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An Appraisal of Food Intake by Three Groups of Senior Citizens

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SUMMARY

The purpose of this study was to examine the food intake and some factors frequently associated with dietary practices of three groups of senior citizens in Columbia, Mo. Eighty-nine subjects, ranging in age from 60 to 95 years, provided seven-day dietary records of food intake and filled out questionnaires giving their personal history, general health, habits of rest, activity, recreation, and mental outlook. There were 27 men and 62 women distributed among three interest groups: a senior citizens' Fun Club, a local home for retired persons, and a church circle. Findings were summarized by interest groups, age decades and sex.

Subjects were described briefly according to their distribution by sex and age, marital status, number of persons residing in household, length of residence in Columbia, occupation before retirement, levels of activity, sleep and rest practices, psychological outlook, snacking habits, general health, including distribution according to body weight for height, and age, chronic disorders, condition of teeth, smoking, use of laxatives and use of vitamin supplements.

Food selections as reported on the seven-day dietary records, were appraised by application of Page and Phipard's daily food plan. As a group, only the men residing in the *home* made adequate selections in sufficient amounts from the four food groups to provide them with the basis for an adequate diet. The food group most inadequately consumed by the largest number of persons was milk. Only the male residents of the *home* had a mean intake of two cups or more daily. In general, women made selections from the milk group less frequently than men.

In all three interest groups, men averaged two servings or more of the meat group; the women averaged approximately 1.75 servings daily. Mean intake of meat and meat substitutes, including eggs, for persons in their 60th, 70th, and 80th decades, was 1.75 servings per day; for those aged 90 to 95, it was 1.25 servings. Eggs were classified separately to emphasize their important contribution to the meat group for men and women at all ages.

Fruits and vegetables appeared frequently on the dietaries of both men and women, but good sources, especially of vitamin C, were frequently not included. More women (56%) than men (44%) included a good source of vitamin C in their daily diets. Fruits and vegetables which are a good source of vitamin A were consumed in suggested amounts by 66 percent of the entire group.

Breads and cereals were a popular food group with the men, 78 percent of whom chose more than the minimum four servings daily. Women from the church circle had a mean intake of four servings daily while women from the Fun Club and the *home* selected less than the minimum recommended amount.

For all age decades beef was the most popular meat choice, followed by pork and ham, fowl and bacon. Eggs were chosen two to four times as frequently as the next most popular meat alternative, cheese. Of the vitamin-rich vegetables, green beans were the most popular, followed by peas, cabbage, and carrots. Orange juice and grapefruit juice were the most popular fruit choice, followed by tomatoes and peaches. Apples appeared on dietaries frequently.

Among desserts other than fruit, ice cream was the most popular and the frequency with which it was selected increased with each age decade. Pie was the next most popular dessert and was followed by cakes and cookies, jello, and puddings.

Other food items analyzed were white potatoes, soup, tea and coffee, tap water, slices of bread eaten, and breakfast cereals.

Even though nutritionally balanced meals were available to some of the senior citizens, they did not always eat the foods which would provide them with the basis for an adequate diet. The need for an improvement in selecting food for the daily diet was apparent for the majority of elderly participants in this study.

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An Appraisal of Food Intake by Three Groups of Senior Citizens

CECELIA PUDELKEWICZ, HELEN GORDON, AND ANN HOLCK

INTRODUCTION

The human life span has been increasing steadily with each generation. Sometimes the question is raised as to whether we are adding life to those years, or merely years to life. It is to the advantage of our nation as a whole, as well as to the individual, to make these added years productive and fruitful. In the percentage of persons aged 65 and over, Missouri ranks second only to Iowa in the United States (1). Moreover, the total number of persons in this age bracket is expected to continue to increase at a phenomenal rate.

Senior citizens' clubs have been organized in communities all over the United States. Activities of a Columbia, Mo. senior citizens' Fun Club include programs such as birthday parties, hay rides, and fund-raising dinners for chartered bus trips to places of interest. A few visits to the Fun Club's weekly meetings revealed a refreshingly active, gay group of people.

Generally we tend to associate healthy, happy people, regardless of age, with good nutrition. Many people recognize the fact that being badly nourished may be cause for complaints, anxieties, a gloomy outlook on life, lack of pep and loss of sleep, to mention a few factors (2). Were these members of the Fun Club unusual with respect to their dietary habits? Would there be a relationship between their food intake on the one hand and their mental outlook, their physical health, their activities, their types of recreation, and the amount of rest and sleep they received? How would these people compare with other, apparently healthy, senior citizens with different interests?

The purpose of this study was to examine food intake and some factors frequently associated with dietary practices of three groups of senior citizens in Columbia. The three groups were members of the Fun Club, residents of a local *home* for retired people, and members of a church circle. Data are presented by interest groups, sex, and age decades.

PROCEDURE

Subjects Studied

A total of 89 subjects was studied. The three interest groups were composed of: 43 members of a Fun Club (Group I), 25 residents of a *home* for retired ministers and their families (Group II), and 21 members of a church circle, including one retired male university professor (Group III). Distribution of subjects by interest group, age decade and sex is presented in Table 1. Individuals were selected if they were 60 years old or older, in apparently good health, appeared to be fairly active, and expressed willingness to cooperate.

Collection of Data

Each person was given a clearly printed instruction sheet, dietary record forms, and a sample dietary record to use as a guide. Oral instructions were given to groups of subjects by a trained nutritionist, assisted by two home economics students. Persons requiring individual assistance were urged to telephone the nutritionist. When requested, instructions given by telephone were supplemented by home visits. The respondents were asked to continue eating patterns which were typical for them.

Subjects were instructed to record everything they ate and drank, including medications, for 7 consecutive days. Their food records included a description of the kind and amount of each food eaten and the method of preparation. Quantities were recorded in household measures, dimensions, common serving sizes, and in common units, e.g., 1 slice of white bread.

Along with the 7-day dietary record, each participant was asked to fill out a questionnaire which was especially designed to supply information pertaining to matters such as: personal history, general health, habits of rest, activity, recreation, and mental outlook.

Data were collected between November, 1961, and March, 1962, excluding holidays and periods immediately before and after holidays.

Appraisal of Food Selection

The primary concern of this study was to examine and appraise the selection of food consumed over a seven-day period by some older persons living in Columbia, Mo. Thus, should nutrition education be needed, it could be given more simply by emphasizing food selection rather than food nutrients. Calorie content was not figured and no evaluation was made of diets by calculation of individual nutrients. Food intake for each subject was evaluated by use of a *Daily Food Plan* as presented by Page and Phipard (3). Criteria used in this investigation for classifying food items into serving portions among the food groups are given in the Appendix. Food selections were summarized by groups as follows:

Milk and milk equivalents in ounces of milk per day; one cup, or 8 ounces of milk, being equivalent to 300 mg. of calcium.

Meat and meat alternates in servings per day; one serving being equivalent to 15 grams of protein.

Eggs in actual number eaten; 2 eggs being equivalent to one serving of meat.

Fruit and vegetable sources of vitamin C in servings or fractional parts of servings; one serving being equivalent to 50 mg. ascorbic acid.

Fruit and vegetable sources of vitamin A in servings or fractional parts of servings; one serving being equivalent to 2500 IU of vitamin A value.

Other fruits and vegetables in servings per day; including all fruits and vegetables not listed as sources of vitamins C and A.

Bread and cereals in servings per day of those that were whole grain, enriched, or restored.

Mean daily intake of each food group was determined for each individual, interest group, sex, and age decade. When 20 of these daily dietaries were analyzed by the short method of Leichsenring and Wilson (4) it was found that the qualitative appraisal by food groups gave equivalent estimates of the quality of the diet.

The frequency with which some foods occurred on the dietaries and the preferences for individual foods within groups also were summarized. These included the number of slices of bread eaten each day and the frequency with which soup, breakfast cereals, white potatoes, coffee, and tea occurred on dietaries. Also included was intake of tap water.

RESULTS AND DISCUSSION

Description of Subjects

Sex and Age

Of the entire group of 89 subjects, approximately one-third were male and two-thirds, female (Table 1). The largest number of individuals (53%) were in the 70 to 79 year age decade. The youngest person was 60 years of age, one person was 61 years old and the remainder were 64 or older. At the opposite extreme, two persons were 91 and the oldest person participating in the study was 95 years of age. Only two persons (both women) refused to give their age. Mean age in years for Group I was 75.7, for Group II, 77.2 and for Group III, 75.8. Mean age for the women was 75.4 and for the men, 78.1 years.

TABLE 1 - DISTRIBUTION OF SUBJECTS BY AGE DECADE, INTEREST GROUP AND SEX

Age decade in years	Number of subjects	Interest Group					
		I Fun Club		II Home		III Church Circle[1]	
		Male	Female	Male	Female	Male	Female
60-69	16	1	8	1	2	0	4
70-79	46	7	10	6	10	1	12
80-89	20	7	7	2	2	0	2
90-95	5	2	0	0	2	0	1
Unknown	2	0	1	0	0	0	1
Total	89	17	26	9	16	1	20

[1] Includes one retired male university professor.

Marital Status

Of the entire group of 89 persons studied, 46 were widowed, 28 were married, 11 were single, and 4 individuals did not give this information. The largest number of widowed persons were in Group III. Approximately one-fourth of the persons in Group II were widowed, about one-half of those in Group I and three-fourths of those in Group III were widowed. The largest number of persons (52%) still living with their spouse were in Group II (Figure I).

Number of Persons in Household

When asked how many persons were living in the household, 45 percent of the entire group stated they were living alone. Included in this group were widowed or single persons living in the Home. Group I had the highest incidence of three or more persons in a household and Group II, the highest percentage of persons living with one other person.

