

Chapter 13: Child and Preadolescent : conditions and interventions

Nutritional Requirements of Children with Special Health Care Needs

Factors to consider

Small muscle size “Hypotonia”	Low caloric intake
high protein losses, such as skin breakdown	High protein
frequent fluid losses from vomiting or diarrhea	High fluid volume
chronic-constipation	High fiber
Long term use of medications	increase or decrease vitamin or mineral requirements

Energy

- Under ideal conditions, the caloric needs are estimated using standard calculations that cannot take into account the specific conditions involved!!!
- Thorough:
 - nutritional assessment
 - activity level

Energy

- Conditions that slow growth or decrease muscle size generally result in **lower caloric needs**
- Caloric needs in a child with **Prader-Willi syndrome** may be **only 66%** of the caloric needs of a child of the same age and gender without the syndrome

Protein Needs

- Healing burns and cystic fibrosis are examples of disorders with **high protein needs**—at 150% of the DRI
- Conditions such as PKU and other protein-based inborn errors of metabolism require greatly **reduced amounts of natural protein in the diet**
- Children with diabetes mellitus do not have modified protein needs

Other nutrients

- As in all children, if the diet provides sufficient foods to meet the needs for protein, fats, and carbohydrates
 - → it is likely the vitamin and mineral needs are also met

Meeting DRI with chronic conditions

Children with chronic conditions may **have more difficulty meeting the DRI for vitamins and minerals**

- **Eating or feeding problems** may restrict intake of **foods requiring chewing**, such as meats, so that certain minerals may be low in the diet.
- Prescribed **medications and their side effects** can increase turnover for specific nutrients, raising the recommended amount needed.
- **Food refusals** are common with recurrent illness, so total intake may be more variable day to day than in other children of the same age.
- Treatment of the condition necessitates **specific dietary restrictions**, so that vitamins and minerals usually provided in restricted foods have to be **supplemented**.

Growth Assessment

- If the child's condition is known to change the rate of weight or height gain—**either slowing or accelerating it**—the following signs need attention regardless of what growth chart is used:
 - A plateau in weight
 - A pattern of gain and then weight loss
 - Not regaining weight lost during an illness
 - A pattern of unexplained and unintentional weight gain

Growth Assessment

- Factors that affect growth assessment and interpretation in childhood
 - the age of onset of the condition
 - secondary conditions*
 - activity

Age of the onset

- **Early onset** is more likely than later onset to affect growth in conditions such as *seizures*.
- If the seizures started in **middle childhood**, the **standard growth chart** may be appropriate because the child's growth pattern is already established.
- Onset of seizures in the **neonatal period** may reflect more severe **brain damage**, which markedly slows growth rate.
- Then the **child's own growth record over time** would be the best indicator of future growth

Special Growth Charts

- Table 13.1
- The number of children reported in such growth charts is **smaller and less representative**
- low-percentile **heights** are usual for a child with Down syndrome if growth is plotted on the CDC chart rather than the special growth chart for Down syndrome.

TABLE 13.1 ▶ Examples of specialty growth charts^{2,19}

CONDITIONS WITH SPECIAL GROWTH CHARTS	COMMENT
Achondroplasia	Form of dwarfism
Down syndrome	Short stature, variable weight
Trisomy 13	
Trisomy 18	
Fragile X syndrome	Short stature, primary in males
Prader-Willi syndrome	Short stature, overweight
Rubinstein-Tabyi syndrome	Short stature
Sickle-cell disease	Short stature
Turner syndrome	Short stature
Spastic quadriplegia	Short stature, low weight
Marfan syndrome	Tall stature

Special Growth Chart

- A thorough assessment that includes **body composition** is necessary.
- For example, a thin-appearing child needs to have **body fat stores** measured before diet recommendations are made.
- If body fat stores are fine, adding calories is more likely to contribute to overweight

Body composition and growth

- Children with small muscle size will have **lower weights** than those with regular-sized muscles.
- Conditions with altered muscle size may be described using terms such as **hypotonia** or **hypertonia**.
 - Examples include cerebral palsy, Down syndrome, and spina bifida

Body composition and growth

- **By standard interpretation**, every child with Down syndrome or spina bifida could be overweight
- For now, no established BMI tables cover specific conditions or the appropriate time for adiposity rebound.

