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ABSTRACT

Nutrition is well-recognized as a necessary component of educational programs for physicians. This is to be valued in that of all factors affecting health in the United States, none is more important than nutrition. This can be argued from various perspectives, including health promotion, disease prevention, and therapeutic management. In all cases, serious consideration of nutrition related issues in the practice is seen to be one means to achieve cost-effective medical care. These modules were developed to provide more practical knowledge to health care providers, and in particular primary care physicians. This module is designed to provide information for the physician which will assist in the counseling of elderly patients regarding their food intake, assessing the nutritional adequacy of the elderly patient's diet, diet planning, and nutritional advice for improving the quality of the meals of the elderly. Included are the learning goals and objectives, self-checks of achievement with regard to goals, and references for the physician and for the physician to give to the patient. The appendices include recommended dietary allowances, a chart of food groups and nutrients, a food composition table, a nomogram for estimating caloric needs, a height and weight chart, a chart of fiber content of foods, and charts of dietary sources of calcium and iron. (CW)

8 Normal Diet: Geriatrics

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Nutrition in Primary Care

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The Nutrition in Primary Care Series Contains These Modules:

1. Nutrient Content of Foods, Nutritional Supplements, and Food Fallacies
2. Appraisal of Nutritional Status
3. Nutrient and Drug Interactions
4. Normal Diet: Age of Dependency
5. Normal Diet: Age of Parental Control
6. Normal Diet: Adolescence
7. Normal Diet: Pregnancy and Lactation
8. Normal Diet: Geriatrics
9. Dietary Management in Obesity
10. Dietary Management in Diabetes Mellitus
11. Dietary Management in Hypertension
12. Dietary Management in Hyperlipidemia
13. Dietary Management in Gastrointestinal Diseases
14. Dietary Management for Alcoholic Patients
15. Nutritional Care of Deteriorating Patients
16. An Office Strategy for Nutrition-Related Patient Education and Compliance

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8 Normal Diet: Geriatrics

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8 Normal Diet: Geriatrics

Nutrition in Primary Care

Tables and Figures

Introduction

Persons aged 60 years and older represent the newest and most rapidly growing minority in this country; estimates in 1976 revealed that there were approximately 32.3 million elderly, constituting about 15% of the total population of the United States. This rapid growth of the elderly population has brought about increasing recognition of geriatric problems, including those related to nutrition. Although many factors such as heredity, disease, water and air pollution, drugs, and tobacco influence the health and longevity of older people, good nutrition can go a long way in helping to ensure good health.[1]

Nutrition is frequently overlooked in counseling and treating geriatric patients. Health professionals who work with the elderly may know the importance of nutrition, yet may overlook it by:

1. Failing to assess that their patients are inadequately nourished;

2. Focusing attention only on the patient's specific complaint such as aching joints or stomach pain; or

3. Not knowing how to assess the nutritional adequacy of the elderly patient.

Three important nutritional concerns for elderly persons are:

1. Consumption of diets low in essential nutrients.

2. Development of undernutrition or obesity.

3. Increased incidence of modified diets (which are frequently self-imposed) for the treatment of chronic illnesses such as cardiovascular disease, atherosclerosis, diabetes mellitus, and arthritis.

A person's nutritional status at age 60, 70, or 80 years is the product of the influences of heredity, environment, and nutrition in the preceding years of life. Consequently, the variation in nutritional status in the elderly is likely to be even more diverse than in the younger age group, which has been subject to the same influences but for a shorter period of time. Elderly persons must be considered as unique individuals because *there is no such thing as a typical elderly person.*

Nutritional care of the elderly always presents a challenge. As a result of the economic, social, and psychological factors over which they may have little control, the elderly frequently develop an apathy toward their environment, toward other persons, and toward food. A nutritional intervention program established for an elderly person must take into consideration the nutritional status of the person and the many factors that influence the person's food patterns.

Goals

Recognizing that you will deal with many elderly patients in your practice, and that nutritional problems in the elderly are frequent and often the cause of other physical and psychosocial problems, as a result of this unit of study, you should be able to:

1. *Assess nutritional adequacy of an elderly patient's food intake,*
2. *Plan a diet which is acceptable for an elderly patient who has numerous problems common to the elderly,*
3. *Answer questions asked by elderly patients regarding their food intake; and*
4. *Provide nutritional advice for improving the quality of the meals of the elderly.*

National nutrition surveys appear to indicate no consistent evidence of marked nutritional deficiencies in older persons as a group. Nutrients, however, for which intake should be evaluated, especially in the low-income elderly, include kilocalories, protein, B-vitamins, iron, calcium, ascorbic acid, and vitamin A.

Current knowledge of the effect of aging on nutritional requirements is limited. Studies in humans have shown age-related decrements in cardiovascular, renal, pulmonary, gastrointestinal, skeletal, muscular, and mental functions. The reserve capacities of many organ systems are reduced with age, and the response of older persons to physiological stresses is not as efficient as that of younger persons. Most older persons have lost some or all of their own teeth; older persons with inadequate or painful dentition may be severely limited in their food choices and their nutritional intake. Although presbyopia, presbycusis, and sensory declines in taste and smell may not be significant health problems per se, they may contribute to the older person's disinterest and dissatisfaction in eating.

Optimal nutrition throughout life has been suggested as one of the best means during later life of minimizing degenerative changes and related diseases. There are data, albeit limited, to support the statement that good or poor nutritional status will change the rate of aging. As the human ages, progressive changes occur in various organs which lead to decreased physiological functioning and the increased chance for development of disease. These physiological changes cause interference with nutrient intake, interference with absorption, storage, and utilization of nutrients, and an increase in excretion and the need for specific nutrients. Superimposed diseases add extra burden to these already diminished physiological functions.

Malnutrition can and does affect the elderly as it does persons of all age groups. The Ten State Nutrition Survey[2] showed that individuals over 60 years of age consumed fewer kilocalories than the standard 1,800 kilocalories for women and 2,400 kilocalories for men as established by the Food and Nutrition Board of the National Academy of Sciences.[7] See Appendix A at the back of this module for the Recommended Dietary Allowances (RDA), (1980). The adequacies of protein, vitamin A, iron, and thiamin appear to depend on the amount of food intake. This survey also found that periodontal disease was a major problem with elderly persons.[2]

In the Health and Nutrition Examination Survey (HANES),[3] the data collected indicated that low-income, elderly black adults have the highest prevalence of low hemoglobin and low hematocrit values of any group. However, this group did not exhibit low serum iron or transferrin values, so iron deficiency may not be the cause of the low hemoglobin and hematocrit levels.

The HANES also indicated that the percentage of persons with low serum proteins increases with age, the group of blacks aged 60 to 74 years having relatively greater percentages of persons with low albumin levels than any other group. Of further importance, this survey report showed possible deficiency signs of B-vitamins existing in some subgroups of the elderly. The absence of ankle jerk, considered to be a moderate risk sign for thiamin deficiency, was observed in 12.2% of elderly blacks above the poverty level and in 17.3% of those below the poverty level. Scarlet-red beefy tongue, the high risk sign for niacin deficiency, and other B-vitamin deficiencies, was found in 4.2% of those below poverty level. Filiform papillary atrophy, a second high risk sign for niacin deficiency, was reported in 8.4% of elderly blacks above the poverty level. In the same group, 18.2% had fissures of the tongue, a moderate risk sign for niacin deficiency.[2]

Other research, to be discussed later in this module, has shown poor intakes of calcium, ascorbic acid, and vitamin A among our nation's elderly.[4-6]

A Care Study in Assessing, Planning, and Implementing Nutritional Care

To assist you in evaluating an elderly patient's food intake, in answering the patient's questions about nutrition, and in advising him concerning his diet, the following care study should be helpful.

Mr. B. is a 76-year-old widower who weighs 125 pounds and is 5 feet 9 inches tall. He lives alone on

a very limited retirement budget in a large metropolitan city apartment. Already, several of these factors should alert you to the possibility of nutritional problems. Surely Mr. B. is underweight for his height. Being alone with limited financial resources may predispose Mr. B. to nutritional problems.

