

# Dietotherapy

## NUTRITION OF CHILDREN DURING THEIR SCHOOL YEARS

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ON JANUARY 19, 1955, the Census Bureau released the following statement: *Our children set mark: 36 million go to school.* This figure is the estimate of enrollments in schools and colleges in October 1954. A breakdown of this enrollment was stated as follows:

in kindergartens .....	1,500,000
in elementary schools .....	24,400,000
in high schools .....	7,700,000
in colleges .....	2,400,000

*These 36 million individuals constitute the most vital segment of the nation for nutrition education.*

From the time a child enters the kindergarten until he leaves school, his nutrition and his health are a concern of many people and agencies. In addition to the parents and the family physician and dentist as early guardians of the child's health, a team of workers is available to safeguard and promote good nutrition.

The classroom teacher has the greatest opportunity to make good food and health habits *vital* in the thinking and practices of children. Her day-to-day influence is greatest among the younger children in kindergarten and the lower elementary grades. In the upper grades, the school nurse, dental hygienist, physician, dentist, psychologist, nutritionist, home economics teacher, the lunch room manager, science and health teachers, and the coach of athletic teams each and collectively have their varying spheres and degrees of influence among the older pupils.

Obviously, best results are obtained when each of the many participants has correct and up-to-date information on this dynamic subject of nutrition. This is a responsibility of the teacher and other professional training institutions at the undergraduate and graduate levels. Refresher courses and summer workshops are a helpful bridge to current facts and procedures for older teachers. Also, it is important that the school and community work together in developing programs based on nutrition in its broader sense. This recognizes the interrelation of physical, emotional, and social development. It also recognizes Graham Lusk's (1917) definition of nutrition as "the sum of the processes concerned in the growth, maintenance, and repair of the living body as a whole or of its constituent parts." While food is an exceedingly important part of nutrition, many other factors influence growth, such as emotions, sleep and rest, exercise, fresh air, and sunshine.

### DIETARY ESSENTIALS DURING GROWTH

National and international groups have formulated numerous dietary standards for individuals of different ages and for population groups. Since 1940 the Food and Nutrition Board of the National Research Council has accepted the responsibility for developing a dietary standard for the United States. Maintenance of *good nutrition* rather than the minimal needs of any age group is the basic philosophy and objective of the recommendations made. The last revision of the Board, comprised of approximately 50 of the country's leading scientists and nutrition research workers, was published in 1953. The recom-

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recommendations for children from kindergarten age through the early college years are outlined in Tables I and II.

### Calories

The calories listed for the various ages are a *first* need for meeting the high energy and growth requirements of active children and youth. In earlier tables, no distinction was made between the sexes until 13 years of age. However, in the United States, there seems to be a greater energy requirement for boys than for girls of the 10- to 12-year age group. Boys engage in more strenuous games and

TABLE I  
Recommended Daily Dietary Allowances

Ages	Calories	Protein <i>gm</i>	Calcium <i>gm</i>	Iron <i>mg</i>
Children				
4-6 years	1600	50	1.0	8
7-9 years	2000	60	1.0	10
Boys				
10-12 years	2500	70	1.2	12
13-15 years	3200	85	1.4	15
16-20 years	3800	100	1.4	15
Girls				
10-12 years	2300	70	1.2	12
13-15 years	2500	80	1.3	15
16-20 years	2400	75	1.3	15

TABLE II  
Recommended Daily Dietary Allowances

Ages	Vitamin A <i>IU</i>	Thiamine <i>mg</i>	Riboflavin <i>mg</i>	Niacin <i>mg</i>	Ascorbic acid <i>mg</i>	Vitamin D <i>IU</i>
Children						
4-6 years	2500	0.8	1.2	8	50	400
7-9 years	3500	1.0	1.5	10	60	400
Boys						
10-12 years	4500	1.3	1.8	13	75	400
13-15 years	5000	1.6	2.1	16	90	400
16-20 years	5000	1.9	2.5	19	100	400
Girls						
10-12 years	4500	1.2	1.8	12	75	400
13-15 years	5000	1.3	2.0	13	80	400
16-20 years	5000	1.2	1.9	12	80	400

they also expend more energy than girls of the same age and body build in the same activities.

Adequate caloric allowances for adolescents are not easily decided. Rate of growth, final body size, as well as activity, are important considerations for individuals. Selections of foods which provide body-building nutrients as well as calories are top priorities to prevent or correct the undernutrition and overnutrition prevalent during these years. Much educational effort is justly being directed against snack or mealtime foods which provide only "empty calories."