Nutrition Recommendations

- Children with special health care needs benefit from the **same nutritional recommendations** other children do, particularly in general areas such as :

Dietary fiber

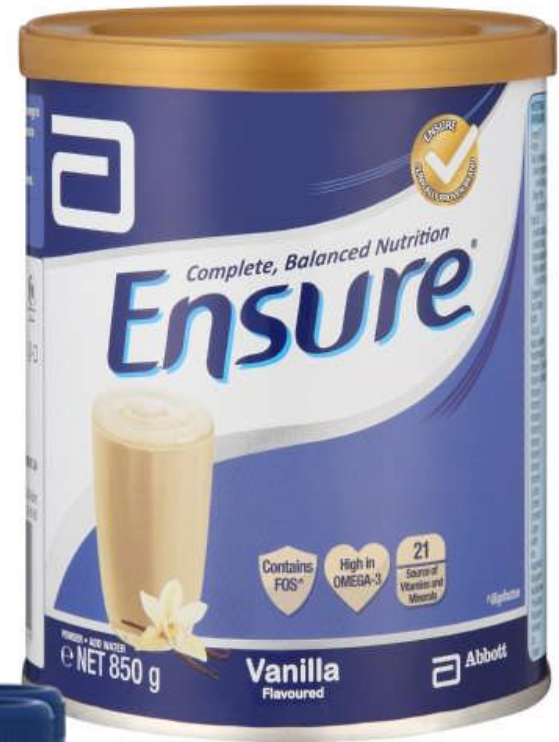
- Appropriate use of soft drinks

Nutrition Recommendations

- Nutritional supports common for children are **enteral supplements**
 - when oral feeding of regular foods is insufficient in **quality** or **amount** to maintain health and to assure growth

Table 13.2 Examples of nutritional supplements and formula for children²⁶

Formula	Comments
Pediatric versions of complete nutritional supplements, such as Pediasure	Generally recommended for children under 10 years of age; can be used for gastrostomy or oral nutrition support
Adult complete nutritional supplements, such as Ensure	Generally 1 calorie per milliliter is recommended for children
Enrichment of beverages, such as Carnation Instant Breakfast added to milk	Requires that milk is tolerated
Predigested formula with amino acids and medium-chain fatty acids, such as Peptamen Junior	For conditions in which intestinal absorption may be impaired
Special formulas for inborn errors of metabolism (PKU), such as Phenex-2	Usually a powder that is mixed as a beverage, but other forms such as bars and capsules are available
High-calorie booster for cystic fibrosis, such as Scandishake	Generally 2.5 calories per milliliter to concentrate calories in small volume



PEPTAMEN® JUNIOR



Peptamen® Junior is a PBS listed whey protein peptide based formulation for the dietary management of children with gastrointestinal impairment.

Suitable for children aged 1-10 years and for oral or tube feed use

FEATURES

Energy Density 1.0 kcal/mL 4.2 kJ/mL

Energy Distribution

Protein – 12% Whey protein peptides

Carbohydrate – 54% Maltodextrin, sucrose, potato starch

Fat – 34% Medium chain triglycerides (MCT 51% of fat), vegetable oils (rapeseed, sunflower) and soy lecithin E322

Nonprotein Calorie: Nitrogen Ratio 190:1

Calorie: Nitrogen Ratio 215:1

n-6:n-3 Ratio 7.5:1

Osmolality 370 mOsm/kg water

Water Content 850mL/1000mL (220g powder + 850mL water)

Eating and Feeding Problems in Children with Special Health Care Needs

- About 70% of children with developmental delays have feeding difficulties, independent of whether neuromuscular problems have been identified
 - having difficulty accepting foods
 - chewing them safely
 - ingesting sufficient foods and beverages to meet their nutritional requirements

Examples of feeding problems

- **Self-feeding skills** are lower than the child's chronological age, **requiring assistance and supervision** to ensure adequate intake
- Meals take so long or so much food is lost in the process of eating that the actual food intake is too low
- The condition requires adjustment in the timing of meals and snacks at home and at school.