The extended family living under one roof, or even within one community, is a rarity today. The loss of a spouse is a very difficult adjustment for an older person to make. In Western culture, eating is a social event, and deprivation of social contacts can have a negative effect on food intake. You need to recognize the importance of socialization as a factor in nutrition and incorporate this knowledge into treatment of the patient.

Most retired individuals live on a reduced income compared with that earned during the working years. Acceptance of a drastically reduced standard of living is often a difficult adjustment. Older persons who retain their middle-class values may refuse financial assistance because of their reluctance to accept charity. They may attempt to maintain their former standard of living at the expense of the basic necessities of life such as food. With retirement from work, individuals may experience depression and a loss of self-esteem which can quickly result in decreased appetite.

Several years ago, Mr. B. had a heart attack, and his physician told him "not to use salty foods." Now his chief complaint is that he has had severe stomach pains and constipation for the past few days. He also complains of pain from his generalized arthritic condition for which he takes 8 to 12 aspirin daily. You observe that there is a cut on his left hand that looks infected, and he has 1+ pedal edema. Results of laboratory tests completed in your office are as follows:

•Blood pressure	180/110
•Hemoglobin:	10 gm/dl
•Hematocrit:	31%
•Urinalysis.	negative for glucose and albumin

Mr. B. tells you that he does his own grocery shopping and food preparation. You delight that Mr. B. has no loss of mobility. Lessened mobility frequently hampers social activities and the making and continuing of friendly relationships with others. The elderly are vulnerable and frequent targets for robbery, and the fear for personal safety prevents many older persons from moving freely about the community. Loss of mobility may also seriously restrict opportunities to obtain food.

Mr. B.'s usual food intake is as follows, although he has not eaten very much for the past two or three days:

Breakfast: 9:00 a.m. (alone at his apartment)

1 cup sugar-coated cereal
½ cup whole milk
2 sl toast
2 tsp margarine
1 cup coffee
1 oz whole milk (in coffee)
2 tsp sugar (in coffee)

Lunch: Seldom eats lunch

Snack: 3:00 p.m. (alone at his apartment)

1 12-oz can cola-type soft drink
2 cupcakes or cookies

Dinner: 5:30 p.m. (alone at his apartment)

2 frankfurters
2 frankfurter buns
1 sm bag potato chips
½ cup coleslaw
1 12-oz can beer
½ cup ice cream

Snack: 10:00 p.m. (during the TV news at his apartment)

1 or 2 12-oz beers

Do you think this is enough information for evaluating Mr. B.'s food intake? (For additional information on evaluating food intake you may refer to Module 1 on nutrient content of foods and Module 2 on appraisal of nutritional status.)

If you said "yes," you are correct. You could, however, gather more information to aid in a better evaluation of Mr. B.'s food intake by asking him particularly about the sources of protein in his diet (such as beef, pork, fish, and cheese) and about the kinds of fruits and vegetables he eats.

Do you remember what foods and their amounts The Daily Food Guide (see Appendix B) recommends for the adult to consume daily? In brief, the recommendations for the adult are as follows:

1. Two 1-cup servings of milk or milk products.
2. Two 2 to 3 oz servings of meat, pork, fish or poultry. As alternates to replace one-half serving of meat could be 1 egg, ½ cup cooked dry beans or peas, or 2 Tbsp of peanut butter.
3. Two ½ cup servings of fruit, one of which should be a citrus fruit, and two ½ cup servings of vegetables, one of which every other day should be a deep green leafy or yellow vegetable.
4. Four ½ cup or 1 sl servings of cereals or breads or grains.

Let us assume that Mr. B. tells you that he has hamburgers or chicken two or three times a week and definitely does not like fish or liver. Since he has heard that eggs are high in cholesterol, he does not eat any at all. As for vegetables, he says that he does not like them except for potatoes, corn, and coleslaw. He declares that fruit juices and fruits are too expensive to buy.

Dietary cholesterol is not a serious problem for individuals 65 years of age and older;[8] smoking, hypertension, and obesity appear to be the biggest risk factors for cardiovascular disease in the elderly. Eggs are a good source of protein and are not as expensive as meat. Adding one egg anytime during the day to the diet of an elderly person would increase the intake of protein, iron, and vitamin A.

Did Mr. B.'s diet meet any of the recommended servings from The Daily Food Guide? You are doing just great if "one" was your answer. He does consume 4 servings per day from the bread, cereal, and grain group. According to the guide, Mr B. does not meet the recommendations for the milk, fruit and vegetable, and meat groups. He really does need a great deal of assistance in planning a better diet! Do your best in instructing

Table 8–1 Completed Calculations for Mr. B 's Food Intake

Food	Amount	Kilo-calories	Protein grams	Sodium mg	Sodium (mEq)
Frosted Cornflakes	1 c	154	2	270	
Whole milk	1/2 c	85	4	60	(2.5)
Toast, white	2 sl	138	4	254	(12.0)
Margarine	2 tsp	72	0	92	(4.0)
Sugar	2 tsp	36	0	0	
Coffee					
Soft drink	12 oz	144	0	0	
Cupcake w/icing	2	310	3	230	
Hotdogs	2	280	14	1100	
Hot dog rolls	2	240	7	400	
Potato chips	1 oz	161	0	300	
Coleslaw w/dressing	1/2 c	57	1	160	
Vanilla ice cream	1/2 c	189	4	140	
Beer-12 ounces	36 oz	450	0	80	
TOTALS		2316	39	3100	

Mr. B. on a proper diet using the recommendations in the Guide. Do not forget that the National Dairy Council (local affiliate) will give you free copies of The Guide to Good Eating for patient use.

Because of Mr. B.'s underweightness and hypertension, it would be a good idea to have more specific information concerning the actual number of kilocalories, grams of protein, and milliequivalents or milligrams of sodium that he consumes. Table 8–1 shows the kilocalorie, protein, and sodium content of Mr. B.'s diet. Figures in Table 8–1 were obtained from the Food Composition Table (see Appendix C at the end of this module) and from Nutritive Value of American Foods, U S D.A. Handbook No. 456, Washington, DC.

Evaluation of Mr. B.'s diet indicates an intake of 2,300 kilocalories. To prevent Mr. B. from losing any more weight, how many more kilocalories would you estimate him to need every day? Use the nomogram found in Appendix D to calculate Mr. B.'s basal energy expenditure and kilocalorie allowance, including kilocalorie allowance for light activity. Using the nomogram for a male, 76 years of age, 125 pounds in weight, and 5 feet 9 inches tall, his basal energy expenditure would be 1,450 kilocalories; with a kilocalorie increment of 40% for light activity, his total kilocalorie expenditure daily would be approximately 2,050 kilocalories. His current kilocalorie intake of 2,300 kilocalories is 250 kilocalories greater than his typical daily kilocalorie expenditure. Mr. B. should therefore consume at least 2,050 kilocalories per day to maintain his current weight. If weight gain of 1 pound per week is desired, he should add approximately 250 to 500 kilocalories per day to his intake for a total of 2,550 to 2,800 kilocalories.

You could have attempted to figure Mr. B.'s recommended kilocalorie requirement by another method such as the following:

1. Using the rule of thumb, calculate Mr. B.'s ideal body weight as follows:

   Use 106 pounds for the first 5 feet in height. Add 6 pounds for each additional inch over 5 feet.

   Mr. B.'s ideal body weight by this rule of thumb would be 160 pounds or a range of 155 to 165 pounds.

   Using the Fogarty modification of the Metropolitan Life Insurance Center Conference recommended height-weight table found in Appendix E, you would find Mr. B.'s ideal body weight range to be 136 to 170 pounds.

   It should be noted that the mean heights of older age groups are less than the mean heights of younger age groups. This can be interpreted in two ways:

   a. The average stature of persons in older age groups is decreased because of environmental conditions, genetic composition, and natural selection, and
   b. The height of individuals in the elderly age groups tends to decrease slightly with aging.