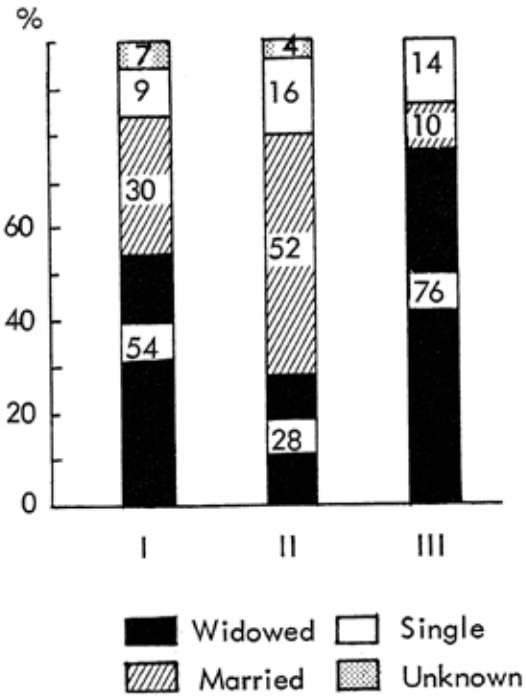
How Long in Columbia

Persons living in the *home* were relative newcomers to Columbia by comparison with the other two groups. Sixty-four percent of the persons residing in the *home* reported living in Columbia 5 years or less. Forty percent of Group I and 62 percent of Group III had lived in Columbia 25 years or longer.

Occupation Before Retirement

When the subjects were classified according to their occupation before retirement, it was quite evident why they were in different interest groups upon

FIG. 1. MARITAL STATUS OF INDIVIDUALS IN PERCENT OF EACH GROUP.



retirement (Table 2). The large majority of participants residing in the *home* were professional (80%). The most varied group with respect to occupation was the Fun Club. This group also had the fewest professional people (12%) and the largest number of persons who gave no response (37%). More than half of the respondents in Group III (church circle) were classified as professional, in business and sales, or skilled.

TABLE 2 - DISTRIBUTION OF SUBJECTS BY OCCUPATION BEFORE RETIREMENT[1]

Occupation Classification	Group I		Group II		Group III	
	No.	%	No.	%	No.	%
Professional	5	12	20	80	8	37
Business and sales	4	9	2	8	2	10
Skilled	2	5	2	8	2	10
Semi-skilled	10	23	0	0	0	0
Farmer	6	14	0	0	2	10
Unknown	16	37	1	4	7	33
Total	43	100	25	100	21	100

[1] If subject was female and married, occupation of husband was used.

Level of Activity

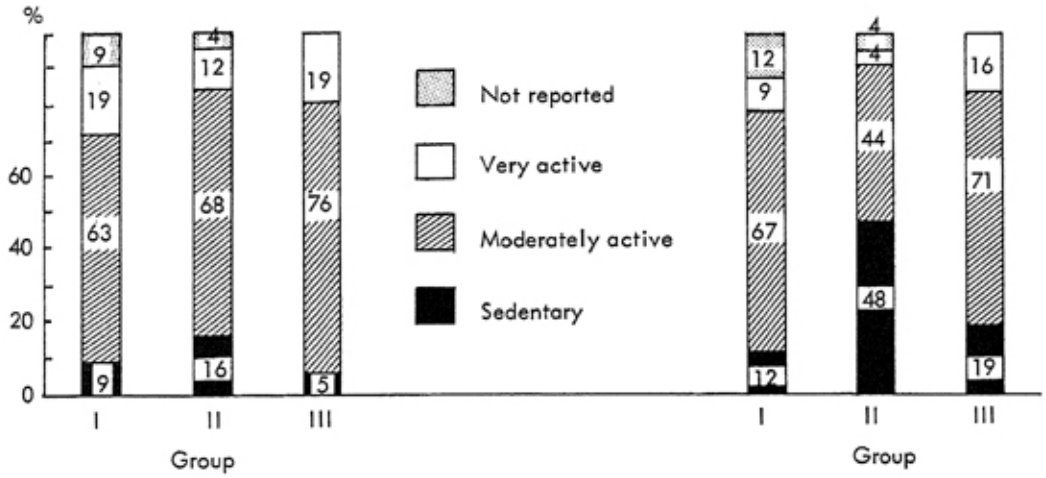
The subjects were asked to rate themselves in activity. Choices on the scale were: very active, moderately active, and sedentary. They were then asked to list their activities according to routine chores, routine employment, and recreation. For purposes of interpretation, degrees of activity were devised within each activity classification. Points were assigned each possibility with those activities taking the most strenuous effort receiving weighted points. Routine chores and employment classifications were given weighted points, whereas each section within the recreation area received the same point value. The points and the ordinal scale for rating activity were arbitrary and were simply a means of objectively rating each individual (Table 3).

Data comparing the three groups of subjects by self-evaluation versus the arbitrary point system are presented in Figure 2. In general, subjects in all three

TABLE 3 - POINT SYSTEM AND SCALE USED IN ACTIVITY RATINGS

Activity	Points	Level of Activity
Routine Chores	0	None
	1	Light (Examples: making bed, hand washing, preparing meals for one or two people)
	2	Moderately heavy (Examples: keeping apartment or small home clean, doing laundry, yard work, shoveling snow, etc.)
	3	Heavy (All work in house plus all yard work)
Routine Employment	0	None
	2	Part-time (Baby-sitting, office work, nursing, giving piano lessons, keeping a roomer or house for others)
	4	Full-time (Working 8 hours per day at certain times of year)
Recreation	0	None
	1	Indoor, alone (Reading, sewing, knitting, watching television, writing)
	1	Indoor, group (Playing cards, games, visiting, singing)
	1	Outdoor, alone (Yardwork, fishing, gardening, walking)
	1	Outdoor, group (Attending meetings, ball games, picnics)
	Activity Rating Scale	
	0-3 points	Sedentary
	4-7 points	Moderately active
	8-13 points	Very active

FIG. 2. COMPARISON OF ACTIVITY RATINGS BY SELF (LEFT) AND ACCORDING TO ORDINAL SCALE (RIGHT) IN PERCENT OF EACH GROUP.



groups tended to rate themselves more active than the ordinal scale indicated. The greatest discrepency was observed in Group II. The members of this group appeared to be busy but not necessarily active. Their level of activity seemed to be far less strenuous and varied than that in either of the other two groups of subjects. In this study, more women (73%) than men (63%) were rated as either moderately or very active. Stevens *et al.* (5) found older women to be slightly more active than older men.

Sleep and Rest Practices

Most of the respondents (66%) slept between 7 and 9 hours and 94% of the entire group slept 7 to 9 hours or less. The largest number of individuals sleeping less than 7 hours were residents of the *home,* but these persons also had the highest rate of regular resting habits during the day. Four persons in Group I and one person in Group III slept longer than 9 hours. Being able to rest when one wanted to was mentioned frequently as one of the things most liked about retirement.

Psychological Outlook

The three groups of subjects were similar in that they were all actively seeking companionship. For Group I, the Fun Club provided companionship and at the same time, gave its members an opportunity to be active physically. Before

retirement many of these people had occupations which required physical activity. For Group II, the *home* provided companionship and security at the price of giving up the family home and a place of prominence in the church and community. For Group III, the church circle and university community provided companionship which required less physical activity than the Fun Club, but more than the *home,* as circle members had to go outside their places of residence to find companionship.

The subjects were asked to respond to a series of 7 statements which dealt with their general feeling of well-being, outlook on world affairs, retirement, and attitude toward food (Table 4). More than half of the entire group classified their general feeling of well-being as good. All of the subjects in Group III classified themselves as either good or fair, but 10 percent of the members of the Fun Club and 4 percent of those in Group II rated their feeling of well-being as poor. Surprisingly, a greater proportion of persons from the *home* (two-thirds) and from the circle (two-thirds) reported feeling rested and energetic upon awakening than did Fun Club members (one-half).

A statement pertaining to the state of world affairs pointed out interesting reactions indicating a remarkable similarity in response by Groups II and III. No doubt the strong religious background of the residents of the *home* and of the Circle members played an important role in their optimistic attitude toward world affairs. On the other hand, 30 percent of the Fun Club members were either not especially interested in the state of world affairs or gave no response.

Two statements were included which could be interpreted as giving some indication of the ability of the subjects to adapt to retirement. The smallest number of complaints about loneliness and feelings of dissatisfaction with retirement were made by residents of the *home;* the largest number by circle members. The distribution of lonely individuals by groups seemed to correspond with the percentage of widowed persons. Group II, with the least lonely persons (8%), had the smallest percentage of widowed persons (28%). The Fun Club had twice as many lonely individuals (16%) and, correspondingly, twice as many widowed persons as Group II (54%). For Group III, these ratios were three times those for Group II (24% lonely persons and 76% widowed persons). The number of lonely persons was distributed evenly between the two sexes. Of the men, 15 percent complained of loneliness; of the women, 16 percent.

Statements pertaining to the quality of our food today and the frequency of eating for something to do pointed out other differences between the groups. No one in Group II rated the quality of our food today as worse than it used to be, but 30 percent of the Fun Club group did. Nearly all of the Circle member (90%) thought the quality of our food today was either the same or better than it used to be. An unusually large number of *home* residents (20%) refrained from expressing themselves on this particular statement.

