



Complex Child E-Magazine

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Formulas Part II: Specialized Formulas

This article is the second part of a two-part series discussing formula options for children with special healthcare needs. Part I appeared in June and talked about commonly-used formulas.

Certain children with very specialized or rare conditions need equally special formulas to satisfy their nutritional needs. Fortunately, multiple products and even modular products that allow your doctor to create a unique formula are now available for infants and children. This article will summarize the available options for premature babies, children on a ketogenic or low-carbohydrate formula, children requiring a low-fat formula, children with various inborn errors of metabolism, and children with severe allergies or eosinophilic disorders. In addition, a brief list of specialized adult formulas (diabetic, renal, pulmonary, critical care, and miscellaneous others) is included since these may be appropriate for some older children.

Preemie Formulas

- ☐ Similac Special Care
- ☐ Similac NeoSure
- ☐ Enfamil Enficare
- ☐ Enfamil Premature
- ☐ Good Start Preemie
- ☐ Breastmilk (fortified or unfortified)

Infants who are premature or low-birthweight may benefit from a formula designed for premature babies while in the hospital and sometimes for several months after hospitalization.

Ketogenic Diet and Low/No Carbohydrate Formulas

- ☐ KetoCal 3:1 and 4:1
- ☐ Ross Carbohydrate Free (RCF)

These formulas are useful for children who are on the Ketogenic diet, a high-fat diet, for intractable seizures and certain metabolic or mitochondrial disorders. KetoCal provides two versions of its formula, a 3:1 fat to carbohydrate/protein ratio version, and a 4:1 ratio

version. Ross Carbohydrate Free is completely free of carbohydrates and may be used as is or as part of a modular formula system when carbohydrates are added.

Low or No Fat

- ☐ Enlive
- ☐ F.A.A.
- ☐ Tolerex
- ☐ Vivonex Plus or RTF
- ☐ Monogen (low fat, high MCT)

Most children should not be on low-fat diets. There are, however, some situations in which a low-fat or no-fat diet is appropriate either in the short or longterm. These may include after pancreatitis, long chain fatty acid oxidation disorders, hyperlipoproteinemia type 1, intractable malabsorption with fatty stools, and short gut syndrome. Enlive is a no-fat drink considered to be a clear liquid and is fruit flavored. Tolerex, F.A.A., and Vivonex are extremely low fat and primarily designed for adults. Monogen is low fat with 90% of fat coming from medium chain triglycerides (MCT) or pre-digested fat and suitable for children over a year of age. While Tolerex, F.A.A., Vivonex, and Monogen are unflavored, depending on the child's condition, flavor packets may be added.

Inborn Errors of Metabolism

- | | |
|--|--|
| <input type="checkbox"/> Cyclinex 1, 2 | Formula for urea cycle disorder, gyrate atrophy of the choroid and retina, or HHH syndrome |
| <input type="checkbox"/> WND 1, 2 | Formula for urea cycle disorders |
| <input type="checkbox"/> UCD 2 | Formula for urea cycle disorders |
| <input type="checkbox"/> Calcilo XD | Low-calcium formula for hypercalcemia and certain other syndromes |
| <input type="checkbox"/> Glutarex 1, 2 | Formula for glutaric aciduria type I |
| <input type="checkbox"/> XLys, XTrp | Formula for glutaric aciduria type I |
| <input type="checkbox"/> GA | Formula for glutaric acidemia type I |
| <input type="checkbox"/> Hominex 1, 2 | Formula for vitamin B6-nonresponsive homocystinuria or hypermethionemia |
| <input type="checkbox"/> HCY 1, 2 | Formula for homocystinuria |
| <input type="checkbox"/> XMet | Formula for vitamin B6-nonresponsive homocystinuria or hypermethionemia |
| <input type="checkbox"/> HOM 2 | Formula for vitamin B6-nonresponsive homocystinuria |
| <input type="checkbox"/> I-Valex 1, 2 | Formula for leucine catabolism |
| <input type="checkbox"/> LMD | Formula for disorders of leucine metabolism |