   Both factors in fact are operating to result in decreasing body height with aging. Stature does decline progressively with age after 50 years, the effect is more pronounced in women than in men.

2. Now calculate the kilocalorie requirement for Mr. B.

   You could use another rule of thumb which multiplies the person's current weight in pounds by 20 kilocalories per pound if weight gain is desired. This would equal a minimum of 2,500 kilocalories for Mr. B. Once Mr. B. has achieved his ideal body weight and weight maintenance is desired, the suggestion in the rule of thumb is to multiply his weight in pounds by 15 kilocalories per pound; this would equal approximately 2,300 kilocalories for Mr. B. for weight maintenance at his ideal body weight of approximately 150 to 155 pounds.

According to a recent study by Munro,[9] nitrogen balance may not be maintained in elderly persons consuming the RDA of 0.8 gram protein per kilogram body weight. Increasing the protein intake to 12% to 14% of total kilocalorie intake has been suggested, although excessive protein intake is not advised because renal function deteriorates with age.

As Mr. B.'s physician, you should ask him why he does not drink milk, a rich source of dietary

protein and other nutrients. In this case, Mr. B.'s response, like many elderly persons' responses, might be that he only likes milk in his coffee or on cereal and that milk is for babies. Many elderly persons, especially women, erroneously believe that as adults they have outgrown their need for milk. Perhaps Mr. B. likes buttermilk, yogurt, cheese, or milk and milk products flavored with fruits or chocolate. These foods would be good sources of protein, calcium, vitamin D, and riboflavin, all of which are low in Mr. B.'s diet. You should encourage Mr. B. to increase his intake of protein by consuming more milk, milk products, eggs, chicken, and hamburger which he likes. These protein-rich foods are less expensive than are beef and pork. Consuming peanut butter and beans such as navy, white or pinto beans would also increase his protein intake inexpensively.

Even though Mr. B. was eating frankfurters and potato chips, his sodium intake was the equivalent of a 3 gram sodium diet. Since he has 1 + pedal edema and a blood pressure of 180/110, what would you advise him regarding his sodium intake?

Advise Mr. B. to eat frankfurters just once or twice a week, substituting them with the other good sources of protein previously mentioned. Tell Mr. B. to avoid excessively salty foods such as potato chips, canned soups, salted crackers, pretzels, ham, luncheon meats, and olives.

Hypertension is often related to obesity, which frequently occurs in the elderly. Although Mr. B. is not obese, his hypertension should be treated with a low-sodium diet, diuretics, and perhaps by the use of additional antihypertensive medications. Mr. B. may have 1 + edema secondary to decreased blood oncotic pressure due to his low protein intake and recent weight loss.

Cardiovascular diseases in the elderly should be treated with a weight-reduction diet when the patient is overweight, with a dietary sodium restriction when hypertension occurs, and with medications and diet to achieve a normal blood glucose level if elevated. Normal blood glucose levels following meal ingestion gradually increase as persons age. If standards for young adults are used, 50% to 80% of the elderly would be diagnosed as diabetic. Controversy exists about whether these individuals are actually diabetic or whether a different standard needs to be developed for application to the elderly. Because almost half the older patients with hyperglycemia do not exhibit glycosuria, testing the urine for glucose or ketones is important. *Glycosuria in an elderly patient makes a diagnosis of diabetes likely*

The lack of fruits and vegetables in the diet may be a contributor to constipation due to insufficient fiber in addition to the diminished intestinal muscle tone that occurs with aging. The level of dietary fiber recommended is approximately 7 grams per day.

"What can I do to prevent constipation?" asks Mr. B. There are several suggestions you might give to stimulate peristalsis, such as the use of prune juice or warm water with lemon juice in the morning before breakfast. Other suggestions are to eat foods which contain high amounts of fiber such as fruits and vegetables (fresh, frozen, or canned — it does not matter) and whole-grain cereals. See Appendix F for a listing of the fiber content of selected foods. In addition, you should encourage Mr. B. to continue drinking 1½ quarts of mixed fluids daily and, if necessary, use a psyllium product.

Because Mr. B. consumes no fruit or fruit juices and consumes very few vegetables, his intake of vitamins C and A is minimal. Encouraging Mr. B. to consume more fruits, juices, and vegetables will be met with resistance because Mr. B. states that these foods are too expensive to buy. You might suggest to Mr. B. that he buy powdered fruit juices such as powdered orange drinks, which are fortified with vitamin C and also frequently with vitamin A. A large jar of powdered juice will last for months when mixed with water as directed on the jar. Individual servings could be made each morning or larger amounts made as Mr. B. desires. A ½ cup serving per day would meet his vitamin C need and, except for the fiber content, is basically equivalent to fresh fruit in nutritive value. If Mr. B. states he will not buy fruits, vegetables, or powdered fruit drinks, you may need to advise him to take one ascorbic acid tablet per day, 50 to 100 milligrams, to supply the needed vitamin. An increased vitamin C intake may in addition contribute to the healing of the cut on Mr. B.'s

hand. Mr. B.'s vitamin A intake could be further increased by consumption every other day of a green leafy vegetable (broccoli, greens, or spinach) or a yellow-orange vegetable (squash, pumpkin, or carrots). These can be purchased at low prices in cans or fresh during their growing season Eggs, milk, and other dairy products are also good sources of vitamin A

Recent work has shown that the daily requirement of calcium is over 1 gram for the average elderly person and 1.4 grams for the postmenopausal woman.[10]

Foods in the Guide to Good Eating that are sources of calcium in the diet are listed in Appendix G. At least 800 milligrams of calcium are needed daily for adult men and women. Calcium absorption has been reported to decrease with age, and its importance to bone health has been the subject of a recent review article by Lutwak.[11] Lutwak has estimated that a minimum of 10% of the population over age 50 suffers from osteoporosis. Recent work has shown that the daily requirement of calcium is over 1 gram for the average elderly person and 1.4 grams for the postmenopausal woman.[10] Although some individuals have been found to remain in calcium balance at lower levels of intake, there is no evidence that adaptation to low intake is desirable. Bone loss in the elderly can be attributed to poor dietary intake of calcium, vitamin D, and kilocalories as well as prolonged immobilization and diseases (such as osteoarthritis) which frequently occur in the elderly. Weight reduction if the patient is overweight can provide some relief of arthritis by decreasing the pressure on affected joints.

Because dietary patterns and food preferences of older persons have developed over a period of many years, they may be difficult to modify. Many elderly persons can be misled by advertising in magazines, on television, and on radio as to claims for specific food items. The elderly are highly susceptible to fad diets and to food and nutrition quackery.

Again, Mr. B. asks, "Doctor, is there any special diet that will help my arthritis? I heard that cod liver oil was good to take to cure arthritis." Your answer should be that there is no special diet that will prevent or cure arthritis. Cod liver oil is an excellent source of vitamin D, but it does not lubricate the joints as some have claimed. Excessive vitamin therapy is of no value in the treatment of arthritis. It is most important to stress to the patient that he should eat a variety of foods from the basic food groups.

Encourage Mr. B. to continue his good fluid intake to aid in the excretion of waste products and to prevent a concentrated urine that may lead to formation of renal calculi. Beer is fine; however, if you could encourage Mr. B. to add milk and fruit or vegetable juices to his diet, you would improve his overall nutrient intake. Supplying three or more servings of milk and milk products daily will improve calcium and nitrogen balance, and when coupled with adequate fluid intake this should not precipitate stone formation.

There is no cause-and-effect relationship between obesity and osteoarthritis. Obesity can, however, contribute to the discomfort and disability of arthritis, and weight reduction can provide some relief by decreasing the pressure on affected joints. Due to decreased absorption of calcium and the possible role of calcium deficiency in the development of osteoporosis, some researchers have recommended that the RDA for calcium be increased from 800 to 1,400 milligrams, especially for postmenopausal women.

Persons 65 years of age and older are considered to be high risk for illness and disability. Many of the medical problems in the elderly are nutritionally related.