CYSTIC FIBROSIS

Will be covered in presentation

Diabetes Mellitus

- **Type 1 diabetes** is related to immune function and results in virtually no insulin production.
- Children with type 1 diabetes have both **high and low blood sugars** during diabetes management, not just high blood sugars, as in type 2 diabetes

Diabetes Mellitus

- Treatment for diabetes is regulation of the **timing** and **composition** of meals and **exercise**, along with **insulin injections** or medications
- Type 1 diabetes requires families and children to master a **carbohydrate counting system**
- This is not the same as the diabetes exchange system, it focused only on the **carbohydrate** content of foods

Diabetes Mellitus

- Common colds, or foods a child refuses to eat, can cause wide variation in blood sugar, contributing to irritability, sleepiness, or difficulty with schoolwork

Seizures

- Seizures are uncontrolled electrical disturbances in the brain.
- Epilepsy and seizures are the same disorder
- Currently, no known nutrients bring on seizures

Seizures

- Feeding or eating during the **postictal state** is not recommended, because the child may choke.
- Some children have long enough postictal states to miss meals.
- In this case, adding other eating times is needed to make up for the lost calories and nutrients

Controlled seizures

- When Seizures controlled with medications, **growth** usually continues at the rate typical for that child.
- Dietary consequences of controlled seizures are primarily related to **drug–nutrient side effects**, such as change in hunger or sleepiness

Uncontrolled seizures

- May cause further brain damage over time
- seizures decrease when brain metabolism is switched from the usual fuel, glucose, to ***ketones*** from fat metabolism
 - Ketogenic diet **(will be covered as presentation)**

Cerebral Palsy

- *Cerebral palsy* is a general term covers a broad range of conditions resulting from brain damage
- Secondary effects may include
 - Contractures
 - Scoliosis
 - Gastro-esophageal reflux
 - Constipation



Contracture of fingers
of right hand (clawed hand)

Cerebral palsy - Constipation

- **Muscle coordination problems** most easily seen in movements of the arms and legs may occur in muscles all over the body,
 - including the **abdominal muscles** that assist in bowel evacuation

Spastic Quadriplegia

- The form of cerebral palsy that presents the most nutrition problems is spastic quadriplegia, involving all limbs.
- Most children with spastic quadriplegia **appear thin**, but this appearance may be a result of **brain damage** or **muscle size**
 - **Chart 13.2 page 348**