Persons living at the *home* were quite different from the other two groups with respect to eating for something to do. The large majority of these respondents said that they ate at mealtime with very little or no snacking in between

TABLE 4 - STATEMENTS ON PSYCHOLOGICAL OUTLOOK WITH SELF CLASSIFICATIONS

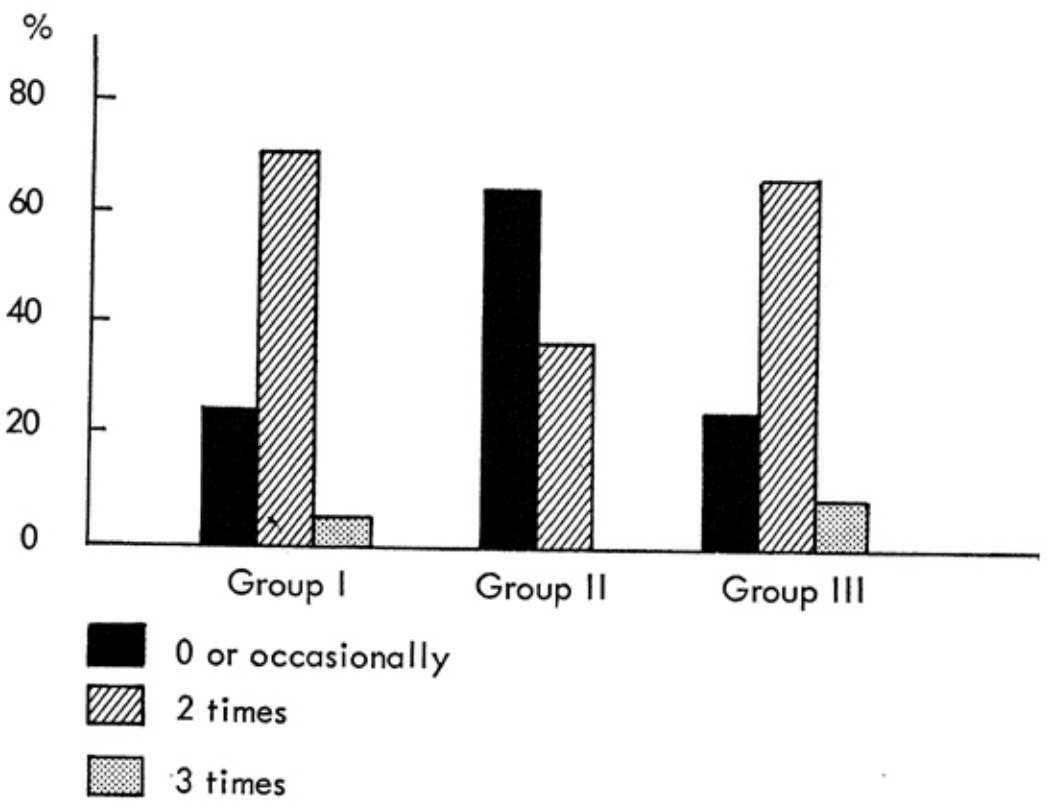
Statements	Group I Fun Club %	Group II Home %	Group III Circle %
I would classify my feeling of well-being as:			
1. Good	53	48	57
2. Fair	30	40	43
3. Poor	10	4	0
4. Not answered	7	8	0
The state of world affairs is:			
1. A hopeless mess	5	4	5
2. A mess, but not a hopeless one	65	88	85
3. Not especially interested	12	0	5
4. Not answered	18	8	5
When I awaken I usually feel:			
1. Tired and groggy	32	20	33
2. Rested and energetic	49	68	67
3. Not answered	19	12	0
Retirement means loneliness:			
1. Yes	16	8	24
2. No	77	88	76
3. Not answered	7	9	0
My feeling about retirement is:			
1. Satisfied	47	76	34
2. Dissatisfied	14	4	19
3. Have to accept it	5	8	14
4. Not retired yet	9	4	19
5. Not answered	25	8	14
The quality of our food today is:			
1. Better	49	56	34
2. Same	16	24	56
3. Worse	30	0	5
4. Not answered	16	20	5
I find myself eating for something to do:			
1. Never	30	64	48
2. Occasionally	39	20	28
3. Quite often	12	0	10
4. Not answered	19	16	14

times. In general the Fun Club and the Church Circle had approximately the same number of members (10%) who said that they quite often tended to eat for something to do.

Snacking Habits

For purposes of this investigation, snacking was considered to be any partaking of food, liquid, or solid which was consumed at times other than the usual three meals. Some people ate six times daily, others preferred two large meals. The 7-day diet records were examined for between-meal eating practices. Results are presented in Fig. 3. The most striking observation was the similarity in snacking habits of Groups I and III, as opposed to those of Group II. The majority of persons in the Fun Club and the church circle snacked frequently (2 or 3 times daily) and the same proportion of each group (24%) was either not in the habit of snacking or snacked only occasionally. The practices of persons in Group II were the direct opposite. The majority (64%) did not snack or only occasionally and the remainder of the group averaged 2 snacks daily. No one in Group II snacked 3 times daily although food was readily available at all times. Of the entire group of respondents, 35 percent did not snack at all during the week reported.

FIG. 3. FREQUENCY OF SNACKING BY PERCENT OF EACH GROUP.



General Health

Body weight for height and age. Subjects were classified as average, underweight, or overweight by use of tables of average height and weight data compiled from nearly 7,000 apparently healthy Americans, aged 65 to 94 years. Master, Lasser, and Beckman (6) tabulated average weight (±10%) for height of men and women for each five years of age. For this study, persons whose weight fell below the 10 percent range were classified as underweight and those above the 10 percent range, overweight. The few persons who were outside the 65 to 94 year age range were classified according to tables in Wohl and Goodhart (7). Slightly more than half of the subjects in each group were of average body weight for height and age. About one-fourth of the Fun Club members and one-fourth of the *home* residents were overweight. Approximately one-third of the circle members were underweight. Approximately one-third of the men and 19% of the women were overweight. Of the men only one was underweight (Table 5).

TABLE 5 - DISTRIBUTION OF SUBJECTS ACCORDING TO BODY WEIGHT FOR HEIGHT AND AGE[1]

Age Decade	Total Number of Persons	Number of Persons in Each Group								
		(I) Fun Club Weight			(II) Home Weight			(III) Circle Weight		
		Under	Avg.	Over	Under	Avg.	Over	Under	Avg.	Over
60-69	16	1	5	3	1	2	0	1	1	2
70-79	43	1	10	4	4	5	6	5	7	1
80-89	17	0	8	3	0	4	0	0	2	0
90-95	5	0	1	1	0	2	0	0	1	0
Totals	81	2	24	11	5	13	6	6	11	3

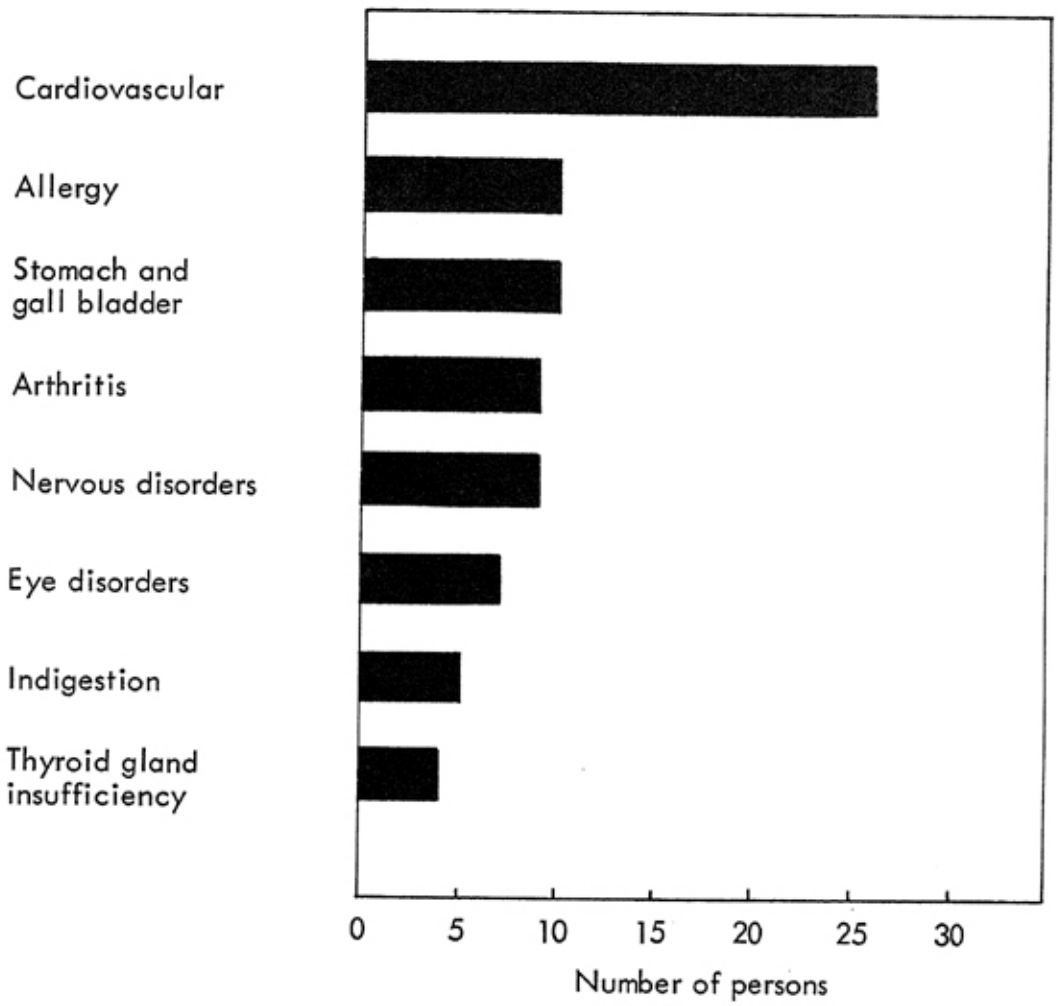
[1] Data were missing for 6 persons in Group I, one person in Group II and one in Group III.

Subjects in the two lower age decades were quite similar in body weight classification. In each decade, about half of the subjects were of average weight while one-fourth were underweight and one-fourth, overweight. Persons of age 80 and over were either of average body weight or overweight, but no one was underweight.

Chronic disorders. A large number of persons had chronic disorders for which they reported taking medication routinely (Fig. 4). Cardiovascular ailments were mentioned most frequently, followed by allergy, stomach and gallbladder disorders, arthritis, nervous disorders, eye disorders, indigestion and thyroid gland insufficiency. With less frequency and in decreasing order were mentioned anemia, back ailments, diabetes, and Parkinson's disease. Eleven percent of the entire group reported using no medications of any kind.

Condition of teeth. When asked if they had and used a complete set of teeth or dentures, 63 percent of the population answered in the affirmative. One-fourth

FIG. 4. FREQUENCY OF REPORTED CHRONIC DISORDERS REQUIRING ROUTINE USE OF MEDICATION.



of the entire group said that the condition of their teeth affected their choice of food.

Smoking. None of the women smoked and only 6 of the men reported that they were still smoking.