Many of the medical problems in the elderly are nutritionally related and make the elderly vulnerable to vitamin and mineral deficiencies, causing persons 65 years of age and over to be at high risk for illness and disability. Unfortunately, there is limited information on the effects of aging on requirements for essential nutrients. The elderly may have greater needs for vitamins because of less efficient absorption, reduced intestinal synthesis, and decreased intestinal secretion. Because

of the decreased kilocalorie requirements due to lowered basal metabolism, inclusion of foods rich in the essential nutrients relative to kilocalories becomes vital. Clearly, more work on the nutrient needs of older persons needs to be done.

Some chronic disorders and some medications commonly used by the elderly may alter the absorption, metabolism, and excretion of particular vitamins or minerals, thereby increasing the requirement for dietary intake.

Health professionals who work with the elderly need to be aware of the many ways in which commonly used drugs can affect food intake and nutrient utilization. Many drugs cause anorexia, nausea, or other forms of gastric distress. Administration of these medications should be timed to interfere as little as possible with intake of food Taking a drug with food sometimes decreases absorption. Increased destruction or excretion of a nutrient by a drug may warrant additional dietary intake of that nutrient.

"Doctor, I am taking 8 to 12 aspirin a day. Even though I have stomach pain, should I increase this amount to help relieve my aches and pains due to my arthritis?" As Mr. B.'s physician, you might tell him that the aspirin may be contributing to his stomach pain. If possible, Mr. B. might reduce the aspirin intake to 6 to 8 tablets per day. Several new non-steroidal antiinflammatory drugs may be used for arthritic patients instead of aspirin. Another possibility is to use buffered aspirin at mealtimes to diminish stomach pain. Aspirin use may also be the reason why Mr. B.'s hemoglobin and hematocrit are low.

Other medications frequently taken by the elderly include diuretics, cardiovascular disease drugs, and gastrointestinal medications. Diuretics, except for spironolactone and triamterene, increase urinary excretion of potassium. Patients on potassium-losing diuretics should consume ample dietary potassium, which can be provided through a wide variety of fruits and vegetables, especially bananas and orange juice. Side effects of diuretics of nutritional importance include anorexia, disturbances of taste, and gastric distress.

Hypotensive agents such as hydralazine and reserpine occasionally cause anorexia, nausea, and diarrhea. Because digitoxin and digoxin may increase magnesium and calcium excretion, monitoring of these minerals is recommended for patients taking digitalis preparations for prolonged periods of time. Symptoms of toxicity may include anorexia, nausea, vomiting, and diarrhea.

Gastrointestinal medications including antacids may cause thiamin deficiency when taken for an extended time. Use of mineral oil as a laxative decreases absorption of fat-soluble vitamins. When steatorrhea occurs, increased intestinal losses of calcium and potassium also occur for which replacement is necessary.

Mr. B. tells you that he tires easily and wonders if this feeling is related to being anemic. Your response should be on the order of, "Although your blood count is low, it does not seem to be severe enough to cause your tiredness. Regarding your anemia, your diet is low in several nutrients such as protein and iron that are necessary in the formation of blood. I have already mentioned several foods that provide protein and iron in your diet, specifically meat and eggs. Consumption of green leafy vegetables will increase the vitamin and iron content of your diet, too. Be sure to buy enriched breads and cereals. Read the label, as it will state if the product is enriched with the B vitamins and iron." (See Appendix H for sources of iron in average servings of foods according to the basic food groups.)

When a patient is diagnosed as anemic, it is essential to ascertain whether the anemia is microcytic or macrocytic. If mean corpuscular volume (MCV) is greater than 95, serum folate and vitamin B_{12} levels should be checked. If microcytic anemia is present, consider, before prescribing iron, the possibility of chronic aspirin use and the possibility of gastrointestinal blood loss secondary to cancer.

After patients are diagnosed as anemic and prior to treatment, red blood cell indices should be done to ascertain whether anemia is of the microcytic or macrocytic type. If mean corpuscular volume (MCV) is greater than 95, serum folate and vitamin B_{12} levels should be checked. If

microcytic anemia is present, before prescribing iron consider not only the possibility that aspirin could have caused iron loss, but also the possibility of gastrointestinal blood loss secondary to cancer. A good reticulocyte response to iron therapy may occur in the cancer patient, lead to an incomplete work-up, and result in a missed diagnosis. You may choose to order ferritin, iron, and iron-binding capacity tests before you prescribe iron; strongly consider whether barium studies and/or sigmoidoscopy are needed. Ferrous sulfate, ferrous gluconate, and ferrous fumarate are effective supplements in increasing the reticulocyte and hemoglobin levels in about ten days. The recommended dose is 0.3 gram three times daily.[12] Iron deficiency and nutritional anemias are common among the elderly, especially in the low-income groups and the chronically ill.

Although you have not ascertained the type of anemia Mr. B. has, you recognize that nutritional anemias can be caused by lack of iron, folic acid, and vitamin B_{12}. Anemia can also be the result of inadequate protein, kilocalorie, and other nutrient ingestion, but the consequent anemias are not termed nutritional anemias. Increasing fruit and vegetable consumption will improve folic acid intake but might not correct the megaloblastic anemia which is frequently seen in elderly patients and which should be considered in Mr. B.'s case. In order to increase the vitamin B_{12} intake, foods of animal origin must be consumed, vitamin B_{12} is not found in fruits, vegetables, breads, cereals, or grain products.

Since Mr. B. lives alone and seldom eats lunch, the following suggestions might aid him in improving his food intake.

- Mr. B. might be eligible for food stamps available from the county welfare office in your city. Check this possibility.
- Group feeding programs such as Meals on Wheels and the city-sponsored group feeding program as part of Title III of the Older American Act (formerly Title VII of that Act) may be available. This program offers a hot noon meal supplying ⅓ of the RDA. Meals are served Mondays through Fridays in most communities. Home-delivered meals may also be available through these or other public and private programs.
- Nutrition education classes are sponsored by senior citizen groups, the Y.M.C.A., or extension services. Suggest that Mr. B. go to such groups, he might meet and make many new friends with whom he may have lunch on frequent occasions.
- The American Association of Retired Persons (AARP) has nutrition materials for members. It costs a minimal membership fee to belong to the AARP.

Many nutrition programs may provide the elderly with a variety of support services such as recreational activities, shopping assistance, legal aid, and nutrition education. Such programs include the following:

- Dial-A-Dietitian will answer questions concerning food buying, nutritive content of foods, and preparation of foods. Check your local telephone listing for such a service.
- Some cities have a Nutrition Hotline sponsored by the United Way Service which answers nutrition and food-related questions. Check the city telephone directory for this service.
- Home health services provided by public or private agencies are available for the home-bound and require referral by a physician. This public health service provides nursing services, it may also provide persons who can assist the elderly with shopping for food, preparing meals, and helping obtain food stamps when appropriate.
- The Retired Senior Volunteer Program recruits older persons for voluntary activities in the community. Through this program, the elderly both serve and are served.
- Many local communities have support groups formed in conjunction with churches, service clubs, senior citizen groups, retirement groups, or unions.
- There are United States Department of Agriculture publications available on food preparation and storage through the Government Printing Office, Washington, D.C., at minimal or no charge. Often these publications will include recipes. These publications are good references for you to display in patient waiting and examining rooms. They may also be obtained by request to the patient's congressman.

Summary

Numerous factors influence the food intake of an elderly patient such as the physiological, mental, social, and physical changes associated with aging. Many elderly live alone and may become apathetic toward food and thus become disinterested in eating. Since money is another frequent problem due to the effect of the increasing cost of food on a fixed budget, the elderly tend to buy foods high in carbohydrate and avoid the more expensive protein-containing foods. If the elderly spend money for foods bought in health food stores and for vitamin and mineral supplements, they have less money to buy foods that would contribute to a better quality diet.

