

**NUTRITION AND THE ELDERLY
NEEDS, PROBLEMS, AND PROGRAMS**

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July 1973

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I.

NUTRITIONAL REQUIREMENTS OF THE ELDERLY

There is considerable disagreement among experts concerning the nutritional requirements of the elderly. It is generally agreed that calorie requirements are lowered with increasing age. For protein, vitamins, and minerals, however, there is often disagreement on the direction of possible changes. Determination of recommended daily allowances for the elderly is complicated by the fact that even when mean requirements remain constant, the variance of requirements within a population increases with increasing age. Moreover, the usefulness of determining the optimal dietary intake of a healthy elderly person is diminished by the fact that the majority of elderly persons have one or more chronic illnesses. Illnesses may affect nutritional requirements, absorption, or both. Average requirements, therefore, are less likely to be applicable to a given individual than in other age groups.

A. REQUIREMENTS OF THE HEALTHY INDIVIDUAL

It is nonetheless important to have some idea of what "normal" requirements are. Nutrient requirements of the elderly have been discussed in several reviews (4, 6, 8, 9, 10, 11). Two sets of allowances, those used in the recent U.S. National Nutrition Survey and the Recommended Dietary Allowances published by the National Academy of Science are summarized in Table 1.

1. Calorie Requirements

Calorie requirements decrease with increasing age. There is a decrease in the basal metabolic rate (11) and a decrease in physical

activity. The Food and Nutrition Board of the National Research Council recommends that calorie allowances be decreased by 5% between ages 22 and 35, by 3% per decade between 35 and 55, by 5% per decade between 55 and 75, and by 7% per decade from age 75 on (5). However, requirements vary considerably from person to person and in practice it is recommended that each individual adjust his calorie intake to maintain constant weight, or to reduce if overweight. Several surveys have shown that the majority of elderly persons are more than 10% heavier than their desirable weights (1). This means that it is important for them to restrict calorie intake while choosing foods in such a way as to obtain the required amounts of other nutrients. Simply eating a little less of all the foods eaten earlier in life may result in inadequate vitamin, mineral, or protein intakes.

2. Protein Requirements

Although numerous studies on the protein requirements of the elderly have been done, especially with reference to possible changes in the optimal ratio of essential to nonessential amino acids, there is no convincing evidence that protein requirements differ from those of younger adults (9).

3. Fats

Ideally, calories provided by fats should comprise 30-35% of total calorie intake at any age (1). However, more than 41% of the total calories available in the United States are derived from fats. Simply in order to reduce calorie intake a lower consumption of fats would be desirable. There is also considerable evidence that overconsumption of highly saturated animal fats is particularly detrimental to health since it increases the serum cholesterol level and is associated with an increased

incidence of atherosclerosis (1, 10, 11). Avoidance of highly saturated fats is particularly important among the elderly who have a high risk of coronary artery disease, but should begin much earlier in life to be effective as a preventive measure.

4. Carbohydrates

There is no evidence to indicate that carbohydrate requirements for the aged differ from those for young adults, except to the extent that calorie requirements are decreased (11).

5. Vitamins and Minerals

Serum levels of some vitamins decrease with age, but the decrease is usually small. There is some evidence that due to decreasing gastric acidity in old age, intestinal absorption of B₆, B₁₂, folate, and calcium decreases (1, 23). There are some intriguing indications that vitamin E may help to prevent the general cellular deterioration found with aging, but research into this question is just beginning (21). None of the available evidence is strong enough to justify increased or decreased vitamin or mineral requirements for the elderly. However, several diseases common in old age are linked to vitamin deficiencies and are discussed below.

6. Trace Elements

Deficiencies of most trace elements are uncommon. Chromium deficiency, however, has been found in the United States (36). In rats, chromium deficiency results in raised serum cholesterol levels and lipid deposition in the arteries (35, 36). There is some epidemiological evidence that populations with higher chromium consumption have lower incidences of atherosclerosis (35, 36). Chromium is obtained through consumption of

whole grains, dark brown sugar, molasses, corn oil and nuts, most of which are not heavily consumed in the United States (6).

Zinc deficiencies have been indirectly indicated among the elderly by beneficial effects of zinc supplements (6). One action of zinc is to oppose vasoconstriction beyond a partial arterial obstruction (6) and this action may be especially important to elderly persons.

B. DISEASES OF THE ELDERLY LINKED TO NUTRITIONAL DEFICIENCIES

1. Bone Diseases and Calcium, Fluoride, and Vitamin D

One of the most long-standing controversies in geriatric nutrition concerns the relationship of calcium intake to osteoporosis ("porous bones"). Most elderly people are continually losing skeletal calcium and in 20% of all elderly women and 10% of all elderly men this results in a condition serious enough to be classified as osteoporosis (1). Various studies have shown that high incidences of osteoporosis are correlated with long term low calcium intakes (29, 30, 31, 34). Other studies, however, have failed to confirm these results (24, 26, 27, 32, 33). Some authors contend that negative calcium balances in old age can be reversed through use of calcium supplement, thus preventing osteoporosis, while others contend that this is false. There is also some question as to whether or not high calcium intakes can be harmful, since deposition of calcium in the soft tissues is common among the elderly.

It is generally accepted that deficiency of vitamin D in adults causes osteomalacia and that this disease is much less common than osteoporosis. Several authors, however, have reported results in which low vitamin D intakes were correlated with high incidences of bone

problems to a larger extent than expected (18, 19, 20). This indicates that osteomalacia may be more common than is usually suspected and may be masked by or confused with osteoporosis. Several practitioners have reported finding a relatively large number of cases of osteomalacia among their patients (16, 17). Most of these studies, however, were done in small localities in Britain, where the climate may have been largely responsible for the low vitamin D intakes.

An impressive survey of two communities in North Dakota with and without fluoridated water has provided evidence that fluoride may be important in prevention of osteoporosis (37). There is also evidence that fluoride supplements, when given to osteoporotic subjects, result in a shift from negative to positive calcium balance (39).

2. Senile Dementia and the B-Vitamins

The causal relationships of vitamin B₁₂ and folate deficiencies in mental disorders including senile dementia are well documented (12, 15). Improvement of mental symptoms among institutionalized patients with vitamin B₁₂ injection treatments has been reported (12).

C. DISEASES OF THE ELDERLY AFFECTING NUTRITIONAL REQUIREMENTS

Diseases common among the elderly include atherosclerosis, hypertension (high blood pressure) and diabetes. These diseases require restriction of dietary intake of fats, sodium, and carbohydrates, respectively. Obtaining special diets often means higher costs, as well as requiring changes in long established dietary habits. It is especially difficult for the elderly, who are frequently poor and without transportation to large stores, to adhere to such diets.

D. PREVENTITIVE NUTRITION

It is important to note that many of the nutritional problems of the elderly result from poor eating habits throughout a lifetime rather than severe deficiencies in old age. Incidences of osteoporosis and other bone diseases are correlated, if at all, with long term, low calcium intakes not with deficiencies in old age alone. Avoidance of saturated fats in order to prevent lipid deposits in the arteries should begin early in life. Short term programs must seek to correct nutritional problems found among those who are already old, but long term programs should include nutrition education for younger adults to help prevent some of these problems.

TABLE I
DAILY NUTRITIONAL REQUIREMENTS OF THE ELDERLY

	<u>National Nutrition Survey¹ (3)</u>		<u>National Research Council (5)</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
Calories Kcal/kg body weight				
Age: 50-59	36	30	Age: 55+	2400 Kcal
60-69n	34	29		1700 Kcal
70+	34	29		
Protein gm/kg body weight				
20+	1.0	1.0	65 gm	55 gm
Vitamin A				
12+	3500 I.U.	3500 I.U.	5000 I.U.	5000 I.U.
Thiamine				
All ages	.4mg/1000 cal.	.4 mg/1000 cal.	1.2 mg	1.0 mg
Riboflavin				
All ages	.55 mg/1000 cal.	.55 mg/1000 cal.	1.7 mg	1.5 mg
Niacin				
All ages	6.6 mg/1000 cal.	6.6 mg/1000 cal.	14 mg	13 mg

7

TABLE I (cont.)

	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
Vitamin B ₆			2.0 mg	2.0 mg
Vitamin B ₁₂			6 μ g	6 μ g
Folacin			.4 mg	.4 mg
Vitamin C				
All ages	30 mg	30 mg	60 mg	55 mg
Vitamin E			30 I.U.	25 I.U.
Adults			30 I.U.	25 I.U.
Calcium				
Adults	400 mg	400 mg	800 mg	800 mg
Iron				
20-55	10 mg	18 mg	10 mg	18 mg
55+	10 mg	10 mg	10 mg	10 mg
Phosphorus				
Adults			800 mg	800 mg
Iodine				
55+			110 μ g	80 μ g
Magnesium				
Adults			350 mg	350 mg

¹These standards for evaluation of dietary intake were developed by an ad hoc committee after review of the National Research Council, Recommended Dietary Allowances and the various FAO/WHO publications on nutritional requirements. Standards for calories, although expressed differently, approximate those in the RDA, calcium, vitamin A and vitamin C standards are nearer those recommended by FAO/WHO and are considerably lower than those in the RDA. Standards for other vitamins and minerals, even where expressed differently, are similar to those in the RDA.

II.

DIETARY HABITS OF THE ELDERLY

A. FACTORS AFFECTING DIETS

There are many different factors affecting the eating habits of the elderly. These include income, availability of transportation, storage and refrigeration facilities, size of packaging, ethnic and family customs, education, physical limitations, chronic disease and psychological factors such as loneliness and depression. The relative importance of these factors is given by a survey of one hundred elderly persons living alone who listed the following reasons for changes in food habits: medical, 41%; social, 30%; economic, 20%; teeth, 4%; and stores, 2% (46).