### Protein

After 10 years of age, protein needs are higher than those of normal adult men and women. This fact is often not well understood by parents, teachers, lunchroom managers, and youth. Careful meal planning at home and

at school is necessary to secure a regular, *daily* adequate intake of protein. At least half of the dietary protein should come from animal sources. Adequate protein at *each meal* gives satiety values that are exceedingly important. The feeling of being "well fed" can be a large determining factor in a child's craving for sweets—so often a source of empty calories—and also a potential or actual contributor to dental caries.

### Calcium

Only one change was made in the calcium figures in the revised Dietary Allowances. Because of ability to use increased calcium in late adolescence, demonstrated by girls as well as boys, the allowance for 16- to 20-year-old girls was increased from 1.0 to 1.3 grams per day. This increase has practical significance for good nutrition and skeletal maturation.

Today's trend is that many more girls are marrying and becoming mothers at earlier ages than formerly. Good nutrition prior to pregnancy is always a health asset to mother and child. It has extra significance when pregnancy is superimposed on a body not yet completely mature.

#### *Iron*

Many studies have been done in recent years on the iron needs of children of different ages. The allowances listed in Table I appear to be the best recommendations at this time. Research points up the fact that deficiencies of other nutrients such as protein, calcium, and vitamin C may increase the body's need for iron for normal hemoglobin. Anemia is apparently prevalent among children of all ages. More adequate total food intake appears just as important as adequate iron. This is particularly true during adolescence.

#### *Vitamin A*

No changes were made in the revised Dietary Allowances for this vitamin. As the body can store vitamin A, there is much practical value in emphasizing rich food sources all during growth. The role of vitamin A in promoting growth, in tooth enamel formation, and in dark adaptation are significant reasons for checking its adequacy during school years.

#### *The B Vitamins*

Minor changes were made in thiamine, riboflavin, and niacin allowances of children at various ages—consistent with changes in caloric allowances.

Continuing refinement of foods, newer methods of food processing, and high intake of refined sugars endanger the adequacy of the B vitamins in the meals of many children. This is particularly true among overweight individuals whose normal cereal and bread intake has been lowered to reduce calories. Enriched bread and cereals are very important contributors to the B vitamins in children's meals.

#### *Ascorbic Acid*

The food of younger children is usually adequate to meet allowances of ascorbic acid.

Among older children and adolescents, clinical tests show many deficiencies. Dislike for or inability to buy citrus fruits in adequate amounts are important contributing factors.

#### *Vitamin D*

Unless Vitamin D milk or fish liver oil in some form is taken during the fall and winter months in the central and northern parts of the United States, diets will fall far below the recommended 400 IU of vitamin D per day for those from 4 to 20 years of age. The value of fortified milk and use of the fish liver oil should be emphasized by the family physician and dentist as well as by schools.

Table III indicates how well-chosen foods can contribute to these Recommended Allowances. Late adolescence was selected because of its very high food needs. Younger children can use this same or a similar pattern. Smaller servings or amounts of meat and fats will help to bring protein and calories to the recommendations for younger children.

TABLE III

DIETARY ADEQUACY DURING LATE ADOLESCENCE  
*Some Suggestions for a Day's Food Needs*

- 1 quart whole milk
- 1 to 2 eggs
- 5 to 6 ounces meat, poultry, or fish
- 1 whole orange or  $\frac{1}{2}$  grapefruit
- 1 serving other fruit
- 2 medium potatoes
- 2 servings leafy, green or yellow vegetable
- 1 serving other vegetable
- 1 serving wholegrain or enriched cereal
- 6 slices wholegrain or enriched bread
- 3 to 4 tablespoons butter or margarine for bread and vegetables
- 1 to 2 tablespoons salad dressing
- 1 to 2 servings peanut butter or dried peas, beans, or lentils at least 3 or 4 times a week
- 1 serving milk or fruit dessert
- 1 serving cake or cookies
- 1 to 2 tablespoons sugar, molasses, honey for cereal or fruit

*Calculated values of foods listed:* Calories, 3800; protein, 100–110 gm; fat, 160–180 gm; carbohydrate, 400–450 gm; calcium, 1.8 gm; iron, 18 mg; vitamin A, 19,600 IU; thiamine, 2.1 mg; riboflavin, 3.1 mg; niacin, 20 mg; ascorbic acid, 149 mg; vitamin D, 51 IU.

A comparison of these values with the Recommended Allowances for a boy 16 to 20

years shows excellent coverage of all essentials except vitamin D. The regular use of vitamin D milk is one of the easiest ways to raise this vitamin during the winter months when sunshine is very limited. The daily use of a fish liver oil capsule is another recommendation of many physicians during winter months in the central and northern states for vitamin D adequacy.