The elderly need the same nutrients in the same quantities as do younger adults except for fewer kilocalories. If it becomes necessary for an elderly person to modify his food intake, help the patient to make the change gradually, do not attempt to create severe restrictions all at once as this will not foster cooperation with the suggested changes. Most elderly people are aware of the importance of proper nutrition in maintaining good health and are willing to learn how nutrition can keep them healthy and living independently.

In planning the nutritional care of the elderly patient, Bartlett[13] has stressed four points which all health professionals should remember:

1. The elderly are likely to be at nutritional risk. Many factors interfere with an older person's ability to obtain adequate nutrition. Some elderly patients will be in marginal nutritional status upon entry into the health care system.

2. Any new stress can have serious nutritional implications. Physical or emotional stress can cause a marginally nourished patient to become frankly deficient.

3. Good nutritional status improves patient well-being and therapeutic effectiveness. Quality patient care requires assessment of nutritional status, planning of intervention strategies when appropriate, and monitoring of progress.

4. Elderly patients are highly individualized. Personal assessment is essential because individual abilities, capabilities, and levels of function vary widely.

The costs of ill health in the elderly in terms of disability, productivity, socialization, and psychological reactions are not easy to quantify. That such costs exist seems apparent. For both economic and humanitarian reasons, it behooves you to help your elderly patients achieve optimal nutritional intake and status.

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Appendix A

National Research Council — Recommended Dietary Allowances

The RDA's were designed for healthy individuals. Amounts listed are greater than may be needed and serve as guidelines for the physician when establishing nutrient intake goals for patients.

The chart below shows the RDA's for two age groups. Note the differences in the allowance for kilocalories, protein, B-vitamins, and iron.

Table 8-2 Recommended Dietary Allowances, 1980

		Persons aged 23-50 years		Persons aged 51+ years	
	Unit	Male	Female	Male	Female
Kilocalories	Kcal	2,700	2,000	2,400 2,050[a]	1,800 1,600[a]
Protein	grams	56	44	56	44
Fat-Soluble Vitamins					
Vitamin A mcg RE[b]/IU	mcg	1,000/5,000	800/4,000	1,000/5,000	800/4,000
Vitamin D	mcg	5.0	5.0	5.0	5.0
Vitamin E mg α T.E.[c]		10.0	8.0	10.0	8.0
Water Soluble Vitamins					
Ascorbic Acid	mg	60.0	60.0	60.0	60.0
Folacin	mcg	400.0	400.0	400.0	400.0
Niacin	mg	18.0	13.0	16.0	13.0
Riboflavin	mg	1.6	1.2	1.4	1.2
Thiamin	mg	1.4	1.0	1.2	1.0
Vitamin B_6	mg	2.2	2.0	2.2	2.0
Vitamin B_{12}	mcg	3.0	3.0	3.0	3.0
Minerals					
Calcium	mg	800.0	800.0	800.0	800.0
Phosphorus	mg	800.0	800.0	800.0	800.0
Iodine	mcg	150.0	150.0	150.0	150.0
Iron	mg	10.0	18.0	10.0	10.0
Magnesium	mg	350.0	300.0	350.0	300.0
Zinc	mg	15.0	15.0	15.0	15.0

[a]Kilocalorie recommendation for age 76 + years
[b]Retinol equivalents
[c]Tocopherol equivalents.

From the Food and Nutrition Board, National Academy of Sciences

Appendix B

Figure 8–1 Guide to Good Eating

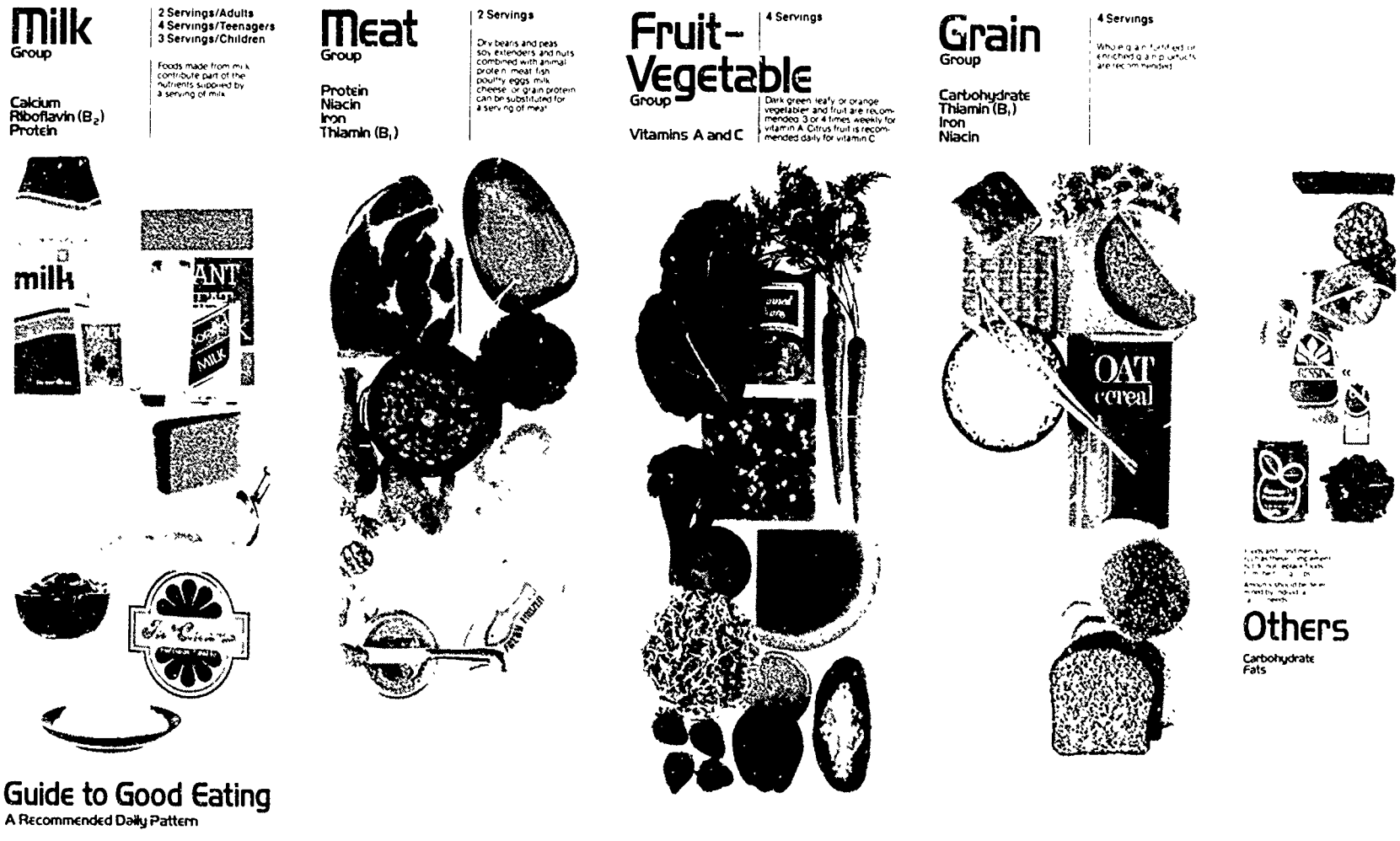


Figure 8-1 (continued)

Guide to Good Eating...

A Recommended Daily Pattern

The recommended daily pattern provides the foundation for a nutritious, healthful diet.

The recommended servings from the Four Food Groups for adults supply about 1200 Calories. The chart below gives recommendations for the number and size of servings for several categories of people.

Food Group	Recommended Number of Servings				
	Child	Teenager	Adult	Pregnant Woman	Lactating Woman
Milk 1 cup milk, yogurt OR **Calcium Equivalent** 1½ slices (1½ oz) cheddar cheese* 1 cup pudding 1¼ cups ice cream 2 cups cottage cheese*	3	4	2	4	4
Meat 2 ounces cooked lean meat, fish, poultry OR **Protein Equivalent** 2 eggs 2 slices (2 oz) cheddar cheese* ½ cup cottage cheese* 1 cup dried beans, peas 4 tbsp peanut butter	2	2	2	3	2
Fruit-Vegetable ½ cup cooked or juice 1 cup raw Portion commonly served such as a medium size apple or banana	4	4	4	4	4
Grain, whole grain, fortified, enriched 1 slice bread 1 cup ready to eat cereal ½ cup cooked cereal, pasta, grits	4	4	4	4	4

*Count cheese as serving of milk OR meat, not both simultaneously.