1. Income

Of the 20 million people over 65 years old in the United States, approximately 5 million have incomes below the poverty line (49). It was estimated in 1967 that 1/3 of all unrelated older men and 1/2 of all unrelated older women had incomes of less than \$1,000 per year (11). At the same time, it was estimated by the Bureau of Labor Statistics in 1966 that an elderly person living alone needed about \$2,130 to maintain a moderate level of living (1). Since costs for rent, utilities, and medicines are fixed, it is assumed that food expenditures are the most elastic in the household budget and that the diet suffers at low levels of income. Several studies have demonstrated some correlation between poor diets and low income, but the results are not as convincing as one might expect (1, 42, 43, 52). In fact, Dr. Jean Mayer of the Harvard University Department of Nutrition argues that low income is not an important cause of poor

diets (151). He points out that in the recent National Nutrition Survey most differences found between low and high income groups were not significant. Moreover, between 1955 and 1965 average American incomes increased while the percentage of diets rated poor rose from 15% to 21%. While income must affect some diets, there are apparently other factors that are more important.

2. Lack of Mobility

Absence of transportation means that many elderly persons must shop in neighborhood stores to which they can walk even if this means paying higher prices. Shopping, in any case, is often physically difficult. Transportation problems also discourage the elderly from participating in government programs such as the Food Stamp and Commodity Distribution Programs since stamps and commodities often must be picked up at a particular time at an inconveniently located distribution center.

3. Health Factors

Over half of all persons over 65 years of age have no teeth (65). Moreover, aging is accompanied by reductions in the senses of taste and smell. Drugs taken for chronic illnesses may cause lack of appetite, nausea or interference with metabolism of nutrients. All of these factors make eating more difficult and less pleasant for the elderly, even when special diets are not prescribed.

4. Psychological Factors

Meals are usually a social event as well as a means of satisfying hunger. For those of the elderly who live alone, lack of company often means lowered incentives to cook and eat properly. Depression, loneliness, feelings of inadequacy and a sense of the imminence of death may reduce

incentives to maintain health with good nutrition. It has been reported that the aged often seek to eat familiar foods as part of a pattern of reminiscencing about earlier life. It becomes important for the nutritionist, when giving advice, to recognize such psychological roles a diet is fulfilling. Problems are compounded when adherence to a strictly prescribed diet is required.

5. Education and Habit

It is frequently stated that lack of education contributes to poor diets. In fact, however, there is little evidence to support this theory. One study performed in New York State demonstrated that food faddism was more prevalent among the elderly and among the less educated than among other groups, but that differences in education did not explain the prevalence of faddism among the elderly (45). It is also known that the majority of patients who have prescribed diets, i.e., know definitely what foods are good and bad for them, do not adhere to the diets (1). On the other hand, ethnic food preferences do play a role in determining quality of diets. This is amply demonstrated by the results of the National Nutrition Survey in which white, black, and Spanish-American groups were evaluated separately. Education or miseducation in the home and community is apparently more important than levels of formal education.

B. RESULTS OF NUTRITIONAL SURVEYS

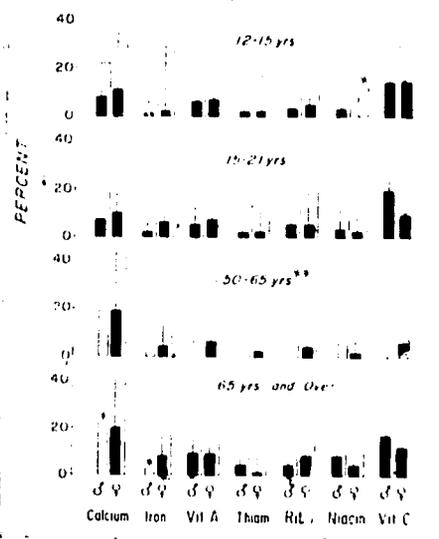
Numerous studies of the dietary intake and of biochemical levels of nutrients among the elderly have been carried out, both in the United States and in Great Britain. Many of these studies used small, unrepresentative samples, but a few used large samples and were comprehensive.

The most useful data is that found in the recent National Nutrition Survey, which covered more than 86,000 persons in ten states and included a collection of socioeconomic, anthropometric, clinical, dietary and biochemical data for all ages (65). The samples in this survey, however, were deliberately biased towards lower income families, so the results are not representative of the country as a whole. Another particularly useful survey is one that was originally conducted among 577 volunteers in San Mateo County, California (53-58). The unique feature of this survey is that resurveys of the same population were conducted after four, six and fourteen years, thus forming a rare longitudinal survey (60-64).

None of the surveys confirm the widely held belief that the elderly exist on tea and biscuits. The San Mateo study indicated that for most individuals the only change in dietary habits with age is a general decrease in the total amount of food consumed. Various surveys have reported that 75-90% of the elderly eat three meals a day, with most of the rest eating two meals a day (43, 46, 47, 49). The only exception to these results is one study that indicated that 35% of elderly men living at home ate less than three meals a day (47). Although various nutritional deficiencies among the elderly have been reported, the frequency of these deficiencies is in most cases not much higher than among other age groups. This can be clearly seen in Figure 1, which is a graphical compendium of most of the nutritional surveys performed in the United States prior to 1969. The National Nutrition Survey confirms these findings.

1. Results of the National Nutrition Survey

Some of the nutritional data for the elderly found in the National Nutrition Survey is summarized in Table 2. A graphical summary of the



Percentages of subjects studied whose dietary intake of seven nutrients is below two-thirds RDA and one-half RDA according to age and sex. *Zero for below 1/2 RDA. **No data for below 1/2 RDA for males.

Solid bars are the percentages consuming less than 1/2 RDA and open bars less than 2/3 RDA.

FIGURE 1

Average Results of American Nutrition Surveys prior to 1969. From Davis et. al. "Review of Studies of Vitamin and Mineral Nutrition in the U.S. 1950-1968" (70).

LOW-INCOME-RATIO STATES KENTUCKY, LOUISIANA,
SOUTH CAROLINA, TEXAS, WEST VIRGINIA

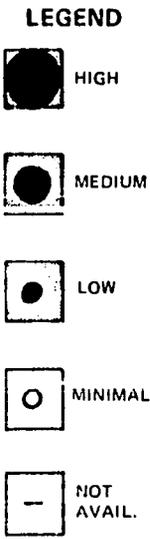
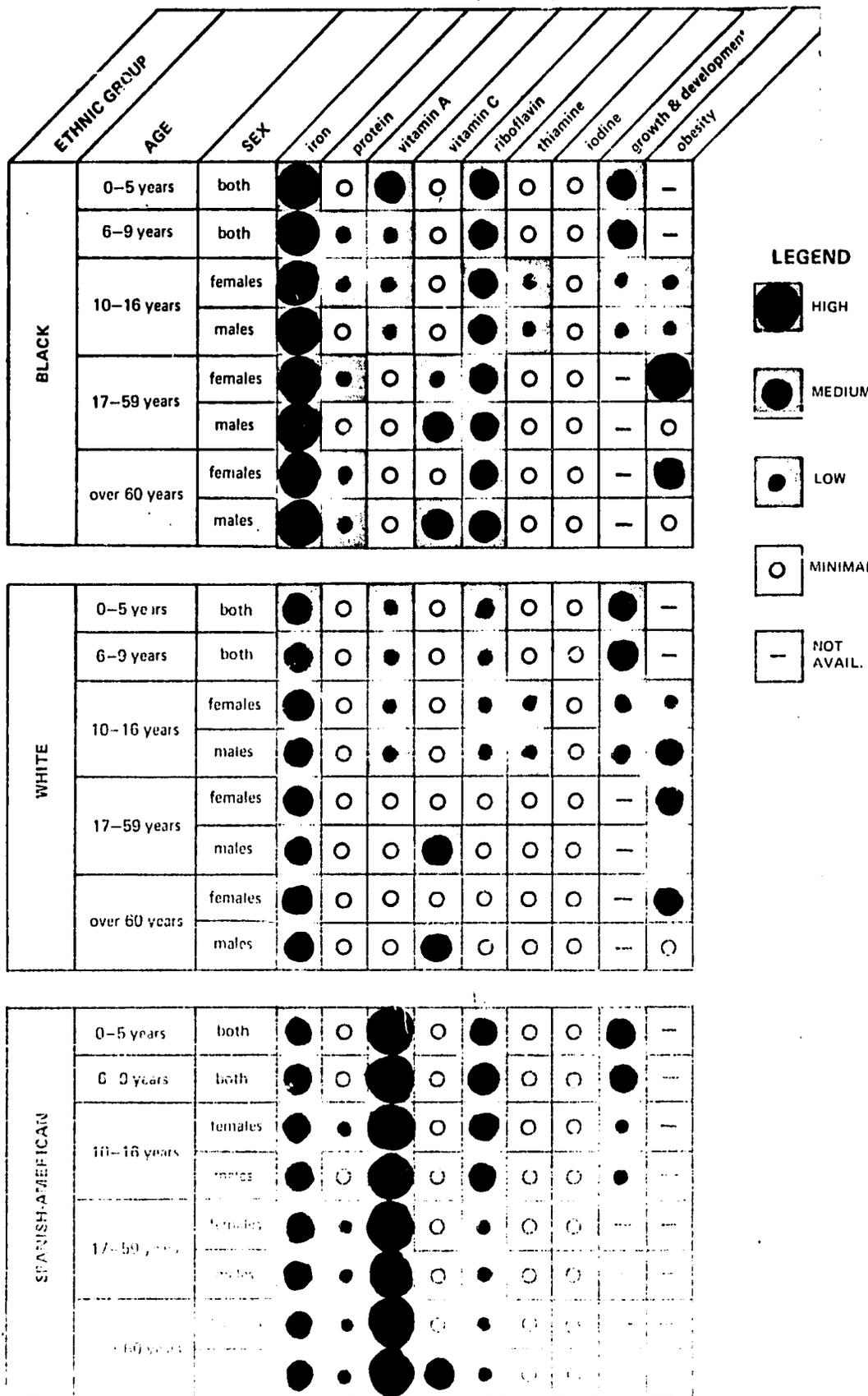
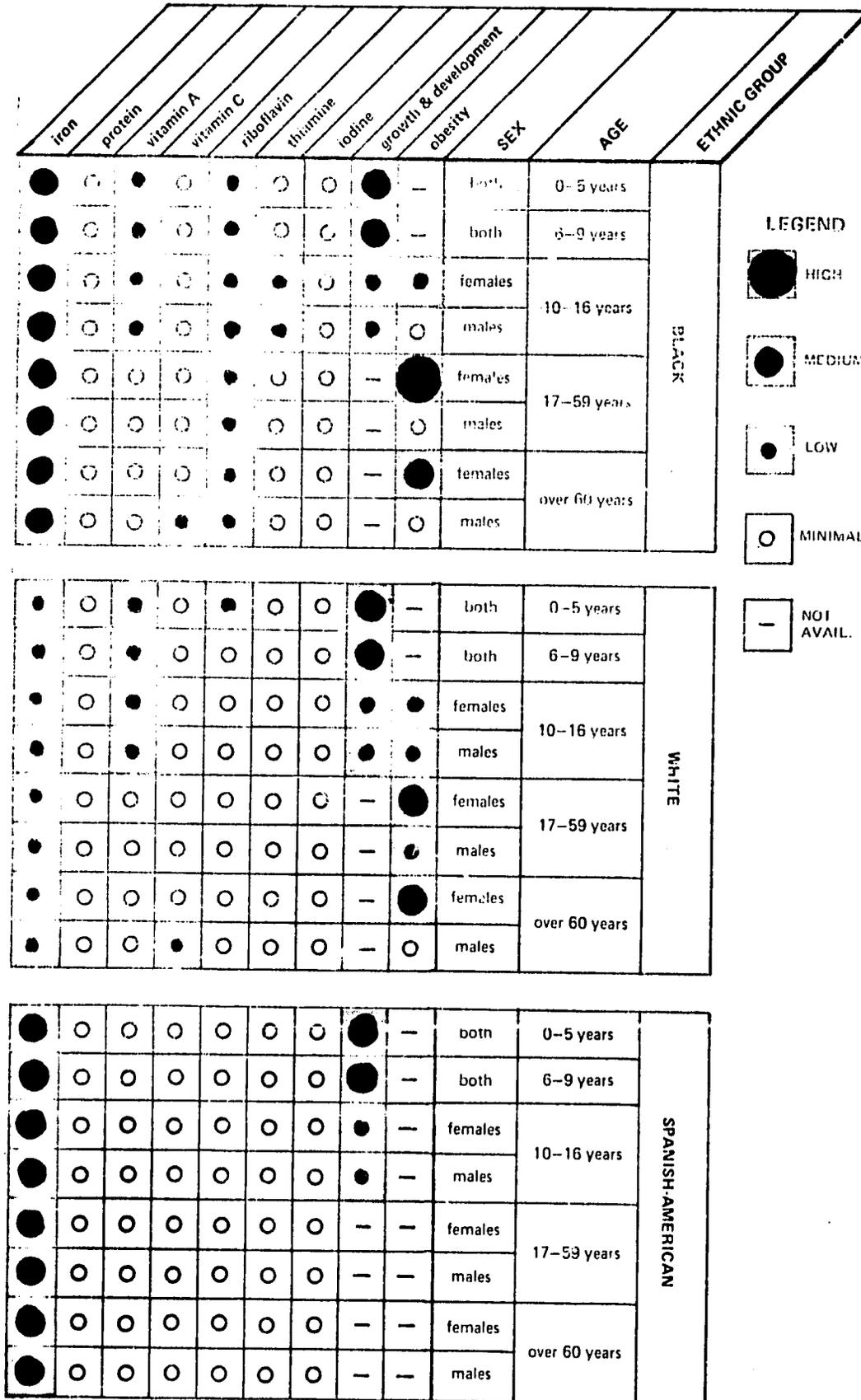