Use of laxatives. Twenty-four percent of the total group reported using some type of laxative regularly. In a similar study of 104 apparently healthy persons of age 50 to 97, by Davidson *et al.* (8), about one-fourth of the persons studied used laxatives regularly. Nineteen percent of Group I, 40 percent of Group II, and 14 percent of Group III reported routine use of laxatives. The unusually high frequency with which laxatives were used by Group II was suspected of

being associated with the sedentary habits of this group. However, no relationship was observed between the use of laxatives and activity, or intake of water, fruits, and vegetables.

Use of vitamin supplements. All three groups had some members who used vitamin supplements. About a third of the entire group reported taking vitamin supplements, but most of the respondents (60%) said they did not take any. Supplements were usually in the form of multi-vitamin preparations in either liquid or capsule form. Also taken were: Brewer's yeast, B-complex, vitamin-mineral tablets, thiamine, vitamin B_{12}, ironized yeast, and wheat germ.

Appraisal of Food Selection

Four Basic Food Groups

A *Daily Food Plan* based on four groups of foods has been developed for use in nutrition education programs by Page and Phipard. Earlier in this bulletin, the *Daily Food Plan* was mentioned to tell how foods were grouped. According to this guide, adherence to the following food plan will provide an adult with the basis for an adequate diet.

Milk group: 2 or more cups daily (16 ounces). This includes cheese and ice cream as a replacement for part of the milk.

Meat group: 2 or more servings daily. This includes beef, veal, pork, lamb, poultry, fish, eggs, and dry peas, dry beans, and nuts as alternates.

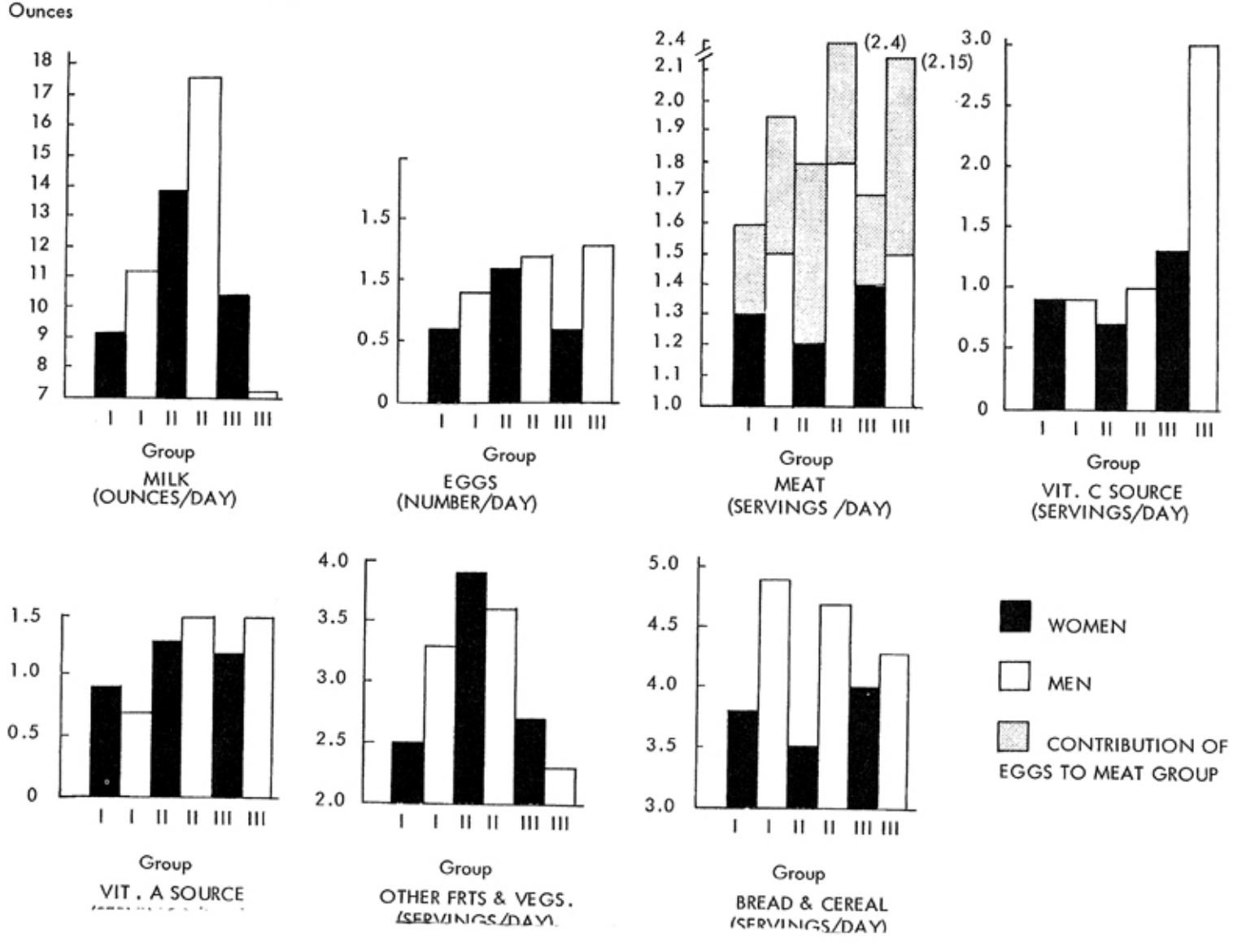
Vegetable-fruit group: 4 or more servings daily. These should include: A dark green or deep yellow vegetable for its vitamin A value, at least every other day,
A citrus fruit, or other fruit or vegetable, which is high in vitamin C content daily.

Bread-cereals group: 4 or more servings daily. These should be whole grain, enriched or restored.

Additional foods, such as fats, oils, sugars, unenriched grain products, and various mixed dishes not stressed in the food plan will help to round out the caloric needs for the day. Adherence to Page and Phipard's plan will supply the adult with 90 percent or more of the essential food nutrients recommended by the Food and Nutrition Board of the National Research Council (9).

The *Daily Food Plan* is a yardstick for measuring the adequacy of a day's food intake. It is used in particular as a quick evaluation of a 24-hour recall of food consumption. In the present study this index was applied to a seven-day food record and a mean was obtained which was representative of each food group for each individual. A seven-day record of food intake lists a larger number of foods and therefore gives a more representative picture of an individual's food intake than the 24-hour recall. Mean amounts of the four food groups consumed were summarized by sex, interest group, and age decade (Figures 5 and

FIG. 5. MEAN INTAKE OF FOOD GROUPS BY SEX AND INTEREST GROUP.



6) Table 6 gives the number of persons in each classification who met or surpassed minimum recommendations. Table 7 shows the number and combinations of food groups which were lacking from the dietaries of individuals.

Milk group. It was readily apparent that the men and women who lived in the *home* made more selections from the milk group than did members of the other two interest groups. However, only the men in Group II had a mean intake of two cups (16 ounces) or more daily. For the men in Group II, mean daily intake of the milk group was equivalent to 17.7 ounces of milk and the range was 12.0 to 28.4 ounces. Mean intake in ounces for the women residing in the *home* was 13.8 with a range of 4.1 to 24.0.

The lone male member of Group III had an average intake of 7.1 ounces of milk daily. The women averaged 10.3 ounces with a range of 1.0 to 47.0 ounces. One woman in this group followed the unusual practice of eating very little solid food but drinking large quantities of milk. Omitting her intake of 47.0 ounces would have made the mean for circle members 8.3 ounces or approximately one cup daily. This value would be more truly representative of the group.

Mean intake from the milk group for the male members of the Fun Club was 11.1 ounces; the range was 2.6 to 23.4 ounces. For the women, mean intake in ounces was 9.2 with a range of 0.6 to 28.1. Selections from this food group by nine women from the Fun Club were equivalent to one-half cup of milk or less daily. A total of 23 individuals met or surpassed the recommendations proposed for the milk group. Of these, the ratio of men to women was 2:1.

When the milk group is consumed in insufficient amounts, calcium, protein, and riboflavin may be lacking in the diet. It is possible to compensate for the protein and riboflavin by a careful selection of foods within the remaining food groups. However, this cannot be done easily with calcium because it is distributed in only limited amounts among the other food groups. It is found most abundantly and is most easily absorbed and utilized by the body from milk and milk-containing products.

More and more evidence is being accumulated to show that there is a relationship between intake of calcium and osteoporosis (10, 11). Osteoporosis is a condition in which bones become porous and fragile because calcium is withdrawn faster than it is being deposited. This disorder has been associated with senile or post-menopausal women, its occurrence being four times as frequent in elderly women as in men. In a recent study of 128 cases of osteoporosis and 103 "normal" subjects, Dallas and Nordin (12) stated that the calcium intake of their male subjects was significantly higher than that of the women. These authors suggested that possibly the difference between the calcium intakes of men and women might explain the sex difference in the incidence of osteoporosis. Dallas and Nordin found that virtually none of their subjects on high calcium intakes had osteoporosis. Many of their subjects on low calcium intakes who appeared to have normal bones complained of backache.

FIG. 6. MEAN INTAKE OF FOOD GROUPS BY AGE DECADES.