Others: complement but do not replace foods from the Four Food Groups. Amounts should be determined by individual calorie needs.

Nutrients for Health

Nutrients are chemical substances obtained from foods during digestion. They are needed to build and maintain body cells, regulate body processes, and supply energy.

About 50 nutrients, including water, are needed daily for optimum health. If one obtains the proper amount of the 10 "leader" nutrients in the daily diet, the other 40 or so nutrients will likely be consumed in amounts sufficient to meet body needs.

One's diet should include a variety of foods because no single food supplies all the 50 nutrients, and because many nutrients work together.

When a nutrient is added or a nutritional claim is made, nutrition labeling regulations require listing the 10 leader nutrients on food packages. These nutrients appear in the chart below with food sources and some major physiological functions.

Nutrient	Important Sources of Nutrient	Some major physiological functions		
		Provide energy	Build and maintain body cells	Regulate body processes
Protein	Meat, Poultry, Fish Dried Beans and Peas Egg Cheese Milk	Supplies 4 Calories per gram	Constitutes part of the structure of every cell, such as muscle, blood, and bone; supports growth and maintains healthy body cells	Constitutes part of enzymes, some hormones and body fluids, and antibodies that increase resistance to infection
Carbohydrate	Cereal Potatoes Dried Beans Corn Bread Sugar	Supplies 4 Calories per gram Major source of energy for central nervous system	Supplies energy so protein can be used for growth and maintenance of body cells	Unrefined products supply fiber – complex carbohydrates in fruits, vegetables, and whole grains – for regular elimination Assists in fat utilization
Fat	Shortening, Oil Butter, Margarine Salad Dressing Sausages	Supplies 9 Calories per gram	Constitutes part of the structure of every cell Supplies essential fatty acids	Provides and carries fat soluble vitamins (A, D, E, and K)
Vitamin A (Retinol)	Liver Carrots Sweet Potatoes Greens Butter, Margarine		Assists formation and maintenance of skin and mucous membranes that line body cavities and tracts, such as nasal passages and intestinal tract, thus increasing resistance to infection	Functions in visual processes and forms visual purple, thus promoting healthy eyetissues and eye adaptation in dim light
Vitamin C (Ascorbic Acid)	Broccoli Orange Grapefruit Papaya Mango Strawberries		Forms cementing substances, such as collagen, that hold body cells together, thus strengthening blood vessels, hastening healing of wounds and bones, and increasing resistance to infection	Aids utilization of iron
Thiamin (B_1)	Lean Pork Nuts Fortified Cereal Products	Aids in utilization of energy		Functions as part of a coenzyme to promote the utilization of carbohydrate Promotes normal appetite Contributes to normal functioning of nervous system
Riboflavin (B_2)	Liver Milk Yogurt Cottage Cheese	Aids in utilization of energy		Functions as part of a coenzyme in the production of energy within body cells Promotes healthy skin, eyes, and clear vision
Niacin	Liver Meat, Poultry, Fish Peanuts Fortified Cereal Products	Aids in utilization of energy		Functions as part of a coenzyme in fat synthesis, tissue respiration, and utilization of carbohydrate Promotes healthy skin, nerves, and digestive tract Aids digestion and fosters normal appetite
Calcium	Milk, Yogurt Cheese Sardines and Salmon with Bones Collard, Kale, Mustard, and Turnip Greens		Combines with other minerals within a protein framework to give structure and strength to bones and teeth	Assists in blood clotting Functions in normal muscle contraction and relaxation, and normal nerve transmission
Iron	Enriched Farina Prune Juice Liver Dried Beans and Peas Red Meat	Aids in utilization of energy	Combines with protein to form hemoglobin, the red substance in blood that carries oxygen to and carbon dioxide from the cells Prevents nutritional anemia and its accompanying fatigue Increases resistance to infection	Functions as part of enzymes involved in tissue respiration

Appendix C

Food Composition Table: Procedure Used to Devise Table

Therapeutic and standard hospital diets were nutritionally analyzed by using the following Food Composition Table. The nutritive values listed in the Food Composition Table represent average weighted nutritive values of foods served on the cycle menus of the associated hospitals of the Mayo Clinic and of foods consumed by the average adult.

The daily diet for the average adult was determined by evaluation of the pamphlet "Food Consumption and Dietary Levels of Households in the United States, 1965" published by the Department of Agriculture. The amounts and kinds of foods consumed were analyzed.

Agriculture Handbook No. 8 was the only source of reference for nutritive values. A computer was used in the calculation procedure. Nutrient values from the three different food patterns (menus of the two associated hospitals and the average outpatient's diet) were averaged together. The Food Composition Table illustrates average nutritive value of foods normally consumed every day. Nutrient value of frequently used modified foods are included also. All standard and therapeutic diets were nutritionally analyzed with the nutritive values in the Food Composition Table. For food in which a range in the number of servings was given, the minimal amount was used for calculation purposes. The chart may be used for quick calculation of the nutritional adequacy of a diet. When more accurate figures are desired, reference sources listing specific foods should be consulted.

Table 8–3 Food Composition Table — Nutrient Values of Foods in Hospital and Outpatient Diets

Food	Wt gm	Amount	Calories	Protein gm	Fat gm	CHO gm	Ca mg	Fe gm	Vit A IU	Thiamine mg	Riboflavin mg	Niacin mg equiv	Absorbic Acid mg	Sodium[a] mFq	Potassium mFq	Fluid ml
Meat																
Meat, fish, fowl	30	1 oz	73	7	5	...	15	1.0	350	.06	.15	2.0	...	3	3	20
Meat substitute	30	1 oz	116	8	9	2	97	0.4	159	.02	.10	1.6	...	7	2	20
Egg[b]	50	1	73	7	5	...	28	1.1	585	.04	.13	...	...	3	3	35
Fat																
Butter, margarine	5	1 tsp	36	...	4	...	1	...	16	...	...	...	...	2	...	1
Salad dressing	15	1 T	62	...	6	2	2	...	...	...	...	...	...	9	...	5
Gravy, white sauce	50	1/4 cup	39	1	3	2	15	0.2	40	0.1	0.4	...	...	4	1	20
Half and Half	30	2 T	36	...	4	...	32	...	144	.01	.04	...	...	1	1	24
Milk																
Whole milk	240	1 cup	170	8	10	12	283	...	336	.07	.41	0.3	2	5	9	209
Milk drink	200	1 cup	204	8	8	25	270	1.0	425	.10	.36	0.3	2	6	9	160
Eggnog	200	1 cup	295	15	15	25	300	1.5	940	.14	.56	3.7	3	7	10	..
Bread																
Bread	25	1 slice	69	2	1	13	21	0.6	...	.06	.05	0.6	...	6	1	9
Cereal	20	2/3 cup	69	2	1	13	30	0.6	...	.08	.05	0.6	..	6	1	112
Potato or substitute	100	1/2 cup	69	2	1	13	7	1.5	940	14	.56	1.5	16	10	5	80
Vegetable																
A	150	1/2-2/3 cup	...	...	...	...	56	1.6	2120	.08	.12	0.8	30	16	8	140
B	75	1/2 cup	24	1	...	5	20	0.8	3190	.08	.06	0.8	10	10	4	65
Fruit																
Citrus	100	1/2 cup	48	...	...	12	2	0.2	130	.07	.03	0.2	40		4	90
Other	Varies	1 serving	84	1	...	20[c]	8	0.5	340	.02	.03	0.4	4	..	4	82
Soup																
Cream	200	1 cup	69	2	1	13	140	0.8	985	.10	.20	1.1	...	35	7	180
Dessert																
Regular	Varies	1 serving	212	3	8	32	55	0.3	155	.03	.08	0.2	...	6	2	40
Modified	Varies	1 serving	189	4	5	32	90	0.4	180	.03	.10	0.4	...	6	2	80
Low fat	Varies	1 serving	128	2	...	30	10	...	...	.02	.06	0.1	...	6	2	50
Sugar																
Sugar, jelly	15	1 T	56	...	...	14	...	...	...	...	...	...	...	...	. .	...

