

## Ketogenic Diet

The guidelines below should be implemented in addition to the appropriate categorical nutrition management guidelines.

**DEFINITION:** The ketogenic diet is designed to establish and maintain ketosis in children with difficult to control epilepsy. The diet is very high in fat and low in carbohydrates and protein. Calories and fluid are strictly controlled and all food and fluids have to be precisely weighed and measured.

**RATIONALE:** The purpose of this nutrition management guideline is to explain the rationale behind the medical management and diet prescription of the ketogenic diet. It is not intended that WIC personal should recommend or alter a ketogenic diet prescription. The ketogenic diet should be offered only to those children who have failed a reasonable trial of antiepileptic drugs (AED) or who experience unmanageable side effects from AEDs. Ketosis occurs when the body burns the fat supplied by the diet since there is a limited amount of glucose to burn. Ketones, the products left after fat is burned, build up in the blood and inhibit seizures, although exactly how is still unknown. The ketotic state exerts an anti-epileptic effect, though its precise mechanism of action is not completely understood.

### MANAGEMENT:

- 1.0 **GOAL:** A complete cessation of seizures or a marked reduction in seizure severity.
- 2.0 **GUIDELINES:** The diet is an individualized program for each person based on their caloric needs, height, weight, age and other medical needs.
- 3.0 **DIET PRINCIPLES**
  - 3.1 The diet is very high in fat (85-90% of energy) and severely restricted in carbohydrates.
  - 3.2 Calorie intake should be approximately 75% of the recommended calorie level for a child's age and ideal weight. Level may be higher for an especially active child.
    - 3.2.1 Ideal body weight should be based on the genetic potential, current growth patterns, and individual circumstances.
    - 3.2.2 The following are guidelines for calculating energy needs:
      - Birth-12 months      ◦ 90 to 100 kcal/kg body weight.
      - 12-18 months        ◦ 75 to 80 kcal/kg body weight.
      - 19-36 months        ◦ 70 to 75 kcal/kg body weight.
      - 3-6 years              ◦ 65 to 68 kcal/kg body weight.
      - 7-10 years             ◦ 55 to 60 kcal/kg body weight.
      - 11-14 years            ◦ 30 to 40 kcal/kg body weight.
      - 15-18 years            ◦ 30 to 40 kcal/kg body weight.

- Adult
    - 20 to 30 kcal/kg body weight.
- 3.3 Two main diet variations:
- 3.3.1 The Traditional - The diet uses foods to obtain a ratio of 4g fat to each 1g protein and carbohydrate combined; in children under the age of 18 months a ratio of 3:1 may be used.
- 3.3.2 The medium chain triglyceride (MCT) supplemented ketogenic diet - Uses MCT oil to induce ketosis as an alternative to the traditional, long-chain triglycerides in the traditional diet.
- 3.4 Dietary units are the building blocks of the ketogenic diet.
- 3.4.1 Dietary units are expressed as ratios of fat to protein and carbohydrate. A 4:1 diet has dietary units made up of 4 grams of fat to each 1 gram of protein plus carbohydrate.
- 3.4.2 The caloric value and breakdown of dietary units vary with ketogenic ratio.
- 2:1  $(2 \text{ g} \times 9 \text{ kcal/g} = 18) + (1 \text{ g} \times 4 \text{ kcal/g} = 4) = 22$
  - 3:1  $(3 \text{ g} \times 9 \text{ kcal/g} = 27) + (1 \text{ g} \times 4 \text{ kcal/g} = 4) = 31$
  - 4:1  $(4 \text{ g} \times 9 \text{ kcal/g} = 36) + (1 \text{ g} \times 4 \text{ kcal/g} = 4) = 40$
  - 5:1  $(5 \text{ g} \times 9 \text{ kcal/g} = 45) + (1 \text{ g} \times 4 \text{ kcal/g} = 4) = 49$
- 3.5 Divide the total calories allotted, by the number of calories in each dietary step to get the number of dietary units/day.
- 3.6 Fat allowance: Multiply the number of dietary units times the units of fat in the prescribed ketogenic ration to determine grams of fat/day.
- 3.7 Protein and Carbohydrate allowance: multiple the number of dietary units times the units of combined protein and carbohydrate (usually 1).
- 3.8 Protein allowance: RDA requirement.
- 3.9 Carbohydrate allowance: Carbohydrates are the diet's filler, and are always determined last. Subtract the protein allowance from the combined protein plus carbohydrate allowance to obtain the carbohydrate allowance in grams.
- 3.10 Divide the daily fat, protein, and carbohydrate allotments into 3 or 4 equal meals. It is essential that the proper ratio of fat to protein + carbohydrate be maintained at each meal.
- 3.11 Liquid intake should be calculated at maintenance levels. As a rule of thumb, a child should not drink more cc's per day than the number of kilocalories in the diet.
- 3.12 Recommended Dietary Supplements.

- 3.12.1 A daily dose of 600 - 1200 mg of oral calcium in a sugar-free form.
- 3.12.2 Milk of Magnesia for constipation, as needed.
- 3.13 Foods.
  - 3.13.1 Children on the ketogenic diet eat similar finger foods as other toddlers only in smaller portions.
  - 3.13.2 Additional fat is incorporated in preparation. For example:
    - Chicken strips or veggie pieces dipped in seasoned mayonnaise dip.
    - Fruit chunks dipped in whipped cream.
    - Crackers with butter and peanut butter on top.
  - 3.13.3 All food items should be weighed in grams.
- 4.0 NUTRITION COUNSELING: Support family in following recommendations of nutritionist / physician.
- 5.0 REFERRALS/FOLLOW-UP  
Schedule for follow-up Nutrition Education - High risk participants must be scheduled for an individual high risk contact with the RD.