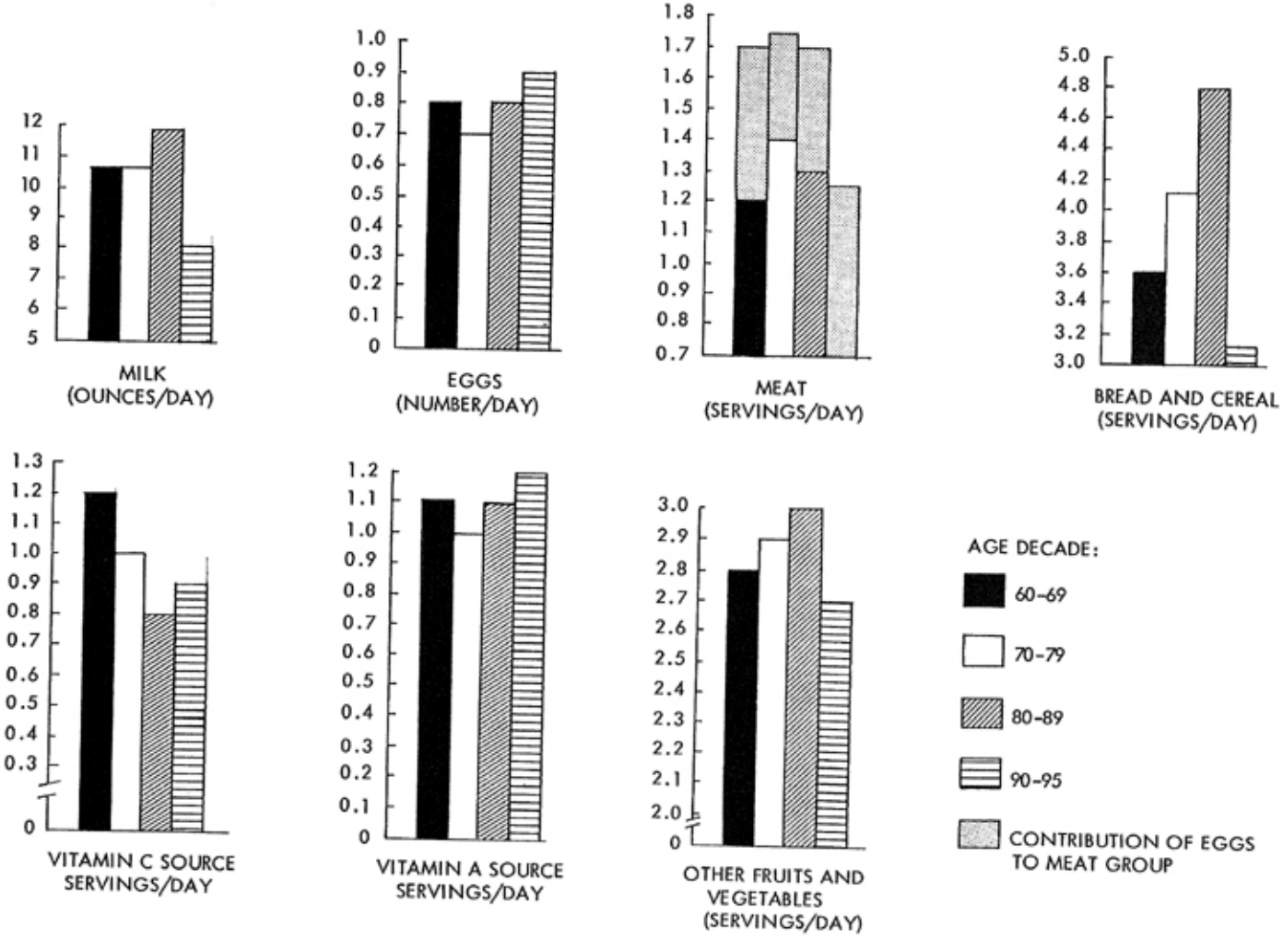


TABLE 6 - NUMBER OF PERSONS IN EACH CLASSIFICATION WHO MET OR SURPASSED MINIMUM RECOMMENDATIONS OF DAILY FOOD PLAN

Classification	No. of Persons	FOOD GROUP: Milk No.	Milk %	Meat No.	Meat %	Fruits and Vegetables: Vitamin C source No.	Vitamin C source %	Vitamin A source No.	Vitamin A source %	Cereal & Bread No.	Cereal & Bread %
Interest group											
I Fun Club	43	6	14	14	33	20	47	23	53	21	49
II Home	25	14	56	13	52	9	36	23	92	11	44
III Circle	21	3	14	8	38	18	86	13	62	12	57
Sex											
Men	27	10	37	16	59	12	44	16	59	21	78
Women	62	13	21	19	31	35	56	43	69	23	37
Age decade											
60-69	16	4	25	8	50	11	69	12	75	7	44
70-79	46	12	26	20	43	25	54	30	65	23	50
80-89	20	7	35	7	35	7	35	11	55	14	70
90-95	5	0	0	0	0	2	20	4	80	0	0
Entire group	89	23	26	35	40	47	53	59	66	44	49

TABLE 7 - APPRAISAL OF FOOD SELECTION INDICATING NUMBER AND COMBINATIONS OF FOOD GROUPS[1] LACKING FROM DIETS OF INDIVIDUALS

Number	Food Group Lacking: Description	Number of Persons
None		4
One	Milk, only	6
	Meat, only	4
	Cereal and bread, only	1
	Vit. A source, only	1
Two	Milk + meat	39
	Other combinations	22
Three	Milk + meat + cereal and bread	25
	Vit. A source + Vit. C source + other fruits and vegetables	13
	Other combinations	21
Four		17
Five		9
Six		4

[1] Food groups and components are: milk, meat, cereal and bread, vitamin A source, vitamin C source, and other fruits and vegetables.

Meat and meat alternates (including eggs). The meat group is important for its contribution to the daily diet of protein, iron, phosphorus, and vitamins of the B-complex. In all three interest groups, the men averaged 2 servings or more of the meat group daily. Mean intake for women was approximately 1.75 servings, with the lowest intake (1.6 servings) being observed for the women in the Fun Club. Mean intake of meat and meat alternates, including egg, for persons in their 60th, 70th, and 80th decades was 1.75 servings. For the 90 to 95 year-olds, mean daily intake was 1.25 servings. When data for men and women at each age decade were considered separately, it was observed that men tended to eat less meat (and alternatives including egg) with each succeeding age decade. This trend was not observed for the women.

Eggs. Eggs were classified separately because it was anticipated that they would be mentioned frequently on the older person's diet. Eggs are high in nutritive value, bland in flavor, easily prepared, and require little effort to chew and eat. The Daily Food Plan suggests that adults should eat at least 4 eggs each week. Mean intake for men and women, for the three interest groups, and for all age groups was 4 or more per week. Eggs were especially popular with the 90 to 95 year olds and were an important source of protein in their daily diets. In fact, eggs were important contributors to the meat group at all the ages.

Fruits and Vegetables

Vitamin C source. It appeared that people either had the habit of eating fruits and vegetables, which are good sources of vitamin C, or they did not. Of the entire group, 53 percent selected one or more servings daily but 27 percent selected 0.4 serving or less. Groups I and II were similar in that a third of each group consisted of persons who had a mean daily intake of 0.4 serving or less. Only 3 persons in Group III selected less than the recommended one serving daily.

Thirty percent of the men and 26 percent of the women selected an intake of 0.4 servings or less daily. Approximately a third of the men and a third of the women in Group I had a similarly low intake but the largest group with such a low intake of this nutrient were the women residing in the *home* (44%). This seemed particularly unwarranted as foods which are good sources of vitamin C were available and served daily. Knowing this, it seems rather unnecessary that only a few women in that group (30%) should choose to eat the suggested amount of a good source of this nutrient.

Persons in the 60th decade had a mean daily intake of 1.2 servings, those in the 70th decade, 1.0, those aged 90 to 95, 0.9 and those in the 80th decade, 0.8 servings.

Vitamin A source. The minimum recommended intake of a good source of vitamin A is one serving every other day. In the present study, this was calculated as a mean intake of a half serving daily. Figures 5 and 6 show that all three interest groups, the sexes, and all age decades surpassed the recommendation of one serving every other day. However, as observed with vitamin C, some

persons were in the habit of selecting fruits and vegetables containing this nutrient frequently while others were not. One-third of all respondents selected less than a half serving daily. Of the men, 40 percent, and of the women, 30 percent, averaged less than half a serving daily.

Many persons in the Fun Club (almost 50%) and the church circle (40%) did not select a good source of vitamin A at least every other day. All but two persons residing in the *home* attained or surpassed the suggested amount. When data were catagorized by age decades, the largest number of persons with less than the suggested amount were in their 80s (40%). The Fun Club, with the smallest consumption of a good source of vitamin A, had the largest number of persons aged 80 to 89.

It was evident from the consumption of "other" fruits and vegetables that this particular food group was well liked by older people. However, quite a few of them need guidance in making more intelligent selections from within the fruit and vegetable group of foods.

Bread and cereals. Bread and cereals were a popular food group with the men. They had a mean intake which surpassed the minimum recommendation of four servings daily. Women in the church circle met the recommendation, but those in the Fun Club and the *home* did not. Persons in their 60s and 90s had the lowest mean intake. This food group does not contribute an outstanding amount of any one nutrient, but, rather, is important for its supplementary contribution to the diet of calories, protein, calcium, phosphorus, iron, and many of the B-vitamins.

Appraisal of Food Selection Summarized

A table was prepared in which the appraisal of food selections was summarized (Table 8). Only the male residents of the *home* made selections from the four food groups in sufficient amounts to provide them with the basis for an adequate diet. The most inadequately consumed food group was milk. Only the male residents of the *home* had a mean intake of two cups or more daily. Almost twice as many men as women had the equivalent of 16 ounces of milk daily. Men averaged two servings or more of the meat group daily, the women, approximately 1.75 servings. For all interest groups, sexes, and age decades, eggs made a substantial contribution to the meat group.

There was a great deal of individual variation in the consumption of good sources of vitamins C and A. It appeared as if these fruits and vegetables were either eaten regularly and in generous amounts or infrequently. Of the 89 subjects, 53 percent averaged one or more servings daily of a good source of vitamin C. There was almost an equal distribution among men (30%) and women (26%) of a poor intake of this food source (0 to 0.4 servings daily). All three interest groups, both sexes, and all age decades had a mean intake of a vitamin A source which surpassed recommendations. However, less than the recommended amount was consumed by the following: a third of the entire group,

TABLE 8 - SUMMARY OF FOOD SELECTION BY VARIOUS CLASSIFICATIONS OF SUBJECTS

Subjects		Food Group[1]					
				Vegetables & Fruits			
Classification	Number	Milk	Meat	Vitamin C Source	Vitamin A Source	Other	Bread and Cereals
I Fun Club							
Men	17	-	+	-	+	+	+
Women	26	-	-	-	+	+	-
II Home							
Men	9	+	+	+	+	+	+
Women	16	-	-	-	+	+	-
III Church Circle							
Men	1	-	+	+	+	+	+
Women	20	-	-	+	+	+	+
Age decade							
60-69	16	-	-	+	+	+	-
70-79	46	-	-	+	+	+	+
80-89	20	-	-	-	+	+	+
90-95	5	-	-	-	+	+	-

[1] A dash (-) symbolizes mean intake below that recommended in the Daily Food Plan. Plus symbol (+) indicates Daily Food Plan recommendations were met.