[a]Value is for average amount of salt used in preparation of food, salt which may be added to food at the table is not calculated

[b]Egg, cheese, cottage cheese, peanut butter

[c]Average value for a serving of fruit, sweetened or unsweetened

Vegetable A — includes all vegetables not listed in Group B and Bread Group

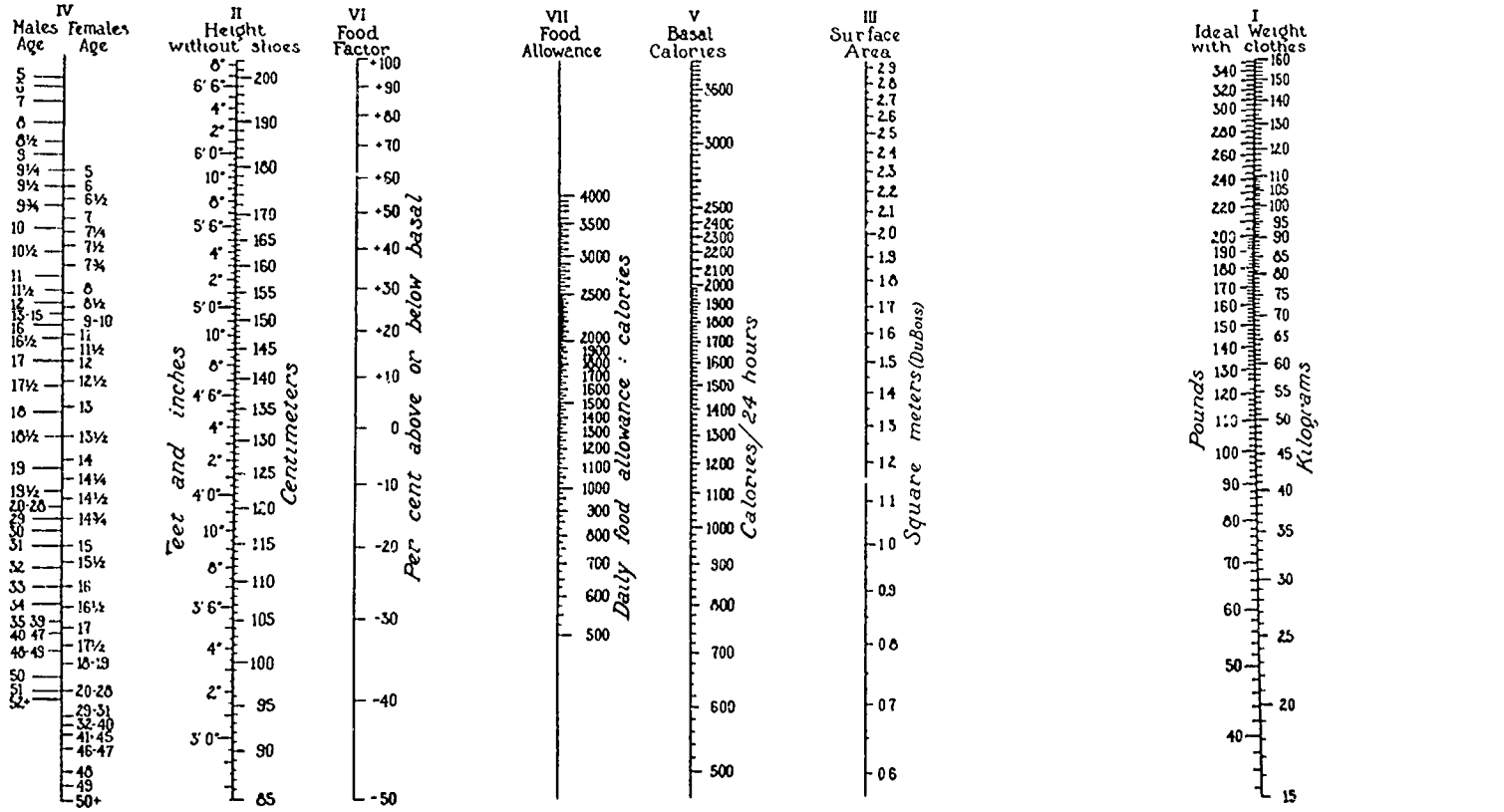
Vegetable B — Contains beets, carrots, onions, green peas, turnips, winter squash

Bread Group — Includes potatoes, corn, and baked beans

From *Mayo Clinic Diet Manual* 4th ed. Philadelphia, Saunders, pp 132-133, 1971. Used with permission of W. B. Saunders Co., © 1971, Philadelphia, PA

Appendix D

Figure 8–2 Nomogram for Estimating Caloric Needs



Directions for Estimating Caloric Requirement To determine the desired allowance of calories, proceed as follows. 1 Locate the ideal weight on Column I by means of a common pin 2 Bring edge of one end of a 12 or 15-inch ruler against the pin 3 Swing the other end of the ruler to the patient's height on Column II 4 Transfer the pin to the point where the ruler crosses Column III 5. Hold the ruler against the pin in Column III 6 Swing the left hand end of the ruler to the patient's sex and age (measured from last birthday) given in Column IV (these positions correspond to the Mayo Clinic's metabolism standards for age and sex) 7 Transfer the pin to the point where the ruler crosses Column V This gives the basal caloric requirement (basal calories) of the patient for 24 hours and represents the calories required by the fasting patient when resting in bed 8 To provide the extra calories for activity and work, the basal calories are increased by a percentage To the basal calorie for adults add 50 to 80 per cent for manual laborers, 30 to 40 per cent for light work or 10 to 20 per cent for restricted activity such as resting in a room or in bed To the basal calories for children add 50 to 100 per cent for children ages 5 to 15 years. This computation may be done by simple arithmetic or by the use of Columns VI and VII If the latter method is chosen, locate the "per cent above or below basal" desired in Column VI By means of the ruler connect this point with the pin on Column V. Transfer the pin to the point where the ruler crosses Column VII This represents the calories estimated to be required by the patient

Used with permission of the Mayo Clinic, Rochester, MN

Appendix E

Table 8–4 Guidelines for Body Weight

Height* Ft	Height* in	MEN Weight (lb)* Average	MEN Weight (lb)* Acceptable weight	WOMEN Weight (lb)* Average	WOMEN Weight (lb)* Acceptable weight
4	10			102	92 119
4	11			104	94 122
5	0			107	96 125
5	1			110	99 128
5	2	123	112 141	113	102 131
5	3	127	115 144	116	105 134
5	4	130	118 148	120	108 138
5	5	133	121 152	123	111 142
5	6	136	124 156	128	114 146
5	7	140	128 161	132	118 150
5	8	145	132 166	136	122 154
5	9	149	136 170	140	126 158
5	10	153	140 174	144	130 163
5	11	158	144 179	148	134 168
6	0	162	148 184	152	138 173
6	1	166	152 189		
6	2	171	156 194		
6	3	176	160 199		
6	4	181	164 204		

*Height without shoes, weight without clothes

Reproduced with permission from Bray, G A "Obesity," in Dowling, H F , et al (eds), *Disease-A-Month* © 1979, by Year Book Medical Publishers, Inc , Chicago (Adapted from the recommendations of the Fogarty Center Conference, 1973)

