incremental Growth Definition

- Two measurements
- Taken over a specific interval of time
- Allows calculation of a rate of growth
- Over that time interval.

Incremental Growth Uses

- Asses catch up or lag-down when subject’s measurements are above or below normal percentiles
- Identify significant shifts in percentile ranking
- Quantify growth response to changes in nutrition
Summary

- WHO growth charts for 0-24 months are based on:
  - Longitudinal data
  - Optimal socioeconomic conditions
  - Optimal nutrition
- WHO growth charts for 2-5 years are based on:
  - Cross-sectional data
  - Fewer children than the CDC charts
- American Academy of Pediatrics and the Center for Disease Control both recommend using the
  - WHO growth charts for 0-24 months
  - CDC growth charts for 2-5 years

Growth Assessment

http://www.cdc.gov/nccdphp/dnpao/growthcharts/who/index.htm

Questions???