<input type="checkbox"/> XLeu	Formula for isovaleric acidemia and other proven disorders of leucine metabolism
<input type="checkbox"/> Ketonex 1, 2	Formula for maple syrup urine disease
<input type="checkbox"/> BCAD 1, 2	Formula for maple syrup urine disease
<input type="checkbox"/> Acerflex	Formula for maple syrup urine disease
<input type="checkbox"/> MSUD	Formula for maple syrup urine disease
<input type="checkbox"/> MSUD 2	Formula for maple syrup urine disease
<input type="checkbox"/> Phenex 1, 2	Formula for phenylketonuria (PKU) or hyperphenylalaninemia
<input type="checkbox"/> Phenyl-free 1, 2	Formula for phenylketonuria (PKU)
<input type="checkbox"/> Periflex Infant, Jr., Adv.	Formula for phenylketonuria (PKU)
<input type="checkbox"/> XPhe Maxamaid	Formula for phenylketonuria (PKU)
<input type="checkbox"/> PKU 2, 3	Formula for phenylketonuria (PKU)
<input type="checkbox"/> Lophlex	Formula for phenylketonuria (PKU)
<input type="checkbox"/> Propimex 1, 2	Formula for propionic or methylmalonic acidemia
<input type="checkbox"/> OA 1, 2	Formula for propionic acidemia or methylmalonic acidemia
<input type="checkbox"/> XMTVI	Formula for propionic acidemia
<input type="checkbox"/> OS 2	Formula for propionic acidemia
<input type="checkbox"/> Tyrex 1, 2	Formula for tyrosinemia type I, II or III
<input type="checkbox"/> Tyros 1, 2	Formula for tyrosinemia
<input type="checkbox"/> XPhe, XTyr	Formula for tyrosinemia
<input type="checkbox"/> TYR 2	Formula for tyrosinemia
<input type="checkbox"/> XPTM Analog	Formula for tyrosinemia (Type I only)
<input type="checkbox"/> PFD 1, 2	Protein free diet

Inborn errors of metabolism often require special diets. The list given above contains formulas for some of the more common inborn errors of metabolism, such as Maple Sugar Urine Disease, Phenylketonuria, or Tyrosinemia. Most formulas come in two or three versions, with an infant formula (labeled “1” or “Analog”) and formulas for older children and adults (labeled “2” or “Maxamaid/Maxamum”).

With few exceptions, these formulas are unflavored or only slightly flavored. Flavor packets may be appropriate for some children, depending on their underlying conditions.

In some cases, a modular formula must be created out of individual components. Manufacturers such as Ross (Abbott Nutrition), Mead-Johnson, and Nutricia also sell individual components that may be combined to create a unique formula for a given child.

Severe Allergy and Eosinophilic Disorders

- ☐ Neocate Infant, Jr., and 1+
- ☐ Elecare
- ☐ Vivonex Pediatric
- ☐ E028 Splash

Children with severe food allergies or eosinophilic disorders may require special elemental diets with broken-down nutrients. E028 Splash is the best choice for oral feeding since it comes in berry-flavored juice boxes. Neocate and Elecare are now available flavored, and Vivonex may be flavored with flavor packets. Note that all of these formulas contain corn or canola.

ADULT FORMULAS

Older children and younger children with certain conditions may benefit from adult formulas. The following is a categorized list of some of these formulas and their uses.

Diabetic and Glucose Regulation Formulas

- ☐ DiabetiSource
- ☐ Glucerna
- ☐ Resource Diabetic
- ☐ Suplena
- ☐ Nutren Glytol

Renal Formulas

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|---|---|
| <input type="checkbox"/> Nepro | High-calorie for patients on dialysis |
| <input type="checkbox"/> NovaSource Renal | High-calorie for patients on dialysis |
| <input type="checkbox"/> Nutren Renal | High-calorie for patients on dialysis |
| <input type="checkbox"/> Renalcal Diet | High-calorie, low-protein for renal failure |

Pulmonary Formulas

- | | |
|--|---|
| <input type="checkbox"/> NovaSource Pulmo. | High-calorie and high-nitrogen for pulmonary patients |
| <input type="checkbox"/> Nutren Pulmonary | High-fat, designed to reduce CO ₂ production |
| <input type="checkbox"/> Oxepa | High-calorie for lung injury |
| <input type="checkbox"/> Pulmocare | High-calorie for COPD and limited respiratory function |

Liver Formulas

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|-----------------------------------|---------------|
| <input type="checkbox"/> Nutrihep | Liver disease |
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Critical Care and Wound Healing formulas

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| <input type="checkbox"/> Crucial | Formula for critical care patients |
| <input type="checkbox"/> Impact | Family of formulas for critical care patients |
| <input type="checkbox"/> Perative | Formula for metabolically stressed patients |

<input type="checkbox"/> Traumacal	Formula for metabolically stressed patients
<input type="checkbox"/> Replete	High-protein for wound healing
<input type="checkbox"/> Pivot	High-protein for metabolic stress
<input type="checkbox"/> Arginaid	Formula for critical care patients