FIGURE 2
RELATIVE IMPORTANCE OF NUTRITIONAL PROBLEMS
Part 1
From the National Nutrition Survey (66)

**HIGH-INCOME-RATIO STATES CALIFORNIA, MASSACHUSETTS,
MICHIGAN, NEW YORK (and NEW YORK CITY), WASHINGTON**



LEGEND

-  HIGH
-  MEDIUM
-  LOW
-  MINIMAL
-  NOT AVAILABLE

**FIGURE 2
RELATIVE IMPORTANCE OF NUTRITIONAL PROBLEMS
Part 2
From the National Nutrition Survey (66)**

TABLE 2
SOME RESULTS OF THE NATIONAL NUTRITION SURVEY

	WHITE		BLACK		SPANISH AMERICAN	
	Male	Female	Male	Female	Male	Female
<u>% Obese</u>						
Age: 45-54	23.9	41.9	13.2	52.7		
55-64	18.6	37.8	19.1	46.7	NO DATA	
65-74	14.8	30.9	8.8	32.6		
75-84	13.7	20.7	10.0	28.1		
<u>% Edentulous</u>						
Age: 55-64	55.1	52.7	17.9	30.9	10.3	18.3
LIR 65-74	57.3	70.6	31.9	42.1	15.4	29.5
74+	68.5	86.5	37.5	62.1	23.5	40.0
55-64	39.1	39.8	30.6	34.1	28.1	31.9
HIR 65-74	56.7	49.5	40.4	46.4	33.3	50.0
74+	65.0	62.9	36.8	55.6	50.0	85.7

PERCENTAGE OF POPULATION OVER 60 WITH
GIVEN DIETARY INTAKES

	Male		Female		Male		Female		Male		Female	
	<1000	<1500	<750	<1000	<4000	<1500	<750	<1000	<1000	<1500	<750	<1000
<u>Calories</u>												
LIR	7.9	35.4	14.8	26.6	25.8	57.8	27.7	45.9	11.6	46.5	12.0	26.0
HIR	8.9	26.4	8.0	20.9	17.1	44.8	15.2	38.0	14.3	28.6	14.3	28.6
<u>Protein (gm)</u>	<35	<45	<30	<40	<35	<45	<30	<40	<35	<45	<30	<40
LIR	7.9	14.2	17.3	28.6	23.4	37.2	31.4	46.3	11.6	27.9	14.0	28.0
HIR	8.1	15.3	7.2	20.1	4.2	14.9	12.7	30.4	9.6	14.4	22.9	31.5
<u>Iron (mg)</u>	<5	<8	<5	<8	<5	<8	<5	<8	<5	<8	<5	<8
Req=10 LIR	5.2	23.2	18.2	46.7	15.0	40.2	30.5	63.6	4.6	18.6	14.0	38.0
HIR	5.5	22.5	10.0	37.9	6.4	34.1	20.3	51.9	4.8	19.1	20.1	51.6

LIR = Low Income Ratio States (Tex., La., S.C., Ky., W. Va.)
HIR = High Income Ratio States (Mass., N.Y., Mich., Wash., Calif.)

TABLE 2 (cont.)

Vitamin A (I.U.)	WHITE				BLACK				SPANISH-AMERICAN				
	Male		Female		Male		Female		Male		Female		
	<1000	<2000	<1000	<2000	<1000	<2000	<1000	<2000	<1000	<2000	<1000	<2000	
Req=3500	LIR	6.8	22.7	12.7	32.2	24.6	40.2	28.0	49.1	23.4	51.3	16.0	38.0
	HIR	6.9	24.3	8.9	29.0	14.9	36.2	16.4	30.4	19.0	42.8	23.0	54.5
Vitamin C (mg)	<10	<20	<10	<20	<10	<20	<10	<20	<10	<20	<10	<20	
Req=30mg	LIR	14.8	29.1	15.4	29.4	28.9	42.1	30.5	42.5	25.6	35.0	18.0	34.0
	HIR	11.5	25.0	8.4	18.5	38.3	46.8	24.1	27.9	28.5	47.5	31.5	43.0

PERCENTAGES OF POPULATION OVER 60 WITH LOW OR
DEFICIENT BIOCHEMICAL NUTRIENT LEVELS

	WHITE				BLACK				SPANISH AMERICAN			
	Male		Female		Male		Female		Male		Female	
	Low	Def.	Low	Def.	Low	Def.	Low	Def.	Low	Def.	Low	Def.
<u>Haemoglobin</u>												
LIR	22.8	3.9	9.5	6.9	50.3	14.9	26.7	4.8	36.6	8.5	14.9	1.1
HIR	20.9	3.7	6.2	0.7	43.6	6.9	21.8	2.6	33.3	2.2	10.1	4.3
<u>Serum Albumon</u>												
LIR	5.8	0.4	7.2	0.7	18.0	3.4	17.2	1.2	16.4	1.5	16.4	2.7
HIR	4.7	.5	4.6	.1	6.1	1.2	4.8	0.0	2.5	0.0	1.6	0.0
<u>Plasma Vit. A</u>												
LIR	2.6	0.0	0.6	0.6	2.5	0.4	1.4	0.0	10.4	3.9	9.9	1.2
HIR	2.8	0.3	1.7	0.4	1.3	0.0	0.8	0.0	0.0	0.0	0.0	0.0
<u>Serum Vit. C</u>												
LIR	8.5	5.1	5.8	1.2	14.3	4.0	7.8	1.4	8.5	7.0	0.0	2.6
HIR	4.2	6.3	2.2	0.1	9.0	1.3	4.1	0.8	5.7	0.0	3.8	0.0
<u>Urinary Iodine</u>												
LIR	4.1	1.5	4.5	0.4	3.3	0.0	4.7	1.2	0.0	0.0	0.0	0.0
HIR	1.7	0.2	0.8	0.1	1.6	0.0	2.6	0.9	5.9	0.0	2.7	0.0
<u>Urin. Riboflav.</u>	Male and Female Combined											
	Low		Def.		Low		Def.		Low		Def.	
LIR	5.5		1.0		13.2		2.6		7.2		1.3	
HIR	5.0		0.5		12.4		0.5		1.9		0.0	
<u>Urin. Thiamine</u>	Low		Def.		Low		Def.		Low		Def.	
LIR	4.2		0.6		7.2		0.8		9.4		2.0	
HIR	2.1		0.5		6.9		2.1		8.6		0.0	

LIR = Low Income Ratio States (Tex., La., S.C., Ky., W. Va.)
HIR = High Income Ratio States (Mass., N.Y., Mich., Wash., Calif.)