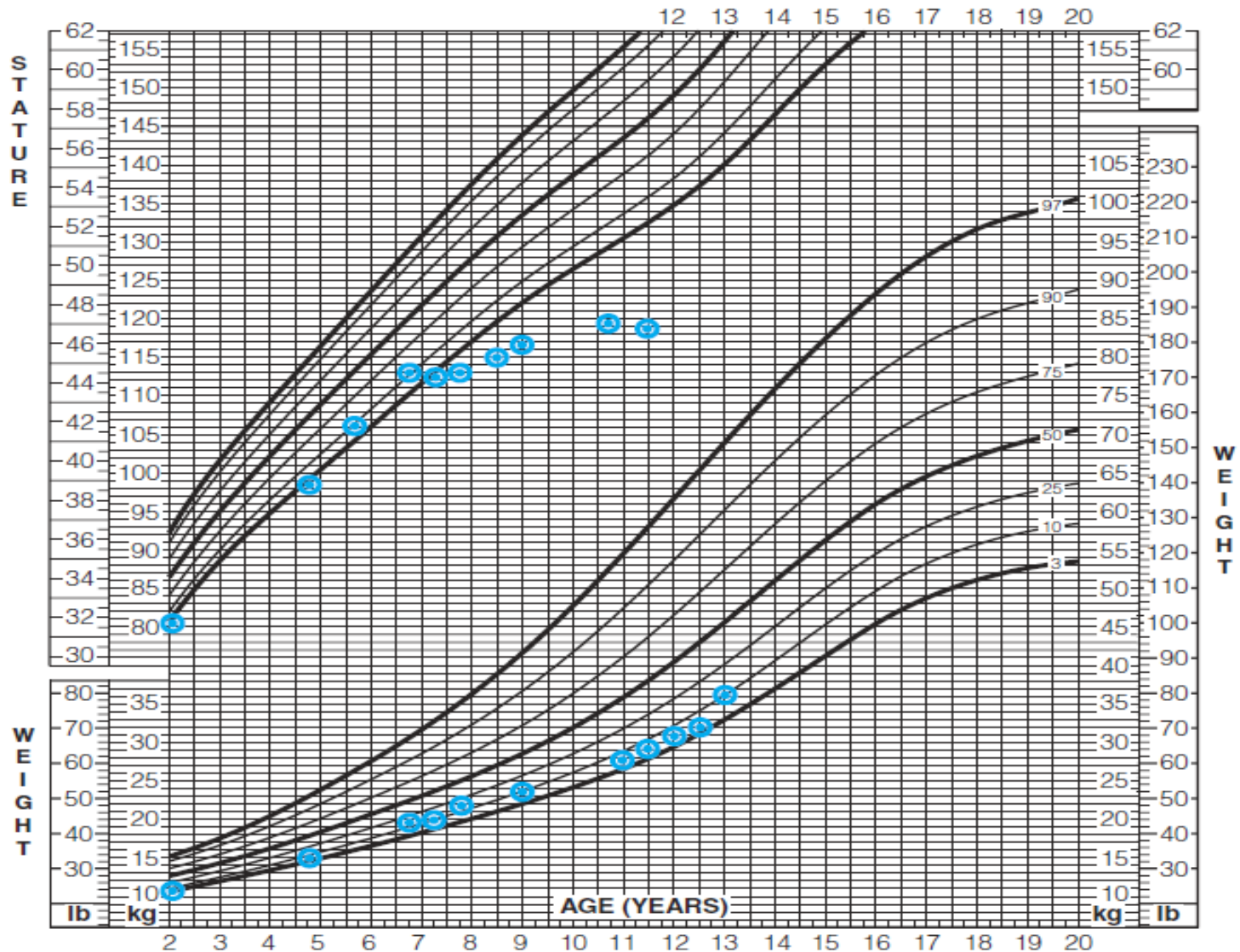
Illustration 13.2 Growth chart for gastrostomy feeding for a boy with spastic quadriplegia and scoliosis.

2 to 20 years: Boys

Stature-for-age and Weight-for-age percentiles

NAME _____

RECORD # _____



Revised and corrected November 21, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>

S. Muhanna 2019



Uploaded by anonymous

Nutritional consequences of spastic quadriplegia

- Slow weight gain and other growth concerns
- Difficulty with feeding and eating
- changes in body composition
- Problem nutrients are likely to be those :
 - Related to bone density, calcium, and vitamin D
 - Nutrients needed in higher amounts as a result of medication side effect
- Caloric needs are difficult to determine!!