40 percent of the men, 30 percent of the women, and 40 percent of persons in the 80th decade.

Breads and cereals were more popular with the men than the women. The men in all three interest groups selected more than four servings daily but only the women in the church circle met the recommendations. A majority of persons in their 60s and 90s selected less than four servings daily.

Frequency Distribution of Individual Foods

In the process of evaluating diets, a great deal of repetition was observed in the use of some foods. Therefore, the frequency with which certain individual foods within food groups occurred on diet records was enumerated for respondents by age decade (Table 9).

Meat, Fish, Poultry

Beef was the most popular meat choice, being selected 24 to 31 percent of the time. Next in order were pork and ham, fowl, and bacon. Fish was chosen more frequently by the 90-95 year olds than by the younger respondents. With each age decade, the kinds of meat chosen appeared to be less varied. A comparison of data for respondents in this study with findings reported by Burrill

TABLE 9 - FREQUENCY DISTRIBUTION OF INDIVIDUAL FOODS WITHIN FOOD GROUPS IN PERCENTAGE OF TIMES FOOD WAS SELECTED BY EACH AGE DECADE

	Age Decades			
	60-69	70-79	80-89	90-95
	%	%	%	%
Meats				
Beef	24	26	31	24
Pork and Ham	22	18	27	21
Bacon	14	19	18	6
Lunch Meat	3	5	2	--
Fowl	16	16	13	23
Fish	5	4	5	12
Mixed Dishes	7	4	2	12
Organ Meat	3	4	2	2
Veal	2	1	--	--
Lamb	2	--	--	--
Other	2	3	--	--
Total	100	100	100	100
Meat Alternates				
Eggs	62	59	66	78
Cheese	26	28	25	20
Legumes	10	9	6	--
Peanut Butter	2	4	3	2
Nuts	--	--	--	--
Total	100	100	100	100
Vitamin Rich Vegetables				
Asparagus	2	8	1	4
Broccoli	2	2	3	4
Green Beans	26	18	24	12
Cabbage	19	13	18	12
Carrots	17	18	13	5
Mixed Vegetables	5	8	4	--
Peas	12	29	11	16
Pumpkin	--	3	4	7
Spinach and Greens	11	4	5	27
Winter Squash	1	3	--	--
Sweet Potatoes	5	4	17	13
Total	100	100	100	100
Other Vegetables				
Beans, Lima and Wax	1	5	9	1
Beets	17	7	2	28
Celery	13	5	3	1
Cucumbers	3	1	1	--
Corn and Hominy	17	19	25	31
Lettuce	18	41	35	28

Table 9 Continued

	Age Decades			
	60-69	70-79	80-89	90-95
Other Vegetables con't				
Onions	14	6	4	7
Parsnips	--	1	1	--
Radishes	--	2	--	--
Turnips	6	7	15	--
Other	11	6	5	4
Total	100	100	100	100
Vitamin-Rich Fruits				
Orange and Grapefruit Juice	24	23	24	28
Grapefruit	19	14	1	5
Oranges	13	9	6	3
Tomatoes	20	16	31	17
Apricots	6	5	5	--
Peaches	8	21	19	30
Prunes	6	11	12	17
Berries	4	1	2	--
Total	100	100	100	100
Other Fruits				
Apples	47	43	61	43
Mixed Fruit	10	6	1	8
Bananas	4	10	7	6
Rhubarb	1	--	--	--
Pears	3	3	4	--
Cherries	11	7	6	2
Pineapple	9	7	7	--
Plums	1	3	3	5
Raisins	5	5	2	--
Grapes	2	4	2	--
Juices	4	9	9	36
Other	3	3	2	--
Total	100	100	100	100
Desserts (Other Than Fruit)				
Cake	25	15	11	14
Pie	21	24	21	11
Cookies	13	13	22	23
Ice Cream	12	21	25	30
Puddings	6	9	8	9
Jello	20	16	11	13
Doughnuts	3	2	2	--
Total	100	100	100	100

et al. (13) indicated that, in general, senior citizens from Columbia chose to eat more bacon and fowl but less beef and somewhat less pork and ham than the Minnesota and South Dakota respondents of similar age.

Judging from the frequency with which bacon appeared on Columbia dietaries, it is possible that some of the respondents considered a serving of bacon to be on a par with a serving of meat. This is not so because, even after cooking, bacon is considerably higher in fat and lower in protein content than most meats.

Meat Alternates

Of the meat alternates, eggs were consumed two to four times as frequently as the next most frequent alternate, cheese.[1] With all age groups, cottage cheese was the favorite cheese. Peanut butter occurred on dietaries rather infrequently, the range for the four age decades being 2 to 4 percent of the time.

Vegetables

Of the vitamin-rich vegetables, green beans were the most popular (12-26%), followed by peas (11-29%), cabbage (12-19%), carrots (5-18%), and spinach and greens (4-27%). Sweet potatoes seemed to be fairly popular with the 80 to 95 year olds (17 and 13%). Among "other" vegetables, lettuce was selected most frequently (18-41%), followed by corn and hominy (17-31%) and beets (2-28%).

Fruits

Of the vitamin-rich fruits, oranges and grapefruit, in the form of juice, were selected most frequently with very little variation among the age decades (23-28%). These were followed by tomatoes and peaches. Selected less frequently were prunes, 6 to 17 percent of the time, grapefruit, 1 to 19 percent and oranges 3 to 13 percent of the time.

Among "other" fruits, apples were a very strong first choice and were selected 43 to 61 percent of the time. Apples were especially popular with the 80-89 year olds. The juices of these "other" fruits appeared on dietaries four to 36 percent of the time and were favored, in particular, by persons in their 90s. Bananas represented four to 10 percent and mixed fruit, 1 to 10 percent of the "other" fruit choices.

Desserts, Other Than Fruit

Among desserts other than fruit, ice cream was the most popular, and the frequency with which it was selected increased with each age decade (12-30%). Pie was the next most popular dessert (11-24%), while cakes and cookies combined were selected 28 to 38 percent of the time. Jello was eaten more frequently (11-20%) than puddings (6-9%). Considering the assortment of pudding mixes on the market, the ease with which puddings may be prepared and eaten,

[1]Although cheese was classified with the milk group because of its noteworthy contribution of calcium to the diet, it is a meat substitute because of its high protein content.

together with the need for a better milk intake by the majority of senior citizens in this study, it would appear that this food product deserves more emphasis in nutrition education programs.

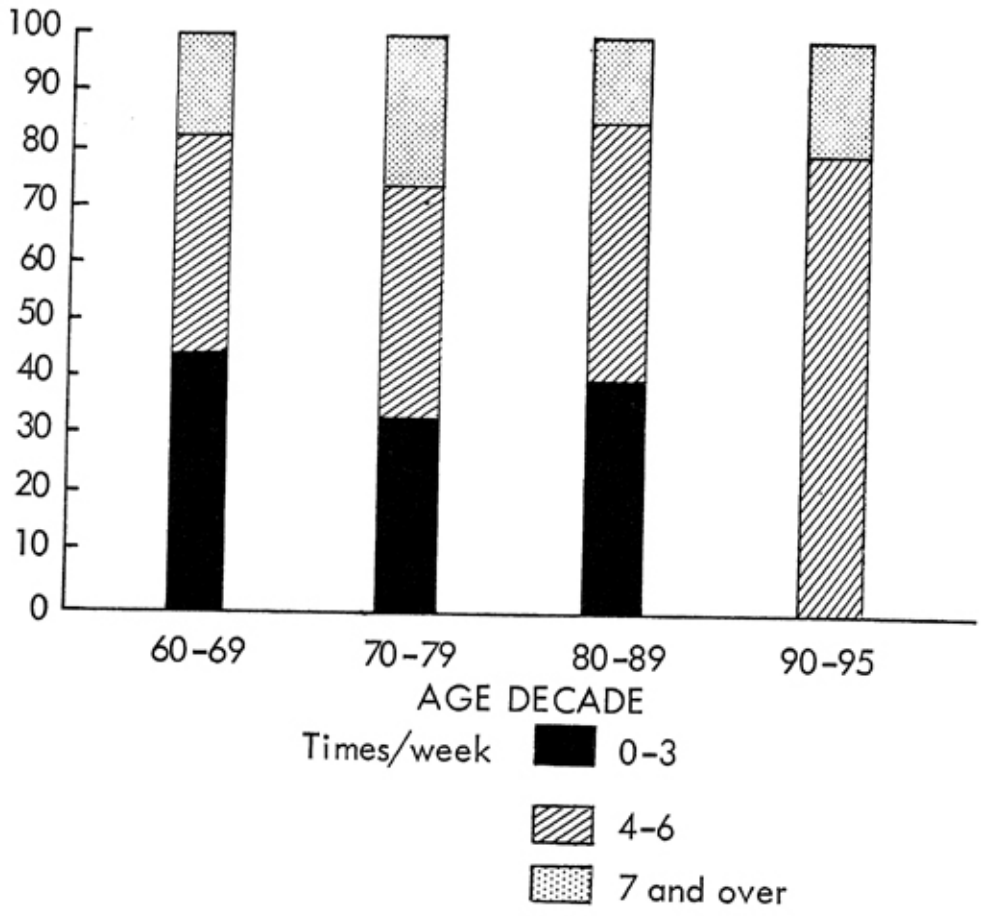
White Potatoes

White potatoes were eaten four or more times a week by two-thirds of the respondents. Only one person ate none. All five of the 90 to 95 years olds had potatoes four or more times during the week. The highest percentage of people eating seven or more servings per week was among those in the 70th decade, which had the highest proportion of men (Fig. 7).

Soup.