TABLE 2 (cont.)

<u>Number of Low or Deficient Bio- chemical Levels</u>	WHITE			BLACK			SPANISH AMERICAN		
	<u>None</u>	<u>One</u>	<u>Two+</u>	<u>None</u>	<u>One</u>	<u>Two+</u>	<u>None</u>	<u>One</u>	<u>Two+</u>
LIR	62.3	36.1	7.6	33.9	39.7	26.4	41.0	35.6	22.1
HIR	72.9	21.5	5.6	48.2	41.1	10.6	66.1	28.6	5.4

LIR = Low Income Ratio States (Tex., La., S.C., Ky., W. Va.)

HIR = High Income Ratio States (Mass., N.Y., Mich., Wash., Calif.)

results is presented in Figure 2. In general, it was concluded that nutritional deficiencies were neither widespread nor severe.

a. Obesity

Obesity is the one anthropometric index particularly relevant to the elderly. It was found that obesity was particularly prevalent among black and white women and that the incidence of obesity decreased with age after 50. In adult women the prevalence of obesity varied from 10 to 55% and in men from 5 to 25%.

b. Dietary Intake

Despite the prevalence of obesity, mean caloric intakes were below standard for the elderly. Values were lower for black people than for other ethnic groups. In the "low-income-ratio" states (Texas, Louisiana, South Carolina, Kentucky and West Virginia) 25.8% of black males and 45.9% of black females over 60 had daily caloric intakes of less than 1000. This means that some people were consuming very few calories per kg body weight. Intakes of protein, iron, and vitamin A were also inadequate for some groups. Spanish-Americans had particularly low intakes of vitamin A. Despite the fact that nutrient intakes in low-income-ratio states were lower than in high-income-ratio states (Massachusetts, New York, Michigan, California, and Washington), nutrient intake was not strongly correlated with income. The authors of the survey conclude that as a group the elderly are at nutritional risk.

c. Biochemical Results

Deficient biochemical levels of most nutrients were rare. Except in the case of iron, low levels were generally found in less than 10% of the population. Anemia was found to be quite prevalent, especially

among blacks and Spanish Americans. Spanish Americans frequently had low serum vitamin A levels and black males tended to have low serum vitamin C levels. With the exception of vitamin C, biochemical nutrient levels were not strongly age dependent. Neither were they strongly income dependent, although there were often slight differences between income groups.

2. Results of Other Surveys

Results of most other surveys confirm the findings that deficiencies in iron, vitamin A and vitamin C are among the most common in the elderly. Earlier surveys found high incidences of low or deficient calcium intakes, while the National Nutrition Survey reported mostly adequate intakes. This is undoubtedly largely due to the difference in calcium standards between the National Nutrition Survey and the National Academy of Sciences Recommended Dietary Allowances. Brin, et. al. have also reported a much higher incidence of thiamine deficiency than that found in the National Nutrition Survey despite using an evaluation method that tends to indicate fewer deficiencies (67, 69). Surveys in Great Britain, using standards similar to those in the National Nutrition Survey, have demonstrated a high incidence of folate deficiency but the populations surveyed have generally not been representative.

3. Results of Surveys of Hospitals and Nursing Homes

Several studies have indicated that dietary problems do exist in nursing homes. For vitamin C in particular it has been repeatedly demonstrated that serum levels are lower among people in hospitals and nursing homes than among those living at home (55, 75, 80, 91, 99). This is easily explained as a result of the difficulty of preparing institutional food in such a way as to retain vitamins, vitamin C being particularly

susceptible to destruction by overcooking. Physical and mental disabilities of elderly persons living in institutions probably also contribute to poor nutrition.

4. Conclusions

The most important nutritional problem among the elderly is simply inadequate general intake. Among nutrients, iron, vitamin A, vitamin C and possibly thiamine and folate are most likely to be deficient. In states in which average income is low, nutritional deficiencies are more common than in high income states, yet within a state lower income groups are only slightly more likely to have inadequate diets than other income groups. Blacks, however, are much more likely to have inadequate diets than other ethnic groups.

In terms of nutrition planning, this suggests that target groups should be primarily black persons, with emphasis on low-income states. Programs should provide food rather than money and should be available to all elderly persons in a community, regardless of income. If successful nutrition education components can be developed, they would be useful. In addition, standards should be developed for dietary services in nursing homes.

III.

NUTRITION PROGRAMS FOR THE ELDERLY

A. PROGRAMS IN OPERATION

1. Congregate Feeding Programs

Title VII of the Older Americans Act was enacted on March 22, 1972. It provided for establishment of nutrition programs for the elderly by the Administration on Aging of the Social and Rehabilitation on Service, with emphasis on congregate feeding programs. Authorizations were \$100,000,000 for fiscal year 1973 and \$150,000,000 for fiscal 1974. No money, however, has been appropriated.

Title IV of the Older Americans Act of 1965 provides for establishment of demonstration and research projects in nutrition, and 23 demonstration projects for the serving of congregate meals have been funded. These projects are designed to be experimental and have used a wide variety of settings and methods of meal preparation and have provided a wide variety of services. An evaluation of the experience with these programs has been published by the Administration on Aging, Department of Health, Education and Welfare, entitled Nutrition for the Elderly (102).

Five major components were emphasized in each of the Title IV projects:

- . Provision of group meals in a community setting.
- . Nutrition education.
- . Provision of supportive services, such as transportation, housekeeping, medical care, referral to other government programs, and social and recreational activities.
- . Outreach efforts to locate and involve elderly persons who would benefit from the program.

. Evaluation.

Arrangements for provision of group meals included site-prepared meals, catered meals and use of senior centers, schools, churches, homes for the aged, and private homes. Most programs charged fees, ranging from \$.10 to \$1.65 per meal, with arrangements for waiving the fee in cases of economic need. Eligibility requirements were usually simply age of 60 years or more. Many projects included a program of elderly persons to help staff the project, either on a paid or volunteer basis. In addition to beneficial, social and economic effects, this was felt to be an effective approach to nutrition education. Many projects included a home-delivered meals component for those who were housebound.

Most reports indicate that the programs were successful and popular, with participants appreciating the social setting almost as much as the meals. Impact on nutritional status, however, has been less than overwhelming. Only 28% of the participants attended 5 times a week, and 50% attended less than three times a week. The magnitude of nutritional impact is seen in the following figures:

	<u>Without Project Meal</u>	<u>With Project Meal</u>
Poor Diets	86%	74%
Fair Diets	11%	21%
Good Diets	3%	5%

The number of poor diets decreases by only 12% among those who eat a project meal everyday. Moreover, the nutrition education components were not successful in bringing about a change of dietary habits away from the center.

The costs for these programs varied widely. Costs per participant

per day ranged from \$2.24 to \$15.92, with an average of \$3.40, excluding the most expensive program. Costs for the meal component alone are summarized below:

<u>Type of Meal</u>	<u>Range of Cost/Meal</u>	<u>Mean Cost/Meal</u>
Rural Site-Prepared	\$0.86-\$2.09	\$1.22
Urban Site-Prepared	1.00- 4.62	1.74 (Excluding 2)
Urban Catered	1.23- 3.70	1.71 (Excluding 1)
School	1.86- 2.20	2.03

Raw food costs averaged about \$0.48. Project size ranged from 37 to 707 meals per day, with a total of about 3300 meals per day for all 23 projects in 1971. The total title IV budget for demonstration and research was \$2,000,000 to be spent over three years; however, this included funding for nine research projects as well as the 23 demonstration projects and some projects obtained additional funding from other sources. Other sources included local matching funds, title III, grants for community programs administered by the states, titles I and XVI of the Social Security Act, and funds available under the Emergency Food and Medical Services and Senior Opportunities and Services programs of OEO. The original demonstration grants have now expired and projects are attempting to continue operations under whatever funds can be raised, often under title III grants. Continuing funding under title VII is anticipated.

Title VII regulations incorporate the five major components of the title IV demonstration projects. Under title VII, however, grants will be made to states, rather than directly to local agencies. States are required to provide 10% matching funds. State plans under title VII are required to give preference to projects serving low income individuals

and to projects operated by and serving minority, Indian, and limited-English-speaking individuals in proportion to their numbers in the state. An appropriation of \$100,000,000 for title VII is included in a Supplementary Appropriations Bill now being held up by Congressional attempts to end military spending in Cambodia. The original Administration on Aging target was to serve 250,000 meals in the first year of operation at a total cost of \$100,000,000. Downward revision of this target is being considered due to rising food costs.

In addition to the title IV demonstration programs, approximately 130 congregate meal programs had been funded under title III and under provisions for areawide planning grants by mid-1972. Approximately 185 programs had been funded by OEO (151). The Emergency Food and Medical Services Program of OEO had a fiscal 1972 budget of \$24,000,000 of which \$7,000,000 was used for nutritional programs for the elderly, including both home-delivered and congregate needs. Portions of an \$8,000,000 fiscal 1973 budget for the Senior Opportunities and Services Program of OEO also were used for nutrition programs for the elderly. A recent HEW estimate is that a total of 500 nutrition projects serving 31,000 meals per day are currently supported by non-title VII funds (143a). However, since grants under these programs were often made to communities for comprehensive service program rather than just nutrition programs, it is impossible to tell the exact expenditures and numbers of persons served for nutrition components alone.