Nutrition intervention for CP

- Stimulating oral feeding
- Promoting healthy eating at school
- Adjusting menus and timing of meals and snacks at home or school for meeting nutrient needs from foods that minimize fatigue during meals
- Assessing and adjusting the child's diet over time
- Using adapted self-feeding utensils or other types of feeding equipment



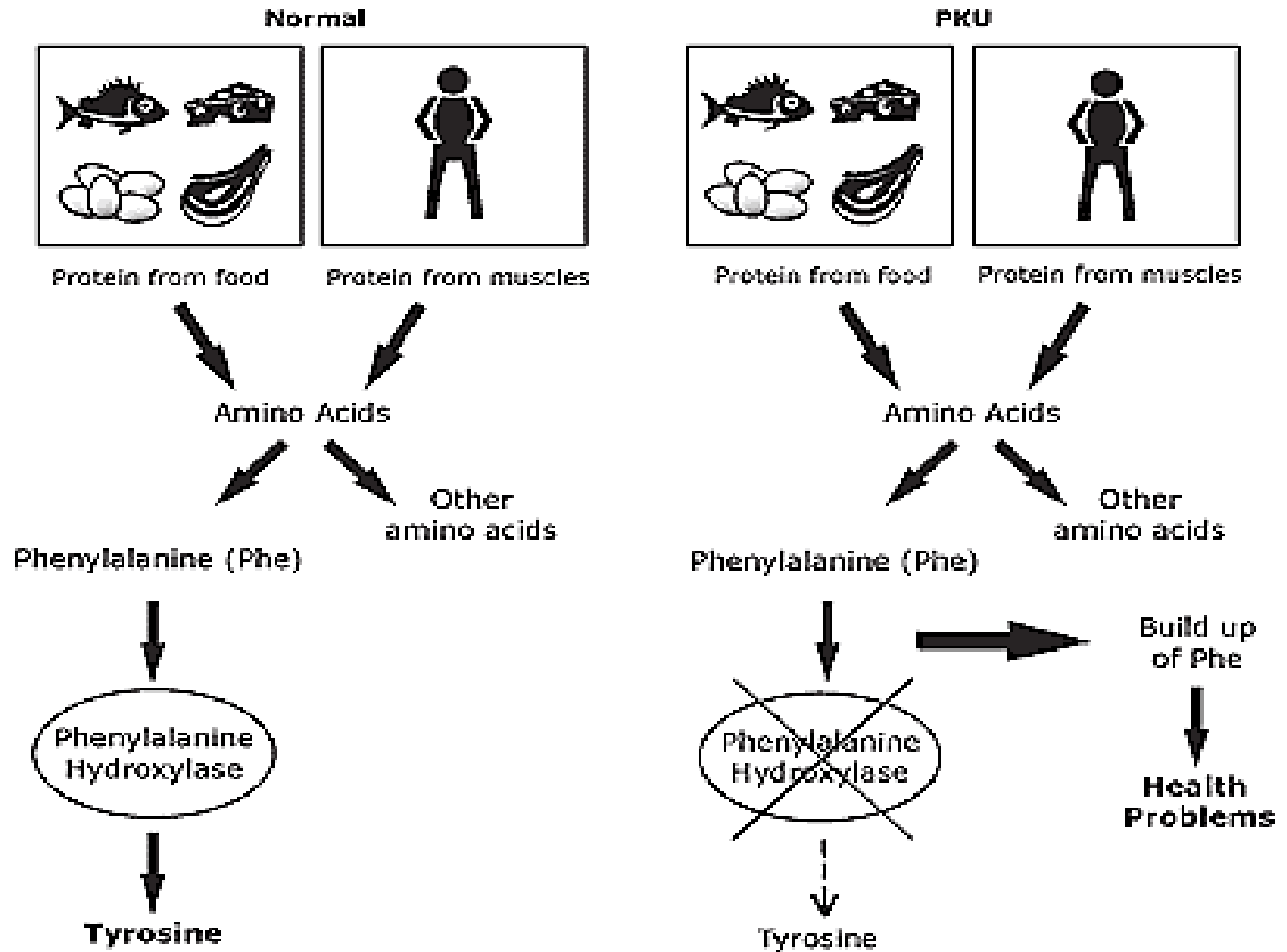
Phenylketonuria (PKU) and Inborn Errors of Metabolism

