Worksheet 23-1: Calculation of Nutrition Needs for Pediatric Cystic Fibrosis-Related Diabetes

M.L. is a 7-year-old male with a five-year history of cystic fibrosis. Last week, he was diagnosed with cystic fibrosis-related diabetes (CFRD). His current weight is 48 pounds and his current height is 46 inches; he is considered to be an active child. M.L.'s mother has come to see the registered dietitian to learn about meal planning for CFRD. Calculate M.L.'s estimated nutrition needs using Table 23.7 and the Energy and Macronutrient Needs section of the text as a guide.

1. Calculate M.L's EER using Table 14.2.

EER for Males 3 through 8 Years

EER = TEE + Tissue Deposition
EER = 88.5 – 61.9 x age + PA x (26.7 x weight + 903 x height) + 20
EER = 88.5 – 61.9 x 7 + 1.26 x (26.7 x 21.8 kg + 903 x 1.17 m) + 20
EER = 1739.8 kcals

2. Calculate M.L.'s kcalorie needs at 110% of the RDA for his age.

The DRI for kilocalorie needs for a seven-year-old boy is 1742 kcals/day. M.L's needs at 110% for this recommendation is 1916.2 kcals.

1742kcals x 0.10 = 174.2 kcals
1742kcals + 174.2kcals = 1916.2 kcals

3. Calculate M.L.'s protein needs at 20% of the total kcalories from step #2.

M.L's protein needs at 20% of the total kcal needs from step 2 are 95.8 grams of protein.

1916.2 kcals x 0.20 = 383.24 kcals
383.24 kcals/ 4g/kcal = 95.8 grams protein.

4. Calculate M.L.'s fat needs at 40% of the total kcalories from step #2.

M.L's fat needs at 40% of the total kcal needs from step 2 are 85.1 grams of fat.

1916.2 kcals x 0.40 = 766.4 kcals
766.4 kcals/ 9g/kcal = 85.1 grams fat.

5. Calculate M.L.'s carbohydrate needs as the balance of the remaining kcalories.

M.L.'s carbohydrate needs as the balance of the remaining kcals are 191.6 grams of carbohydrate.

383.24 kcals protein + 766.4 kcals fat = 1149.64 kcals
1916.2 kcals – 1149.64 kcals = 766.56 kcals carbohydrate
766.56 kcals/ 4g/kcal = 191.64 grams carbohydrate

6. Divide M.L.'s estimated need for carbohydrate into 3 meals and 3 snacks using 65% of the carbohydrates for meals and 35% for snacks.

M.L. should consume about 41.5 grams of carbohydrate at each meal and about 22.4 grams of carbohydrate in each snack in order to attain the 65% of

carbohydrate consumption through 3 meals and 35% carbohydrate consumption through 3 snacks.
191.64 grams carbohydrate x 0.65 = 124.566 grams/ 3 meals = 41.5 grams/meal
191.64 grams carbohydrate x 0.35 = 67.074 grams/ 3 snacks = 22.4 grams/snack

7. Summarize M.L.'s estimated nutrition needs.

M.L. should be consuming about 1916.2 kilocalories per day to meet 110% of the RDA for children his age. In order to meet his intake needs, M.L. should intake about 95.8 grams protein, 85.1 grams fat, and 191.64 grams carbohydrate. His carbohydrate intake should be divided between three meals and three snacks with 41.5 grams of carbohydrate consumption at meals and 22.4 grams of carbohydrate consumption with snacks.

Worksheet 23-2: Diet Prescription—Carbohydrate Counting Meal Plan for Pediatric Cystic Fibrosis-Related Diabetes

Based on the estimated nutrition needs for M.L., develop a carbohydrate counting meal plan that meets his needs for kcalories, carbohydrate, protein, and fat. Using the ADA Exchange System as a guide, provide a sample menu for one day. Distribute his total grams of carbohydrate evenly into 65% among three meals and 35% among three snacks, and his total grams of fat and protein into 75% among three meals and 25% among three snacks.

Meal Plan	**Sample Menu**
Breakfast 41.5 grams of carbohydrate 23.9 grams of protein 21 grams of fat	1 cup dry, unsweetened cereal (30 g cho, 1 g fat, 6g pro) ½ cup 2% milk (6g cho, 4g fat, 4g pro) 2 eggs (16 g fat, 14g pro) ¼ cup canned fruit (7.5g cho)
AM Snack 22.4 grams of carbohydrate 8 grams of protein 7.1 grams of fat	½ cup low-fat yogurt (6g cho, 2.5g fat, 4g pro) 6 snack crackers (16g cho, 2g fat, 4.6g pro)
Lunch 41.5 grams of carbohydrate 23.9 grams of protein 21 grams of fat t	2 oz. bread (30g cho, 1g fat, 6g pro) 2 oz. lunch meat (0g cho, 16g fat, 14g pro) 2 tsp. mayo (0g cho, 10g fat, 0g pro) ½ cup orange juice (15g cho, 0g fat, 0g pro)
PM Snack 22.4 grams of carbohydrate	1 cup 2% milk (12g cho, 8g fat, 8g pro) 1 banana (15g cho, 0g fat, 0g pro)

8 grams of protein 7.1 grams of fat	
Dinner 41.5 grams of carbohydrate 23.9 grams of protein 21 grams of fat	1 cup pasta (30g cho, 1g fat, 6g pro) 2 tsp. butter (0g cho, 10g fat, 0g pro) 2 oz. beef (0g cho, 10g fat, 14g pro) ½ cup peas (15g cho, 1g fat, 3g pro)
HS Snack 22.4 grams of carbohydrate 8 grams of protein 7.1 grams of fat	3 cup popcorn (15g cho, 1g fat, 3g pro) 1 tsp. butter (0 cho, 5g cho, 0g pro) 1 cup ice cream (12g cho, 8g fat, 8g pro)