2. Home-Delivered Meals

The most up-to-date information on home-delivered meal programs, usually known as "Meals-on-Wheels," is contained in a 1972 report of a

brief study conducted for the Administration on Aging (131). The study located 349 programs in operation as of May, 1971. Of these, 215 served at least 15 meals per week and were included in the study. Of a representative subsample of 32, 15 programs served one meal per day, 12 served two meals, and 3 served three meals. Only 18 out of the 215 programs served low salt or low carbohydrate diets. Few provided any services other than meal delivery. Most of the programs were located in the northeastern part of the United States.

Of the participants in the programs, 86% were white, 9% were black, and 4% were Spanish-American. It was estimated that without the home delivered meals service, 35% of the participants would have to be placed in nursing homes. It was also estimated that 40% would be able to participate in a congregate meal service program.

The majority of the programs were funded without public assistance. Twenty-nine out of thirty-two programs received donations from individuals, service organizations, or religious groups. Ten out of 32 received federal funds, mostly from the Administration on Aging under title III or from the Office of Economic Opportunity. Three out of 32 received state funds and 6 out of 32 were wholly self-supporting. In 16 out of 32 programs, at least 80% of the costs were paid by the participants. On the average, payments by participants accounted for 50% of the costs. Projects made considerable use of volunteers and donated kitchen facilities. Median cost per meal was \$.80. As of 1971, approximately 67,000 meals per week were being served to 11,000 people through these programs.

3. Department of Agriculture Programs

The Food Stamp and Commodity Distribution programs of the USDA are

BEST AVAILABLE DOCUMENT

available to the elderly poor. Exact data on participation by the elderly in the Food Stamp Program is not available, but estimates have been made. In a memorandum submitted as part of the 1969 Hearings of the Senate Committee on Nutrition and Human Needs (157) it was estimated that 30% of all expenditures of the Food Stamp and Commodity Distribution Programs went to the elderly, based on the percentage of elderly among the poor. This would mean that 4.5 million elderly persons would currently be participating in one program or the other. In a December, 1972 speech by Carol Lourdes of the American Society of Geriatrics and Gerontology, however, it was estimated that of the 15 million participants in the two programs, only 2.5 million were elderly. Estimates given recently by the Office of the Commodity Distribution Program are that 424,000 of the 2.6 million people receiving commodities are elderly, that 500,000 elderly persons benefit from donation of foods to 2200 resident institutions for the elderly, and that 10,451 elderly persons benefit from foods donated to non-resident institutions for the elderly (personal communication). If it is estimated, following Carol Lourdes, that one-sixth of all Food Stamp and Commodity Distribution expenditures are for the elderly, this would mean expenditures for fiscal 1973 were approximately \$365,000,000 and \$500,000, respectively.

From the point of view of the poor elderly person, the following options may be available, depending on geographic area. A person may receive food stamp bonuses, the amount depending on income. He may use food stamps to pay for home-delivered meals or for groceries. He may participate in congregate feeding programs that make use of USDA donated foods. He may receive USDA donated commodities. Donated commodities are not currently available for use in home-delivered meals, and food stamps may not be used

to pay for congregate meals.

The major obstacles to use of these options are pride and lack of transportation to distribution centers. It is felt that congregate meal programs where a small fee is charged and means tests are not applied are more acceptable to many of the elderly than food stamps. In some areas, volunteer programs have been organized to distribute commodities (139). In West Virginia a successful experiment was tried in which Food Stamps were mailed to participants and participation increased.

There are also problems with the effectiveness of the programs. One study has shown that a 10% increase in income provided by food stamps resulted in a 4-6% increase in food expenditures and only a 1-2% increase in food weight (141). It has been pointed out previously that income is not the only major factor affecting the diets of the elderly, and in fact may not be very important. Elderly persons have difficulties using donated foods because they are supplied in large packages and foods may not be appropriate for special diets needed.

4. The Senior Citizen's Plate

One highly successful private sector program has been established in San Francisco. Balanced meals are served to the elderly for \$1.00 at off-peak hours in local restaurants. The program is monitored by the City and County of San Francisco Health Department to insure high quality meals (143e).

5. Summary

The major kinds of nutrition programs for the elderly are congregate meal service and home-delivered meals. At present these programs are reaching only a tiny percentage of the elderly. They are generally

expensive. The only widespread nutrition programs reaching the elderly are the USDA Food Stamp and Commodity Distribution Programs, and these programs are not particularly well suited to the needs of the elderly. Exact data on the number of persons being reached by different programs and on costs of nutrition components of various programs is not available due to the use of multiple funding sources and the policy of giving grants to local agencies, each of which uses the funds differently. It may be noted here that one of the plans awaiting appropriations is for the establishment of a national information service for programs serving the elderly which would make such data available.

B. PROPOSALS AND PLANS

The major plan affecting nutritional programs for the elderly, other than funding of title VII, is the Supplemental Security Income Program scheduled to go into effect in January, 1974. This program will replace various public assistance programs now in effect and will provide a guaranteed monthly minimum income of \$130 for the elderly individual, to be paid by the federal government. This level is in fact lower than the benefits currently available in many states, but the administration expects that the states will use revenues freed from present programs to provide supplemental benefits. A "cash out" provision allows the states the option, in addition, of substituting cash supplements for current food stamp bonuses. A "hold harmless" provision states that if supplemental benefits and food stamp cash-outs sufficient to bring benefit levels up to 1972 levels exceed a state's 1972 expenditures, the federal government will assume the excess cost. Despite this provision, states have yet to enact

supplementation programs, and few state legislatures meet between now and January. This means that incomes may drop sharply for many of the elderly, while food prices will have risen. Hearings have been held recently by the Senate Committee on Nutrition and Human Needs on these problems and a bill to guarantee continuation of food stamp benefits is in preparation.

On a different line, proposals have frequently been made that regulations for federal funding of senior housing projects be amended to require group dining facilities in all new buildings. Such facilities have been included in some housing projects.

C. SUMMARY OF THE ISSUES

- . Should programs for the elderly emphasize income supplements or programs specifically designed to meet nutritional needs? The Administration argues that income supplements will allow the elderly to determine their own needs and spend accordingly. Many experts, however, contend that low income is not the cause of nutritional problems of the elderly, and that nutrition programs are needed.
- . Should nutrition programs be funded as such or be included as part of comprehensive service programs? The administration opposed the enactment of title VII on the grounds that categorical programs should be avoided.
- . Should nutrition programs be aimed at all of the elderly, or at low income groups? There is no strong evidence that the nutritional needs of the elderly poor are really much greater than those of the elderly in general.
- . To what extent should the federal government, as opposed to state and local governments, assume responsibility for nutrition programs?

D. SPECIAL PROBLEMS OF NURSING HOMES

The programs discussed above are aimed primarily at those of the elderly who live at home. There are also needs for nutritional supervision of nursing homes. This requires establishment of dietary standards.

Federal standards currently exist for skilled nursing homes and are under revision. Federal standards for intermediate care facilities are in preparation, but appropriations to fund their implementation are not expected. Federal standards for residential and minimal care facilities are not likely to be established in any case. State standards vary widely in stringency. Results of studies of nutrition in nursing homes do indicate that establishment of standards can be an effective means of improving nutritional services (143b).

IV.

SUMMARY

The nutritional needs of the elderly do not differ significantly from those of younger adults. However, numerous factors make it more difficult for the elderly to obtain adequate diets. Nutrient intakes of the elderly tend to be low, particularly for calories, iron, vitamin A and vitamin C. Black elderly persons are particularly likely to suffer from nutritional deficiencies. The only large programs affecting nutritional status of the elderly are the Food Stamp and Commodity Distribution Programs, which are not aimed at the special problems of the elderly. Methods of administering congregate meal services and of providing home-delivered meals have been developed, but have not been applied on a large scale. Where such programs have been implemented, they have been generally successful but expensive.

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2. "Nutritional Needs in the Older Adult": Concerns nutrient requirements and factors affecting them.
3. "Culture, Myths, and Food Preferences Among Aged"
4. "Family Structure, Socialization, and Diet"
5. "Adult Stress and Diet" - This chapter contains an excellent discussion of the psychological factors affecting dietary habits of the elderly.
6. "Diet and the Nervous System - Effects on Behavior and Emotions in the Older Adult": Discusses the relationship of nutritional deficiencies to mental disorders with a brief review of the major literature.
7. "Chronic Disease: Aging and Illness": Discusses effects of common diseases on nutrient intake, absorption, and requirements.
8. "Age and the Learning of New Behavior: Changing Dietary Habits": Discusses approaches to nutrition education for the elderly.
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48. Odland, Lura M., Mason, Rossie L., Alexeff, Anne I. "Bone Density and Dietary Findings of 409 Tennessee Subjects." American Journal of Clinical Nutrition, 25, 905-910 (1972).

This survey reported inadequate intakes of vitamins A and C. It also reported that diets and bone density were not correlated.

49. Pelcovits, Jeanette. "Nutrition to Meet the Human Needs of Older Americans." Journal of the American Dietetic Association, 60, 297-300 (1972).

This is really a publicity paper for the Administration on Aging. AoA demonstration projects are discussed. In addition, results of a 24 hour recall study of 3,500 elderly subjects are reported. It was reported that large percentages (18-34%) were lacking fruit, vegetables, or milk products in their diets.

50. Swanson, P., Smith, T.A., Ohlson, M.A., Brester, A., Burrill, L.M. "Food Intakes of 2,189 Women in Five North Central States." North Central Regional Publication Number 83. Iowa Agriculture and Home Economics Experiment Station Research Bulletin 468 (1959).

Reports a downward trend with age of mean intakes of calories, protein, calcium, ascorbic acid, and vitamin A.

51. United States Department of Agriculture, Agriculture Research Service Dietary Levels of Households in the United States: Spring, 1965, Washington, D.C., Government Printing Office, 1968.

This survey has been largely superceded by the more recent and comprehensive National Nutrition Survey. Findings indicated deficiencies in intakes of calcium, vitamin C and vitamin A.

52. Young, Charlotte M., Streib, Gordon B., Greer, Betty J. "Food Usage and Food Habits of Older Workers." Archives of Industrial Hygiene and Occupational Medicine, 10, 501-511 (1954).