- These disorders require interventions to manage breakdown products from dietary protein, fats, and carbohydrates being metabolized incompletely or inadequately
 - glycogen-storage diseases (inborn errors of carbohydrate metabolism)
 - medium-chain fatty acid disorders (inborn errors of fat metabolism)

PKU

- The enzyme that uses phenylalanine as a substrate is either not working at all or only partially active in the liver of a person with PKU
- The main treatment is **lifelong dietary management**, in which more than 80% of protein intake from foods and beverages is replaced by a mixture of amino acids from which phenylalanine has been removed

PHENYLKETONURIA (PKU)



PKU

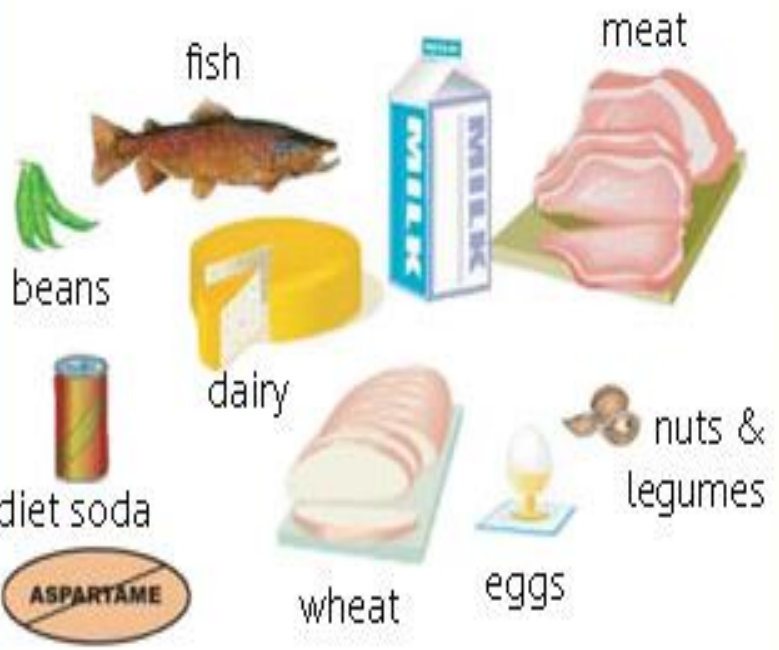

- Dietary management limits toxic breakdown products of accumulated phenylalanine, which the body has difficulty clearing

PKU

- If foods with protein are consumed in too-high amounts, PKU slowly becomes **a degenerative disease** affecting the brain at whatever age the treatment is stopped.
- When their diets are managed correctly, children with PKU appear to be eating meals providing less food than the meals of other children.
- The diet is adequate in all vitamins, minerals, protein, fats, and calories, but more nutrients are in liquid rather than solid forms.

PKU diet

- Foods to be **avoided completely** are protein-rich foods such as meats, eggs, regular dairy products, peanuts, and soybeans in all forms.
- **Allowed natural sources of protein** are limited amounts of regular crackers, potato chips, rice, and potatoes.
- Many fruits and vegetables are encouraged, if offered without added sources of protein.
- Some foods that are high in fats and/or sugars and generally low in natural protein, such as fried vegetables or candy canes, are safe for children with PKU

high phenylalanine foods	low phenylalanine foods
 <p>fish</p> <p>meat</p> <p>beans</p> <p>dairy</p> <p>wheat</p> <p>eggs</p> <p>nuts & legumes</p> <p>diet soda</p> <p>ASPARTAME</p> <p>high-protein foods</p>	 <p>most vegetables</p> <p>most fruit</p> <p>sugars</p> <p>Special Formula</p> <p>special breads cookies crackers</p> <p>low-protein foods</p>

Attention Deficit Hyperactivity Disorder

- The incidence of ADHD is estimated at 5% to 8% of school-age children and adolescents
- Children suspected of having ADHD may have a chaotic meal and snack pattern and the inability to stay seated for a meal.