#### MEALS FOR ONE DAY FROM SUGGESTED FOODS

##### *Breakfast*

1 whole orange  
1 serving oatmeal—sugar  
1 egg  
1 to 2 slices bread or toast with butter or margarine  
8 to 12 ounces milk to drink and with cereal

##### *Lunch or Supper*

1 serving split pea soup  
1 ham and lettuce sandwich  
1 piece iced cake  
8 ounces milk

##### *Dinner*

1 large serving beef with gravy  
2 potatoes  
1 serving carrots  
1 serving snap beans  
Lettuce salad with Russian dressing  
1 to 2 slices bread with butter or margarine  
6 to 8 ounces milk  
1 serving caramel cornstarch pudding

##### *Additional Food at Meals or Between Meals*

Peanut butter sandwich  
Apple  
6 to 10 ounces milk

#### DIETARY AND NUTRITIONAL STATUS STUDIES

During the past two decades many data have been assembled on food habits of school children of different age periods and their nutritional status. Through medical examinations, dietary surveys, and detailed clinical studies at research centers, facts are available from practically every state in the nation. Physicians, dentists, and research workers report a high percentage of unfavorable physical conditions closely related to dietary inadequacy. Those most frequently noted are extensive dental caries, poor skeletal development, underweight, overweight, anemia, constipation, and various skin, eye, and tongue

conditions associated with vitamin deficiencies. Facts are similar in urban, small town, and rural areas.

The economic level of the family or area was found to be an important factor in the *number* and *degree* of nutrition defects and the rate of their correction. In general—the higher the economic status, the better the medical and dental care, the nutritional status, and the quality of the diets. However, 58 per cent of the children in the highest economic level had diets that needed improvement.

With respect to *food intake*, surveys showed that only 35 per cent of children had good diets when economic levels were not considered. Availability of food did not guarantee a good diet. On the whole, boys ate better than girls. They drank more milk and ate more eggs. Girls ate more green and yellow vegetables. Boys and girls ate about the same amount of meat, potatoes, breads and cereals, butter and margarine.

Analyses of research reports on the basis of deficiencies indicate these facts:

1. Nutritional status and dietary adequacy is, in general, at higher levels for children 4 to 6 years than for children 7 to 12 years. The 13 to 15 age level showed the greatest deviations from good nutritional status and dietary adequacy.

2. Vitamin D was the single most deficient essential nutrient from age 4 to 20 years.

3. The highest deficiencies of other essentials were in *calories* and *thiamine* for both boys and girls at the teen-age level.

4. Teen-age girls were also lower in *iron* and *calcium* than children of either sex at other age periods.

5. About half the children at all age levels were deficient in *ascorbic acid*.

6. Protein was adequate in 83 per cent of children in the younger age group, 67 per cent of the 7 to 9 year old children, 73 per cent of the 10 to 12 year olds, in 57 per cent of teen-age boys and 47 per cent of teen-age girls.

#### SUMMARY

Carefully prepared and accepted “yardsticks” are available for evaluating good nu-

tritional status and dietary adequacy of school children. The most recent data on the dietary essentials needed have been presented, as well as some suggestions for meeting recommendations in late adolescence—when needs are highest.

Cumulative data from all areas of the country show that much improvement is desirable in both nutritional status and dietary habits.

A *good breakfast* before going to school is still an important goal for children at all ages. Parents feel this is their greatest single difficulty in helping their children to better nutrition. Physicians, nutritionists, dietitians, and school personnel can do much to motivate children of all ages to appreciate the value of this meal. Better breakfasts would eliminate so many problems now faced by teachers, school nurses, and youth itself.

The rapidly expanding school lunch program provides unlimited possibilities for improved nutrition and for better food habits and attitudes on the part of all school children. The many values of a well-operated school lunch program deserve the best support the school and community can provide. A satisfying lunch is an excellent aid to reducing the amount and kind of snack foods children eat when their previous meal is inadequate. Too often, the snacks selected are foods high in carbohydrate and sources principally of "empty calories."

Family and school physicians are highly valued members of the team working for better nutrition. Their emphasis on milk, leafy green and yellow vegetables, on fruits, eggs, and meat, as *necessary* foods for growth, is needed and appreciated by parents and the school faculty.

Motivation to practice good food habits is a continuous educational process all through the years of growth. Here again the team approach can be very helpful. Children, like adults, are not usually motivated by an interest in nutrition as such. They want only the things nutrition can do for them.

The school and community can provide many opportunities to portray *What Nutrition Can Do for You*. Animal nutrition studies, 4-H or FFA projects, school or home gardens, home economics and science class programs all can demonstrate the magic of food in growth and development. Radio and television are powerful media for both education and motivation. Teamwork of all forces in the community needs no finer goal toward which to unite effort than *Better Nutrition for School Children*.

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