A study of 1640 sixty-four year old workers throughout the U.S. Authors reported that higher incomes were correlated with an increased use of fruits, vegetables and milks.

See also Senate Select Committee on Nutrition and Human Needs, Hearings, 1969, Pt. 14 (157), statement by Commissioner Martin, for a brief review of findings of American surveys.

2. Surveys Including Biochemical Data

a. The San Mateo Study

This study was originally conducted in 1948 and included 577 subjects over 50 years of age from San Mateo County, California. Follow-up studies were conducted after 4, 7, and 14 years, with 141 subjects completing all four surveys. Data collected included dietary intake, hemoglobin levels, blood glucose levels, and serum levels of vitamin A, carotene, vitamin C, cholesterol, and protein. Results for a subsample of men living in a county home were also reported and showed a significantly higher incidence of nutritional inadequacy than results for those living at home, particularly for vitamins C and A.

(aa) Original Results.

53. Gillum, Helen L., Morgan, Agnes F. "Nutritional Status of the Aging, I. Hemoglobin Levels, Packed Cell Volumes, and Sedimentation Rates." Journal of Nutrition, 55, 265-288 (1955).
54. Gillum, Helen L., Morgan, Agnes F., Williams, Ramona I. "Nutritional Status of the Aging; II. Blood Glucose Levels." Journal of Nutrition, 55, 289-303 (1955).
55. Morgan, A.F.M., Gillum, Helen L., Williams, Ramona, I. "Nutritional Status of the Aging; III. Ascorbic Acid." Journal of Nutrition, 55, 431-448 (1955).
56. Gillum, Helen L., Morgan, Agnes F., Jerome, D.W. "Nutritional Status of the Aging; IV. Serum Cholesterol." Journal of Nutrition, 55, 449-468 (1955).
57. Gillum, Helen L., Morgan, Agnes F., Sailer, F. "Nutritional Status of the Aging; V. Vitamin A and Carotene." Journal of Nutrition, 55, 655-670 (1955).
58. Morgan, Agnes F., Murai, Mary, Gillum, Helen L. "Nutritional Status of the Aging; VI. Serum Protein, Blood Non-Protein Nitrogen, Uric Acid and Creatinine." Journal of Nutrition, 55, 671-685, (1955).
59. Chope, Harold D., Dray, S. "The Nutritional Status of the Aging: Public Health Aspects." California Medicine, 74, 105-107 (1951).

A summary of the original findings.

(bb) Four Year Follow-Up.

60. Chope, Harold D. "Relation of Nutrition to Health in Aging Persons: A Four-Year Follow-Up of a Study in San Mateo County." California Medicine, 81, 335-338 (1954).
61. Morgan, Agnes F. "The San Mateo Study of the Nutritional Status of the Aging." California Health, 13, 65 (1955).

(cc) Seven Year Follow-Up.

62. Chope, Harold D., Breslow, L. "Nutritional Status of the Aging." American Journal of Public Health, 46, 61-67 (1956).

(dd) Fourteen Year Follow-Up.

63. Steinkamp, Ruth C., Cohen, Nina L., Walsh, Helen E. "Resurvey of an Aging Population: Fourteen Year Follow-Up." Journal of the American Dietetic Association, 46, 103 (1965).

64. Watkin, Donald M. "Nutritional Problems Today in the Elderly in the United States." In A.N. Exton-Smith and D.L. Scott, eds. Vitamins in the Elderly, Bristol, John Wright & Sons Ltd., 1968, pp. 66-77.

Further analysis of the data from the San Mateo study.

b. The National Nutrition Survey

65. United States Department of Health, Education and Welfare, Health Services and Mental Health Administration, Ten State Nutrition Survey, 1968-1970, Atlanta, Georgia, Center for Disease Control, 1972 (DHEW Publication Nos. [HSM] 72-8130 to 72-8133), Vols. 1-5.

This publication is more than 1,000 pages long and consists mainly of tables and graphs of the data collected in the survey. For each section, a two or three page summary of the major findings is given. The volumes are I., Historical Development; II., Demographic Data; III., Clinical Anthropometry, Dental; IV., Biochemical; and V., Dietary. Variables included in the data include age, sex, ethnic group (white, black, or Spanish American), income level, and the various clinical, dietary, and biochemical measures of nutritional status. Nutrients studied included calories, protein, iron, vitamin A, vitamin C, riboflavin, thiamine and iodine.

66. Highlights: Ten-State Nutrition Survey 1968-1970, Atlanta, Georgia, Center for Disease Control, 1972 (DHEW Publication No. [HSM] 72-8134), 12 pp.

c. Other Surveys

67. Brin, M., Schwartzberg, Seymour H., Arthur-Davies, D. "A Vitamin Evaluation Program as Applied to Ten Elderly Residents in a Community Home for the Aged." Journal of the American Geriatric Society, 12, 493-499 (1964).

Emphasis is on demonstrating new methods of evaluating thiamine levels.

68. Brin, M., Dibble, Marjorie V., Peel, A., McMullen, E., Bourquin, A., Chen, N. "Some Preliminary Findings in the Nutritional Status of the Aged in Onandaga County, New York." American Journal of Clinical Nutrition, 17, 240-258 (1965).

Incidences of nutritional deficiencies were low.

69. Brin, M. "Biochemical Methods and Findings in U.S. Surveys." In A.N. Exton-Smith, Vitamins in the Elderly, op. cit., pp. 25-33.

This article contains a summary of previous findings by Brin and Dibble. Emphasis is on thiamine levels, although other nutrients are included.

70. Davis, Thomas R.A., Gershoff, Stanley N., Gamble, Dean F., "Review of Studies of Vitamin and Mineral Nutrition in the U.S. 1950-1968." Journal of Nutrition Education, 1 (2), Supplement 1, Fall, 1969, pp. 41-57, 91 refs.

This review contains a statistical summary of the total number of cases of nutritional deficiency found in the U.S. prior to 1969. The elderly are included but not emphasized.

71. Dibble, M.V., Brin, M., Thiele, U.F., Peel, A., Chen, N., McMullen, E. "Evaluation of the Nutritional Status of Elderly Subjects With a Comparison Between Fall and Spring." Journal of the American Geriatric Society, 15, 1031-1061 (1967).

A study of 214 volunteers from a senior housing project in Syracuse, New York. Data collected included both dietary intake and biochemical data. Low thiamine and iron levels were found. Seasonal variation of vitamin A levels was reported.

72. Kelsay, June L. "A Compendium of Nutritional Status Studies and Dietary Evaluation Studies Conducted in the U.S., 1957-1967." Journal of Nutrition, 99, Supplement 1, 1969.

Although this article does not particularly emphasize the elderly, it does give a very brief summary of the major findings of surveys performed in the dates included.

3. Problems of Nursing Homes

73. American Dietetic Association. "Position Paper on Nutrition and Aging." Journal of the American Dietetic Association, 57, p. 448 (1970).

This paper includes a statement of a need for surveillance of nursing homes. It is simply a list of recommendations and does not contain any background information.

74. Ford, Margaret G. and Neville, Janice N. "Nutritive Intake of Nursing Home Patients Served Three or Five Meals a Day." Journal of the American Dietetic Association, 61, 292-296 (1972).

Authors conclude that it makes little difference to nutrient intake whether meals are served three or five times a day, and that the nursing home studied had reasonably good dietary services.

75. Kaufman, M., Dinham, Margaret A., Saunders, Lucretis A. "The Challenge of Nursing Home Food Service." Reprinted in Hearings, 1969, Pt. 14, Senate Select Committee on Nutrition and Human Needs, Appendix.

A 1960 study of 410 Indiana nursing homes found that only three used a dietician, that diets were low in protein, vitamin A and vitamin C, and that prescribed diets were not always served.

See also references 53-58, 67, 80, 88, 91, 99 and for survey data on incidences of nutritional deficiency among people living in hospitals and nursing homes and for articles on federal programs concerning nutrition in nursing homes.

C. BRITISH SURVEYS

Except where noted, these are generally small surveys of non-representative populations.

1. Dietary Surveys

76. Baines, A.H.J., Hollingsworth, Dorothy F. "The Diets of Elderly Women Living Alone." Proceedings of the Nutrition Society, 14, 77-80 (1955).

Summary of results of a British National survey.

77. Durnin, J.V.G.A., Blake, Elaine C., Allan, Margaret K., Shaw, Elizabeth J., Blaire, S. "Food Intake and Energy Expenditure of Elderly Women with Varying Sized Families." Journal of Nutrition, 75, 73-76 (1961).
78. Evans, E., Stock, Anne L. "Dietary Intakes of Geriatric Patients in Hospital." Nutritional Metabolism, 13, 21-35 (1971).

2. Biochemical and Dietary

79. Anderson, W.F. "Nutritional Problems of the Elderly." Proceedings of the Nutrition Society, 27, 185-187 (1968).

A concise review.

80. Andrews, J., Brook, M., Allen, Margaret, A. "Influence of Abode and Season on Vitamin C Status of the Elderly." Gerontologica Clinica, 8, 257-265 (1966).

Nutritional status was worse for those living in welfare homes than for those living at home.