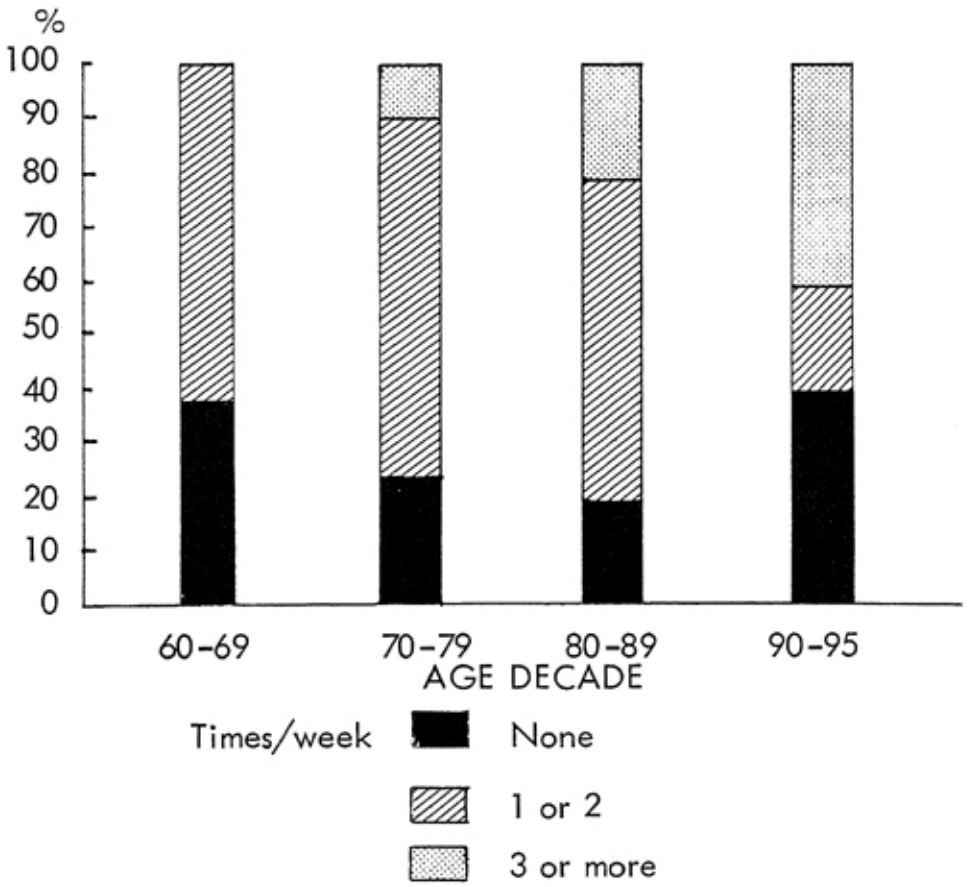
About three-fourths of the respondents had soup at least once during the week. There was a tendency for this food item to be selected more frequently with increasing age. None of the respondents in their 60s listed soup on their

FIG. 7. FREQUENCY WITH WHICH WHITE POTATOES OCCURRED ON DIETARIES IN PERCENT OF TOTAL GROUP BY AGE DECADES.



dietaries, but two of the five persons in their 90s chose to eat soup three or more times during the week (Fig. 8).

FIG. 8. FREQUENCY WITH WHICH SOUP OCCURRED ON DIETARIES IN PERCENT OF TOTAL GROUP BY AGE DECADES.



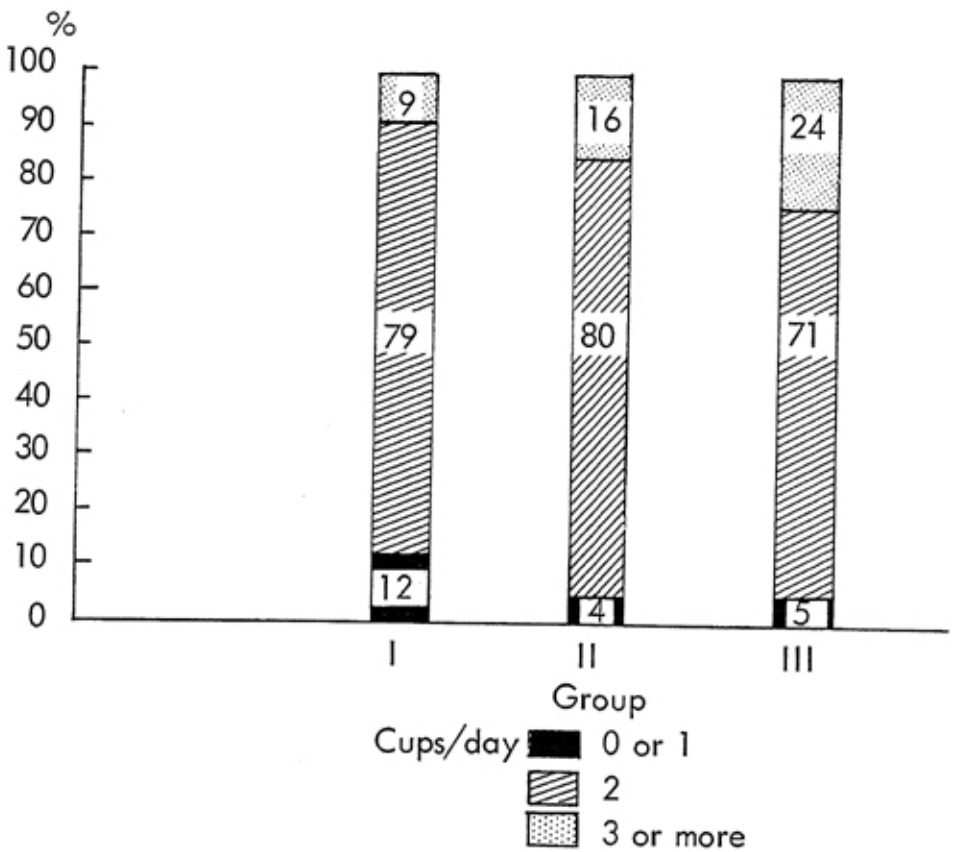
Tea and Coffee

Tea and coffee were consumed in amounts of two or more cups daily by 92 percent of the respondents. The heaviest drinkers were the church circle members (Group III) with about one-fourth of the group drinking three cups or more daily (Fig. 9).

Tap Water.

As a person ages, his water intake becomes increasingly important, because of the general slowing down of all body processes. End products of metabolism

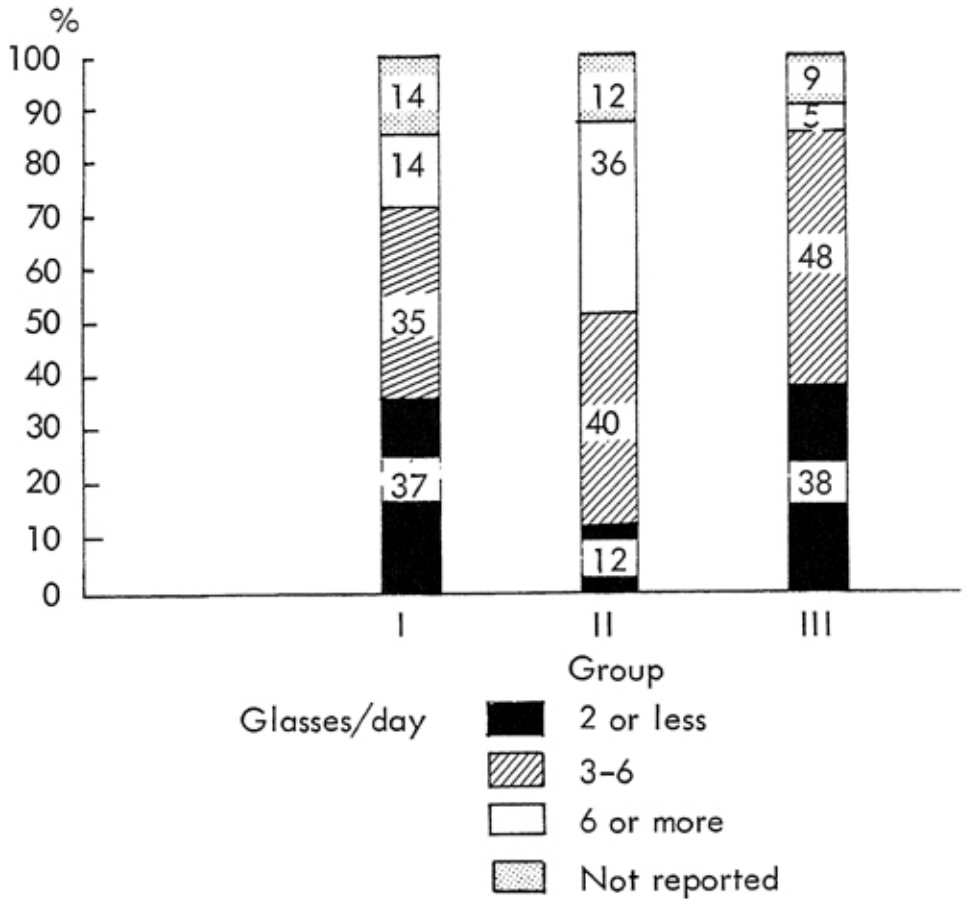
FIG. 9. CONSUMPTION OF COFFEE AND TEA REPORTED IN PERCENT OF EACH GROUP.



are still being produced and must be eliminated from the body. Stieglitz (14) has recommended that the optimum intake of fluid, for the average person, should consist of approximately 2 quarts of beverage fluids daily. Such an intake of fluids would result in a urinary output of approximately 1½ quarts. Fluid intake is stressed for the elderly because kidneys must work harder to rid the body of metabolic debris when it is concentrated in a small volume of urine than when it is diluted in a larger volume. In addition, with aging, many individuals develop circulatory ailments. These involve the kidneys, which would emphasize the importance of their proper functioning.

No attempt was made in this investigation to assess total fluid intake of the subjects. It was observed, however, that approximately 50 percent of Groups I and III and 75 percent of Group II drank three or more glasses of tap water daily (Fig. 10). It would appear that such an intake of tap water together with

FIG. 10. APPROXIMATE INTAKE OF TAP WATER BY PERCENT OF EACH GROUP.