Appendix F

Table 8–5 Fiber Content of Some Selected Foods

Food	Grams Crude Fiber Per Serving
Cereals and Breads	
All Bran - 3 4 cup	2.0
Branflakes 40% - 3/4 cup	1.0
Raisin Bran - 3/4 cup	0.9
Shredded Wheat - 1 biscuit	0.7
Wheaties - 1 cup	0.6
Puffed Wheat - 1 cup	0.2
Cornflakes - 1 cup	0.2
Rice Krispies - 1 cup	0.2
Oatmeal (cooked) - 2/3 cup	0.2
Whole wheat bread - 4 slices	1.6
White bread - 4 slices	0.2
Vegetables	
Peas - 2/3 cup	1.9
Lima beans - 2/3 cup	1.8
Baked beans - 1/2 cup	1.7
Brussels sprouts - 3/4 cup	1.6
Broccoli Tips - 2/3 cup	1.5
Coleslaw - 3/4 cup	0.7
Celery - 1 cup (diced)	0.6
Lettuce - 1/4 head (small)	0.5
Fruits	
Apple (raw including skin) 1 small 2½" diameter	1.0
Prunes (cooked) 6 medium	0.8
Peach (raw including skin) 1 small 2½"x2"	0.6
Grapes (raw including skin) 10 grapes	0.2
Cherries (raw including skin) 10 cherries	0.1

From Watt, B K and Merrill, A L *Composition of Foods* Agriculture Handbook No 8, Washington DC U S Department of Agriculture, 1963

Appendix G

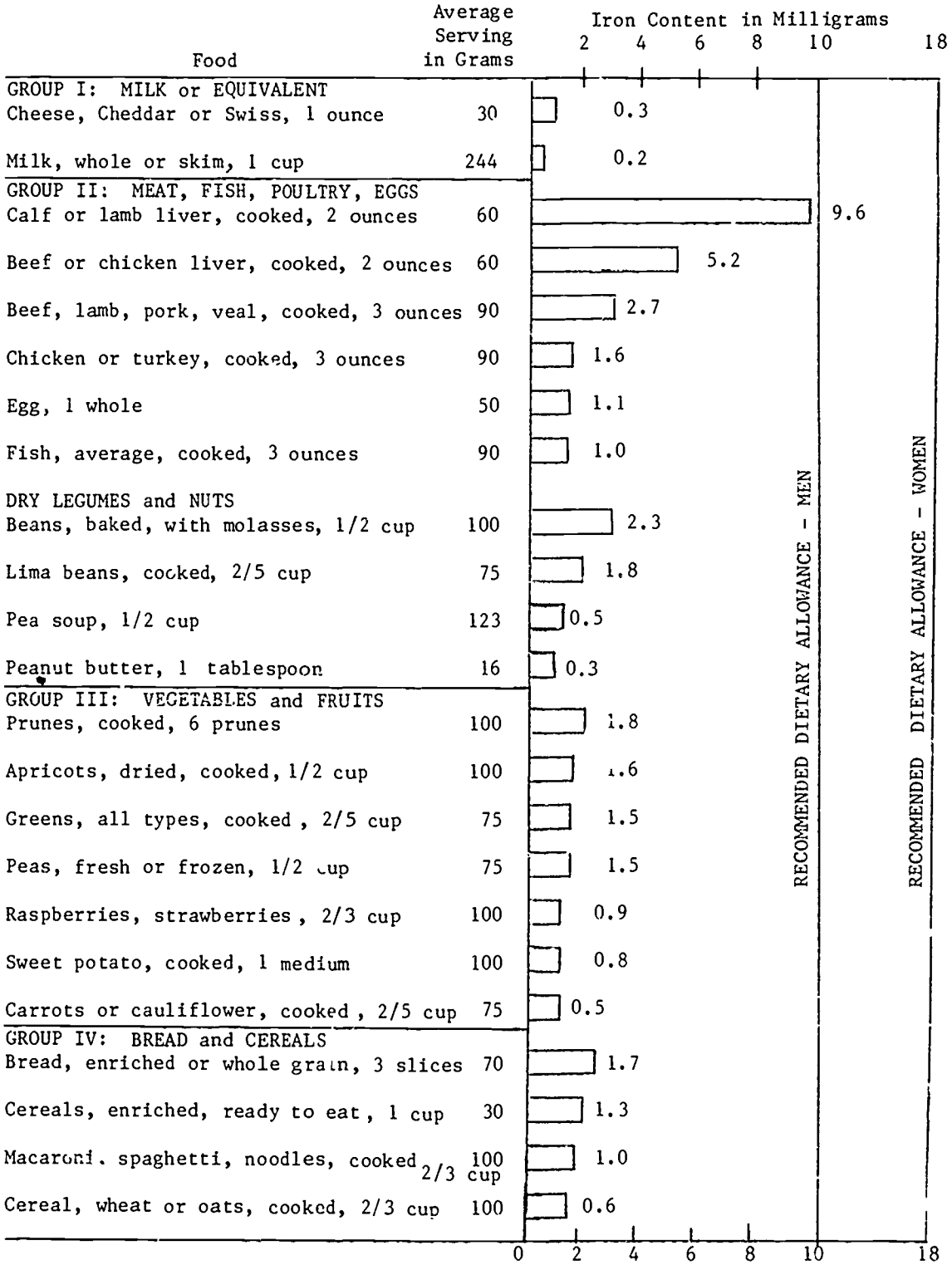
Table 8–6 Calcium in Average Servings of Foods Classified in the Four Food Groups

Food	Average Serving in Grams	Calcium content in milligrams
GROUP I: MILK or EQUIVALENT		
Milk or Buttermilk, whole or skim, 1 cup	244	285
Yogurt, 1 cup	244	271
Cheese, Cheddar, 1 ounce	30	206
Ice Cream, 1/6 quart or 2/3 cup	60	76
Cottage Cheese, 2 ounces	30	54
GROUP II: MEAT, FISH, POULTRY, EGGS		
Salmon, canned with bones, 2 ounces	60	120
Egg, 1 whole	50	27
Fish, all kinds, without bones, 3 ounces	90	25
Meat, lean, all kinds, 3 ounces	90	9
DRY LEGUMES and NUTS		
Beans, baked with molasses, 1/2 cup	100	63
Lima beans, cooked, 1/3 cup	75	21
Peanut butter, 1 tablespoon	16	10
GROUP III: VEGETABLES and FRUITS		
Kale, mustard and turnip greens, 1/3 cup	75	110
Broccoli, cooked, 1/3 cup	75	66
Orange, 1 whole	100	41
Green beans, cooked, 1/3 cup	75	33
Carrots and turnips, 1/3 cup	75	26
Cabbage or celery, raw, 1/4 cup	50	20
Apple, peach, pear, 1 small	100	5
GROUP IV: BREAD and CEREALS		
Bread, white or whole wheat, 3 slices	70	60
Oat cereal, ready to eat, enriched, 1 cup	25	50
Tortilla, Mexican, 2 medium	40	44
Macaroni, spaghetti, noodles, cooked 1/2 cup	100	9

Adapted from Mitchell, H., Rynbergen, H., Anderson, L., and Dibble, M. *Nutrition in Health and Disease*. 16th ed., 1976. Used with permission of J. B. Lippincott Co., © 1976, Philadelphia, PA

Appendix H

Table 8–7 Sources of Iron in Average Servings of Foods Classified in the Four Food Groups



Adapted from Mitchell, H., Rynbergen, H., Anderson, L., and Dibble M. *Nutrition in Health and Disease*, 16th ed., 1976. Used with permission of J. B. Lippincott Co. © 1976, Philadelphia, PA

Some Abbrevations Used in the Nutrition in Primary Care Series

ATP	adenosine triphosphate
c	cup
cc	cubic centimeter
CNS	central nervous system
FDA	Food and Drug Administration
gm	gram
IBW	ideal body weight
IU	International Units
kcal	kilocalorie
kg	kilogram
lb	pound
lg	large
MCV	mean corpuscular volume
MDR	minimum daily requirement
med	medium
mEq	milliequivalent
mg	milligram
MJ	megajoule
ml	milliliter
oz	ounce
RDA	Recommended Dietary Allowances
RE	retinol equivalents
sl	slice
sm	small
Tbsp	Tablespoon
TPN	total parenteral nutrition
tsp	teaspoon
USDA	United States Department of Agriculture