81. Batata, M., Spray, G.H., Bolton, F.G., Higgins, G., Wollner, L. "Blood and Bone Marrow Changes in Elderly Patients with Special Reference to Folic Acid, Vitamin B₁₂, Iron and Ascorbic Acid." British Medical Journal, 2, 667-669 (1967).
82. Department of Health and Social Security. A Nutrition Survey of the Elderly: Report by the Panel on Nutrition of the Elderly. London: Her Majesty's Stationery Office, 1972, 165 pp.
- This survey covers 179 subjects in six areas of Britain. Authors conclude that malnutrition is infrequent. Problems identified, however, included low caloric intake and low level vitamin C and iron. The survey is more comprehensive than any other of the British surveys but not as good as the U.S. National Nutrition Survey.
83. Elwood, P.C. "Epidemiological Aspects of Iron Deficiency in the Elderly." Gerontologica Clinica, 13, 2-11 (1971).
84. Elwood, P.C., Shinton, N.K., Wilson, C.I.D., Sweetnam, P., Frazer, A.C. "Hemoglobin, Vitamin B₁₂ and Folate Levels in the Elderly." British Journal of Haematology, 21, 557-563 (1971).
85. Elwood, P.C., Burr, M.L., Hole, D., Harrison, A., Morris, T.K., Richardson, R.W., Wilson, C.I.D., Shinton, N.K. "Nutritional State of Elderly Asian and English Subjects in Coventry." Lancet, 1, 1224-1227, June 3, 1972.
86. Evans, D.M.D., Pathy, M.S., Sanerkin, N.G., Deeble, T.J. "Anemia in Geriatric Patients." Gerontologica Clinica, 10, 228-241 (1968).
87. Exton-Smith, A.N. "The Problems of Subclinical Malnutrition in the Elderly." In Exton-Smith, Vitamins in the Elderly, op. cit., pp. 12-18.
- Contains a very brief review of findings of British surveys and a discussion of the incidence of osteomalacia.
88. Girdwood, Ronald H. "Deficiencies of Folic Acid and Vitamin B₁₂ in the Elderly." In Vitamins in the Elderly, op. cit., pp. 40-45.
- Contains a summary of the relevant British surveys.
89. Girdwood, Ronald H., Thomson, A.D., Williamson, J. British Medical Journal, 2, 670-672 (1967).
- Serum folate levels for hospital patients were lower than for elderly persons living at home.
90. Griffiths, L.L. "Biochemical Findings of the Farnborough Survey." In Vitamins in the Elderly, op. cit., pp. 34-39.
- This was part of a double-blind therapeutic study on the effects of vitamin supplements. Deficient nutrient levels were much more common among untreated than among treated patients after a year.

91. Hurdle, A.D.F., Williams, T.C. Picton. "Folic-Acid Deficiency in Elderly Patients Admitted to Hospital." British Medical Journal, 2, 202-205 (1966).

92. Kataria, M.S., Rao, D.B., Curtis, R.C. "Vitamin C Levels in the Elderly." Gerontological Clinica, 7, 189-190 (1965).

Levels of people living at home were superior to those of people in either a hospital or a welfare home.

93. Myers, A. Mary., Saunders, Cynthia R.G., Chalmers, D.G. "The Haemoglobin Level of Fit Elderly People." Lancet, 2, 261-263 (1968).

94. Read, A.E., Gough, K.R., Pardoe, J.L., Nicholas, A. "Nutritional Studies on the Entrants to an Old People's Home with Respect to Folic-Acid Deficiency." British Medical Journal, 2, 843-848, (1965).

95. Shulman, R. "A Survey of Vitamin B₁₂ Deficiency in an Elderly Psychiatric Population." British Journal of Psychiatry, 113, 241-251 (1967).

3. Clinical Studies

96. Berry, W.J.C. "Protein Status of the Elderly." Proceedings of the Nutrition Society, 27, 191-196 (1968).

The author found that 51 out of 1191 elderly patients admitted to the hospital had oedema problems due to protein deficiency.

97. Brocklehurst, J.C., Griffiths, L.L., Taylor, G.F., Marks, T., Scott, D.L., Blackley, J. "The Clinical Features of Chronic Vitamin Deficiency: A Therapeutic Trial in Geriatric Hospital Patients." Gerontologica Clinica, 10, 309-320 (1968).

Vitamin therapy produced clinical improvement.

98. Taylor, G.F. "A Clinical Survey of Elderly People from a Nutritional Standpoint." In Vitamins in the Elderly, pp. 51-56.

Results of the same therapeutic trial as reference 97.

99. Taylor, G.F. "Nutrition and Old Age." Community Health, 3, 244-249 (1972).

Includes a clinical survey and a review of the literature on vitamin C deficiency.

4. Problems of Nursing Homes

100. Eddy, T.P. "The Problem of Retaining Vitamins in Hospital Food." In Vitamins in the Elderly, pp. 86-92.

IV. NUTRITIONAL PROGRAMS FOR THE ELDERLY

A: GENERAL

101. Watkin, Donald M. "The Aged." In Mayer, Jean, ed., U.S. Nutrition Policies in the Seventies, San Francisco, W.H. Freeman and Co., 1973.

B. CONGREGATE FEEDING PROGRAMS

1. General

102. Administration on Aging, Social and Rehabilitation Service, Department of Health, Education and Welfare, Nutrition for the Elderly, Washington, D.C., Government Printing Office, 1972, 96 pp.

This is the report of a comprehensive evaluation of title IV programs carried out under contract from the Administration on Aging. It contains data on costs of programs, services provided and methods used, characteristics of participants, planning and staffing arrangements, and nutritional impact. It also includes brief descriptions of each of the 23 programs evaluated.

103. Administration on Aging, Social and Rehabilitation Service, Department of Health, Education and Welfare, Evaluation of Research and Demonstration (Title IV), Nutrition Projects, Washington, D.C., December 1971, Nutrition Series 14-0, 35 pp.

This is a preliminary report of the evaluation reported in reference 102. It contains a higher ratio of statistics to text and is less complete.

104. Pelcovits, J. "Nutrition for Older Americans." Journal of the American Dietetic Association, 58, 17-21 (1971).

A discussion of the most important features of title IV programs.

105. Administration on Aging, Social and Rehabilitation Service, Department of Health, Education and Welfare. "Nutrition Program for the Elderly, Rules and Regulations." Federal Register, 37 (162), August 19, 1972, pp. 16844-16850.

These are the official regulations for title VII programs.

2. Reports of Individual Projects

Most of the reports included in the Administration on Aging, Nutrition Series 14 are reports of individual demonstration projects. They vary in form and emphasis and are primarily useful as reports of the wide variety of experimental approaches tried. All of them are published in preliminary form by the Administration on Aging, Department of Health, Education and Welfare. They are generally 25-30 pages long.

106. "Older People's Response to a Nutrition Program: Henry Street Settlement, New York." Administration on Aging Nutrition Series 14.
107. "Nutrition for Inner City Aged: An Interim Report, Washington, D.C." Administration on Aging Nutrition Series 14-A.
108. "A Survey of Elderly Volunteers in a Nutrition Program: Emmet, Idaho." Administration on Aging Nutrition Series 14-B.
109. "Neighborhood-Kitchen Meals for the Aging Poor: St. Louis, Missouri." Administration on Aging Nutrition Series 14-C.
110. "Nutrition and Health-Screening Services to the Aging, New York, New York." Administration on Aging Nutrition Series 14-D.
111. "Columbia Club: A Nutrition Demonstration Project for Low Income Elderly: Seattle, Washington." Administration on Aging Nutrition Series 14-E.
112. "Interaction of Nutrition and Social Activities on the Aged: Tulsa, Oklahoma." Administration on Aging Nutrition Series 14-F.
113. "A Neighborhood School Nutrition Education-Meal Program for Older Americans: Los Angeles, California." Administration on Aging Nutrition Series 14-G.
114. "Senior Services: Meals, Nutrition and Social Activities in a Rural Area: Emmet, Idaho." Administration on Aging Nutrition Series 14-H.
115. "Nutrition Services for Older Americans in a Small Urban Area: Helena, Montana." Administration on Aging Nutrition Series 14-I.
116. "A Food and Nutrition Project for the Elderly in a Senior Center: Henry Street Settlement, New York, New York." Administration on Aging Nutrition Series 14-J.
117. "A Nutrition Program for Senior Citizens in Public Schools: Salt Lake City, Utah." Administration on Aging Nutrition Series 14-K.

118. "Group Meals and Services for the Elderly in Community Settings: Detroit, Michigan." Administration on Aging Nutrition Series 14-L.
119. "Using Homes for the Aged for Community Meals Programs: Buffalo, New York." Administration on Aging Nutrition Series 14-M.
120. "A Study of the Nutritional and Social Services Problems of the Aged: Phoenix, Arizona." Administration on Aging Nutrition Series 14-N.
121. "A Co-op Approach to Food for the Elderly: Hudson Guild, New York, New York." Administration on Aging Nutrition Series 14-P.
122. "Nutrition for the Inner City Aged, A Final Report: Washington, D.C." Administration on Aging Nutrition Series 14-Q.
123. "A Research and Nutrition Program for Aged Blacks in a Rural Setting: Greenwood, Mississippi." Administration on Aging Nutrition Series 14-T.
124. "A Meals and Socialization Project for American Indians and Older Caucasians: Walthill, Nebraska." Administration on Aging Nutrition Series 14-U.
125. "Nutrition Services in an Urban Community: Denver, Colorado." Administration on Aging Nutrition Series 14-V.
126. "Nutrition Service for Low-Income Elderly, An Experiment: Roxbury, Mass." Administration on Aging Nutrition Series 14-W.
127. "Nutrition Programs for the Inner City Elderly: Cincinnati, Ohio." Administration on Aging Nutrition Series 14-X.
128. "A Low-Cost Meals Program for Older Americans: A Research and Demonstration Project: Dade County, Florida." Administration on Aging Nutrition Series 14-Y.
129. "A Nutritious Program for Seniors in a Large City: A Demonstration: Chicago, Illinois." Administration on Aging Nutrition Series 14-Z.
130. Holmes, D. "Nutrition and Health Screening Services for the Elderly." Journal of the American Dietetic Association, 60, 301-305 (1972).

See reference 109. This is the final form of the article.

C. HOME-DELIVERED MEALS

131. Administration on Aging, SRS, Department of Health, Education and Welfare. "A Study of Home-Delivered Meals Programs in the

United States." Washington, D.C., Administration on Aging Nutrition Series 14-S, February 1972.

Although this report is brief and is missing some important information such as the total numbers of people and meals served, it is the most comprehensive study of home-delivered meals programs that exists. It provides data on services provided, costs, and characteristics of participants.