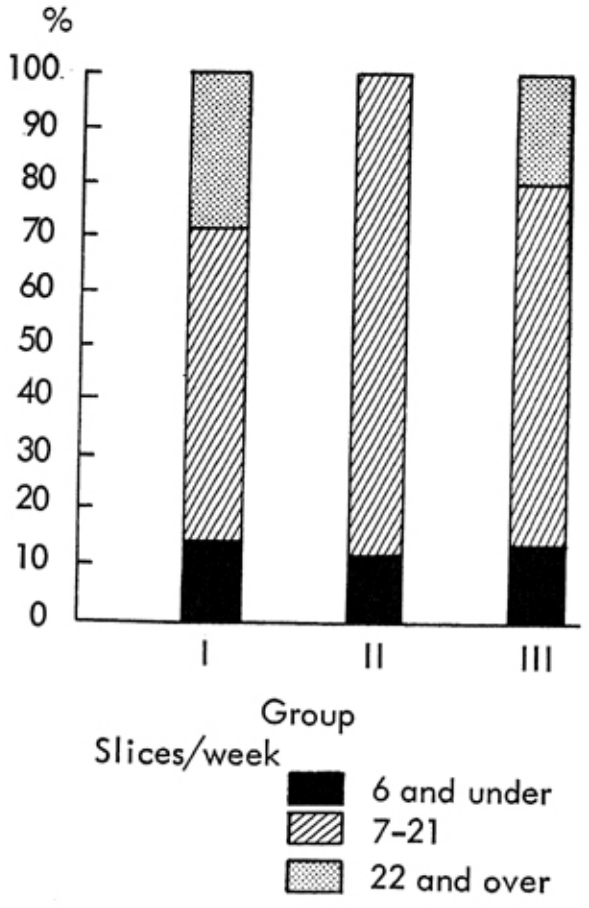


tea, coffee, milk, soups and soft drinks should bring the beverage fluid level for these individuals up to the recommended two quarts with no difficulty. The importance of fluids in the daily diet should be included as a part of nutrition education programs especially for elderly persons.

Slices of Bread

Bread was eaten by a majority of the group (70%) in amounts of one to three slices daily, with 16 percent of the respondents eating four or more slices. Excluded from this latter group were the *home* residents and the 90 to 95 year-olds. The Fun Club had the largest number of persons (28%) who ate four or more slices of bread each day. No one aged 80 to 89 averaged less than one slice of bread daily (Fig. 11).

FIG. 11. SLICES OF BREAD CONSUMED BY PERCENT OF EACH GROUP.



Breakfast Cereals

Breakfast cereals were a popular food with senior citizens of Columbia. Sixty percent of the respondents ate them three or more times weekly, while less than a quarter ate no cereal. When the percentage of persons using breakfast cereals four or more times weekly was graphed for each age decade, a stepwise increase with age was observed (Fig. 13).

Although this food item appeared most often on the breakfast menu, it also was eaten frequently for snacks and as the main component of the evening meal. Some of the members from all three interest groups ate breakfast cereal for supper at one time or another during the week. Many residents of the *home* (44%) ate cereal for supper at least one time during the week, while one member of their group (male) ate breakfast cereals for snacks eight times during the week. At the opposite extreme were the members of the Fun Club (35%) who ate no breakfast cereal at any time during the week.

FIG. 12. FREQUENCY WITH WHICH BREAKFAST CEREAL APPEARED ON DIETARIES BY PERCENT OF EACH GROUP.

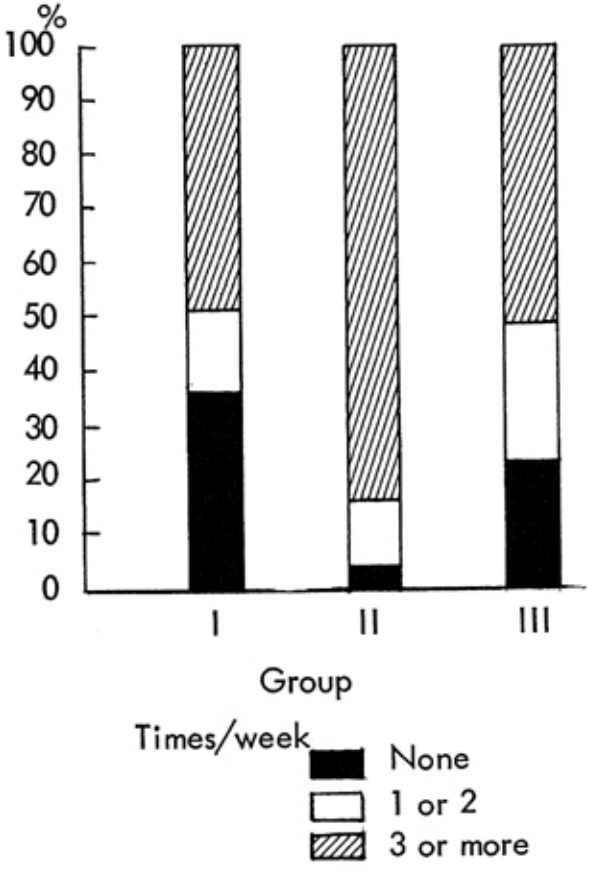
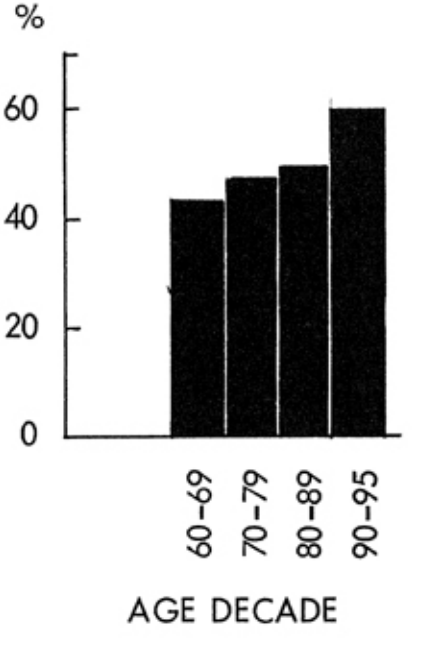


FIG. 13. PERCENT OF EACH AGE DECADE USING BREAKFAST CEREAL 4 OR MORE TIMES PER WEEK.



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APPENDIX

TABLE A - CRITERIA USED FOR CLASSIFYING FOOD ITEMS ON DIETARIES INTO SERVING PORTIONS AMONG FOOD GROUPS

I. Milk Group

Count in ounces: (One 8 ounce cup of milk equivalent to 300 mg. calcium)

8 ounces - 1 cup of fluid whole, skim, or buttermilk

8 ounces - 1/2 cup undiluted evaporated milk
7 ounces - 1 glass milk
6 ounces - 1 cup cocoa
6 ounces - milk on cereal or milk toast, when amount is not specified

IF AMOUNT OF MILK USED IN COFFEE OR TEA IS NOT SPECIFIED COUNT AS 1 TABLESPOON (16 T/Cup).

Milk equivalents:

4 ounces - serving of ice cream (2/3 cup)
2 ounces - ice cream served on side, as with pie
4 ounces - cup custard (1/2 cup) or piece of custard pie
4 ounces - serving of milk pudding or cream pie
4 ounces - bowl of cream soup
2 ounces - serving of milk sherbet (2/3 cup)

5 ounces - 1 ounce or 1 slice of cheese, natural or processed
4 ounces - 1 ounce of cheddar cheese food
3 ounces - 1/2 cup cottage cheese

II. Meat Group (Beef, veal, pork, lamb, poultry, fish, eggs; dry peas, dry beans and nuts as alternates)

Count in servings: (1 serving equivalent to 15 gm. protein)

1 serving: 2 ounces of lean cooked, without bone, of beef, veal, lamb, pork, poultry or fish

Bowl of Chili

1/2 cup creamed dried beef

1/2 serving: 1/2 cup cooked dried peas or beans
2 Tablespoons peanut butter
1 Frankfurter
2 slices luncheon meat
1 egg
1 sausage patty

1/4 serving: 2 slices bacon

III. Fruit and Vegetable Group

A. Dark green and deep yellow sources of vitamin A value

Count in servings (1 serving equivalent to 2500 IU vitamin A value)

1 serving: 5 halves of apricots, canned, fresh or dried
1/2 cup broccoli
1/8 cup carrots, cooked and diced
1/2 medium raw carrot
1 piece pumpkin pie
1/8 cup cooked spinach, turnip or mustard greens
1/4 medium sweet potato (yellow) baked
1/4 cup sweet potato, cooked
1 large tomato, fresh
1/4 cup winter squash, baked

1/2 serving: 1 cup tomato soup
1/2 cup apricot nectar
1/2 cup mixed vegetables
1/2 cup tomatoes, juice, cooked, canned

B. Sources of vitamin C

Count in servings (1 serving equivalent ot 50 mg. ascorbic acid)

1 serving: 1 orange, 1/2 grapefruit
1/2 cup orange juice, grapefruit juice or mixture of the two
1/2 cup broccoli
1 large, raw tomato

1/2 serving: 1/2 cup Brussels sprouts
1/2 cup cole slaw
1/2 cup spinach, turnip or other greens
1/2 small green pepper
1/2 cup cabbage cooked
2/3 cup sauerkraut
2/3 cup tomatoes, cooked or juice
1 medium potato - sweet or white - cooked in jacket
1 small serving frozen strawberries

C. Other fruits and vegetables

Count in servings

1 serving: 1/2 cup raw or cooked vegetable
1/2 head lettuce
2 stalks celery
1 medium white potato - not cooked in jacket
1/2 cup white potatoes
1 small apple
3 prunes or plums
1 small banana
1/2 cup berries or fruit cup
1 bunch grapes
1 medium pear or peach

IV. Bread and Cereal Group (Whole grain, enriched, or restored)

Count in servings

1 serving:	1 slice bread, 1 piece cornbread 1 roll, muffin, doughnut, biscuit, waffle, or pancake 1 ounce or 1 cup ready-to-eat cereal 1/2 to 3/4 cup cooked cereal, macaroni, noodles, rice, or spaghetti 3 medium graham crackers 1 cup popcorn 3 oatmeal cookies
2 servings:	1 wiener or hamburger bun