132. Administration on Aging, SRS, Department of Health, Education and Welfare. Home-Delivered Meals: A National Directory, Washington, D.C., Government Printing Office, May 1971.

This is the most up-to-date listing of home-delivered meals services in existence. It contains data on size, services, and participants of individual programs but no data on totals or averages for all programs. The study in reference 131 was a by-product of the contract under which this directory was prepared.

133. Health Committee, National Council on the Aging. "Home-Delivered Meals for the Ill, Handicapped, and Elderly." American Journal of Public Health Supplement, May 1965, 86 pp.

An article containing extensive recommendations for organizing, operating, and financing a meals-on-wheels program. The article also contains results of a survey of the characteristics of five programs.

134. Hillyard, K. "Meals on Wheels." Harvest Years, 2, 24-31 (1962).

135. Keller, Martin D. and Smith, Charlotte E. "Meals on Wheels: 1960." Geriatrics, 16, 237-247 (1961).

A description of the services, administration, and funding of 14 different programs.

136. Piper, Geraldine M., Frank, B., Thorner, Robert M. "Survey of Home-Delivered Meals Programs." Public Health Reports, 80, 432-436 (1965).

A good survey of 22 different programs conducted in 1962. Data on organization, costs, use of volunteers, and characteristics of participants is given.

D. OFFICE OF ECONOMIC OPPORTUNITY PROGRAMS

137. Older Persons Programs, Office of Economic Opportunity, Senior Opportunities and Services, Directory of Programs, Washington, D.C., OEO, July 1, 1972.

The bulk of this book consists of budgets for and descriptions of the different local programs supported in whole or in part by OEO funds. Part 5 contains a four page statement of the OEO Older Persons Policy, which is that programs should emphasize reaching the elderly poor, and part 6 contains a general summary of SOS programs.

138. Select Committee on Nutrition and Human Needs, U.S. Senate. "Emergency Food and Medical Services." Committee Print, Washington, D.C., Government Printing Office, February 1973, 33 pp.

This pamphlet contains descriptions of the different EFMS programs, including those for the elderly.

E. DEPARTMENT OF AGRICULTURE PROGRAMS

139. Cashion, M., Young, W., Harburger, R. "Communities Drive to Serve the Elderly." Food and Nutrition, 1, p. 2 (1971).

A brief note on projects operating as auxiliaries to USDA Commodity Distribution programs in which volunteers deliver commodities to the elderly.

140. Guthrie, Helen A., Madden, J., Patrick, Y., Koontz, Marion D., Perrault, H. "Effect of USDA Commodity Distribution Program on Nutritive Intake." Journal of the American Dietetic Association, 61, 287-292 (1972).

A report on the number of counties served and on the effects in one county in Pennsylvania. It was found that dietary intake was not significantly changed by the commodity distribution but that expenditures on food decreased.

141. Hiemstra, Stephen J. "Evaluation of USDA Food Programs." Journal of the American Dietetic Association, 60, 193-196 (1972).

A study of the Food Stamp and Commodity Distribution programs containing information of the percentage of eligibles being reached and the nutritional impact on those that are reached.

142. "Showdown Looms on Food Stamps." Washington Post, Tuesday, June 19, 1973.

A report of the current status of the controversy over food stamps versus cash-out provisions.

F. CONGRESSIONAL PUBLICATIONS ON THE ISSUES

These publications are arranged in reverse order by date.

143. Select Committee on Nutrition and Human Needs, Senate. Hearings, May 30, 1973. Prepared statements by witnesses.
- a. Carlucci, Frank C., Undersecretary of the Department of Health, Education and Welfare. He presents the Administration's viewpoint.
 - b. Kocher, Ruth E. "Nutrition Programs in Nursing Homes and Home Health Services." **Cites** the need for and benefits of standards for nursing homes.
 - c. Percy, Senator Charles H. Opening Statement. Statement of the food stamp issue.
 - d. Ossofsky, J. National Council on the Aging. Discussion of problems of food stamp programs for the elderly and problems with the Supplemental Security Income Plan.
 - e. Watkin, Donald M. Discussion of nutrition programs for the elderly, both those in operation and those needed.
144. Select Committee on Nutrition and Human Needs, U.S. Senate. "Hunger, 1973." Committee Print Washington, D.C., Government Printing Office, May 1973, 75 pp.
- This pamphlet identifies geographic areas in which nutritional problems are particularly widespread and criticizes USDA programs.
145. "Older Americans Comprehensive Services Amendments of 1973." Public Law 93-29, May 3, 1973.
- The final form of the 1973 amendments to the Older Americans Act of 1965.
146. Committee on Education and Labor, House of Representatives. "Comprehensive Older Americans Services Amendments of 1973." House Report 93-43, March 2, 1973, Government Printing Office, Washington, D.C., 90 pp.
- Report to accompany the bill. Includes descriptions of programs currently in operation.
147. Select Committee on Nutrition and Human Needs, Senate. "Dollars for Food: The Fiscal Year 1974 Budget." Committee Print, D.C., Government Printing Office, March 1973, 23 pp.
- Brief summaries of budget proposals for nutrition programs, including food stamps and programs for the elderly.
148. Special Committee on Aging, Senate, Subcommittee on Federal, State, and Community Services. "The Rise and Threatened Fall of Ser-

vice Programs for the Elderly." Committee Print, D.C., Government Printing Office, March 1973, 74 pp.

A discussion and defense of service programs under the Social Security Act.

149. Select Committee on Nutrition and Human Needs. "Publications List with Research Reference." Committee Print., D.C., Government Printing Office, February 1973, 35 pp.

A bibliography primarily of committee publications but also including other publications on nutrition.

150. Committee on Labor and Public Welfare, Senate, Subcommittee on Aging and Senate Special Committee on Aging. "Legislative History of the Older Americans Comprehensive Service Amendments of 1972." Joint Committee Print., D.C., Government Printing Office, December 1972, 245 pp.

Discussion of the 1972 bill, which was essentially similar to the 1973 act but was pocket-vetoed. Includes some discussion of nutrition programs in operation.

151. Select Committee on Nutrition and Human Needs, Senate. Hearings, Part 2, Nutritional Needs of Nation's Older Americans. D.C., Government Printing Office, June 14, 1972.

Particularly interesting is the material submitted by Dr. Jean Mayer in the Appendix entitled "Let them Eat Cake." The purpose of the hearing was to discuss the implementation of the title VII nutrition program.

152. Select Committee on Nutrition and Human Needs, Senate. Hearings, Part 3, April 27, June 2 and June 19, 1972, D.C. Government Printing Office, 1972.

Includes report of preliminary results of the National Nutrition Survey, discussion of food programs at the local level, and a USDA progress report.

153. Select Committee on Nutrition and Human Needs, Senate. "Hunger and the Reform of Welfare: A Question of Nutritional Adequacy." D.C. Government Printing Office, February 1972.

Contains a history of federal nutrition programs. The report is opposed to the abolishment of food stamps in favor of cash income supplements, largely on the grounds that cash supplements may not be forthcoming from the states.

154. Committee on Labor and Public Welfare, Senate. "Nutrition Program for the Elderly under the Old Americans Act of 1965, as Amended."

Senate Report No. 92-515, November 29, 1971, Government Printing Office, 30 pp.

Report to accompany the bill for establishment of title VII. The report supports the bill and gives briefly reasons for doing so. Text and section by section analysis of the bill are given.

155. Committee on Labor and Public Welfare, Subcommittee on Aging, Senate. "Research in Aging and Nutrition Programs for the Elderly, 1971." Hearings, June 1, 2 and 14, 1971, 290 pp., D.C. Government Printing Office, 1971.

Testimony in support of enactment of title VII.

156. Special Committee on Aging, Senate. "Developments in Aging, 1970." Senate Report 92-46, March, 1971, D.C. Government Printing Office.

Chapter 5 is a 15 page discussion of nutrition needs and programs.

157. Select Committee on Nutrition and Human Needs, Senate. Hearings, 1969, Part 14, 1969 Government Printing Office.

Hearing on the nutritional needs of the elderly. The Appendix contains a budgetary summary for fiscal 1969 of all federal nutrition programs serving the elderly.

158. Select Committee on Nutrition and Human Needs. "Poverty, Malnutrition and Federal Food Assistance Programs: A Statistical Summary." Committee Print., September 1969.

This pamphlet contains an explanation of eligibility requirements for food stamps and commodity distributions and an evaluation of availability and participation in the two programs.

G. NURSING HOMES

159. Department of Health, Education and Welfare, Public Health Service, Health Service and Mental Health Administration, Community Health Services. "A Guide to Nutrition and Food Service for Nursing Homes for the Aged." Department of Health, Education and Welfare.

A manual of free advice. Not particularly useful for evaluation of needs and problems.

160. National Council of Senior Citizens. "A Program for the 93d Congress." Senior Citizens News, 3 (142), June 1973, Special Supplement.

This newspaper supplement includes a full page article on the needs of nursing homes.

See also testimony by Ruth Kocher, Select Committee on Nutrition and Human Needs, Hearings, 1973 (reference 143b).

V. OTHER REFERENCES

161. Administration on Aging, Department of Health, Education and Welfare. "Facts and Figures on Older Americans: Measuring Adequacy of Income." D.C., Department of Health, Education and Welfare, March 1971.

A six page pamphlet on budget needs and poverty levels.

162. Riley, H.W., Foner, A. Aging and Society, Vol. 1: An Inventory of Research Findings, New York, Russell Sage Foundation, 1968, 636 pp.

Contains vast amounts of statistics on sociocultural situations of the elderly, health, personality and social roles.

163. White House Conference on Food, Nutrition and Health: Final Report. Washington, D.C., Government Printing Office, 1969.

Particularly relevant in the three page report of panel II-4 on the aging.

164. White House Conference on Aging, Toward A National Policy on Aging, Final Report, Vols. 1 and 2, Washington, D.C., 1971.

Part 1 of Vol. 2 contains recommendations of various committees, including the committee on nutrition's 6 pages of recommendations.