DIETARY HABITS OF 2,252 FOURTH AND FIFTH GRADE SCHOOL CHILDREN SELECTED FROM 39 STATES

Thesis for the Degree of M. S.

MICHIGAN STATE COLLEGE

Helen Patricia Louise Wyatt

1949

This is to certify that the

thesis entitled

"Dietary Habits of Two Thousand Two hundred Fifty-Two Fourth and Fifth Grade Children Selected from Thirty-Nine States"

presented by

Helen Patricia L. Wyatt

has been accepted towards fulfillment
of the requirements for

Master of Science degree in Foods and Nutrition

Dena P. Edwards
Major professor

Date August 12, 1949

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DIETARY HABITS OF 2,252 FOURTH AND FIFTH GRADE SCHOOL CHILDREN SELECTED FROM 39 STATES

by

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A THESIS

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Department of Foods and Nutrition

1949

ACKNOWLEDGMENTS

The author wishes to express her sincere appreciation to the Home Economics Division of the Kellogg Company, Battle Creek, Michigan for furnishing the original data which made this study possible; to Dr. Dena Cederquist and Dr. Margaret Ohlson for their invaluable assistance and encouragement throughout the study.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

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Food consumption has long been recognized by investigators as being one of the important factors in the appraisal of the nutritional status of individuals and population groups. The study of food habits is an essential part of the dietary survey, for in order to study the influence of diet on health it is necessary to determine the kinds of food which people accept.

More than 75 years ago, Voit, the German physiologist studied the dietary intakes of laborers on self-selected diets and thus set up protein and calorie allowances on the basis that these persons, who were apparently in good health, were consuming an adequate diet. Some of the earliest studies in this country were made by Atwater (1) in 1902. He studied individuals and boarding house groups who were engaged in different occupations, using their caloric needs as a basis to propose dietary standards for adults of different degrees of activity. Sherman and Gillett in 1914-15 made a detailed study of the food consumption of 92 low income families living in and around New York City. This study was one of the earliest attempts to determine the effect of economic status on dietary intakes.

Two of the most extensive investigations indicating trends in American food patterns have been carried out by the Bureau of Home Economics. One of these studies (2), based on dietary records obtained during the period December, 1934 to February,1937 deals with the content, nutritive value and economy of food purchased by families of employed wage earners and clerical workers in 43 industrial centers in eight major geographical regions of the United States. The other (3) deals with the food consumption of families at various income levels living in cities, villages, and on farms in different parts of the country.

Food habits vary from place to place (2,3) and season to season (2,4,5). They differ from family to family reflecting economic circumstances (2,6,7) and cultural backgrounds (7,8,9,10,11). Family size also affects the food consumption level; the larger the family, the more limited the diet of each family member (12). Reid (13) puts forth the following factors as influencing food habits and preferences:- physiological needs, social organization, economic resources and cost, attributes of foods and psychological attitudes.

Established habits of eating are difficult to change and it is being realized that more emphasis must be put on correct eating patterns for preschool and school

children if dietary intakes of this age group are to meet the present standards of adequacy. The value of the school lunch program has been emphasized by several workers (14,15,16,17,18).

The problem of improving the American food pattern is foremost in the minds of all interested in a better way of life. In spite of the fact that the United States has the highest standard of living in the world today, and leads in nutrition research, public health authorities are concerned with the lack of adequate dietaries as judged by the present recommended dietary allowances. Food enrichment, especially of wheat flour and cereals, is an important step toward guaranteeing the nutritive quality of a low cost food (19). Twenty-six states and two territories have enacted enrichment laws as of August 1949*. An even greater emphasis on nutrition education can also do much to improve American eating habits.

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PURPOSE OF THE STUDY

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During the first four months of 1947, data of food consumption of approximately 5,000 elementary school children (grades one to eight) in 40 states and the District of Columbia were collected by the Home Economics Division of the Kellogg Company, Battle Creek, Michigan. The states for which data were not secured include Montana, Maine, Connecticut, New Hampshire, Nevada, Rhode Island, South Dakota and Wyoming.

The main purpose in collecting the data was to determine the extent to which Kellogg's cereals were being used by school children throughout the country. However, the data represented an unbiased record of the foods that were served to these children during the five day survey, as the children were not informed of the purpose for which these data were being collected. Schools were contacted and all teachers interested in supervising the keeping of the food records in their classrooms filled out cards stating the number of records desired, the grade or grades of their students and the address to which the records were to be sent.

Twenty-four hour recall records were written at school for five consecutive days (Sunday through Thursday)

and at the end of that time the completed records were returned to the Kellogg Company. The company made a partial analysis of breakfast scores; then made the data available to the Department of Foods and Nutrition, Michigan State College for further analysis.

The purpose of this study was to make a descriptive evaluation of these food records; this evaluation was used as a basis for the comparison of the food patterns of elementary school children throughout the main geographical regions of the United States.

The greater majority of the 4,743 food records made available to the Department of Foods and Nutrition for use in this study were filled out by children in the fourth, fifth and sixth grades. Incomplete records were rejected as being inaccurate; also rejected were any records filled out by teachers rather than by the children themselves. Rejection of these food records eliminated the states of Maryland and Idaho and reduced the total sample to 3,967. A number of additional records were discarded because the spelling could not be deciphered.

The selected sample of 2,252 food records included all complete records filled out by children in the fourth and fifth grades. There was no differentiation as to the sex of the children, other than by name, indicated in the records. Sex differentiation did not seem necessary since the food habits of the age group (9 to 12 years), rather than the quantitative intakes are the object of the study.

DISCUSSION OF LITERATURE

DISCUSSION OF LITERATURE

The Bureau of Human Nutrition and Home Economics, United States Department of Agriculture has outlined four procedures for collecting food consumption data: their uses and limitations (20). These are:-

1. Estimation by recall - food intake (in measures or servings) of the previous 24 hours or longer is recalled.
2. Food records - record of all food eaten made at the time the food is consumed (in measures or servings) for varying lengths of time, usually three to seven days.
3. Diet history - by recall or repeated food records or both to discover usual food patterns over a relatively long period of time.
4. Weighed dietary intake - may be accompanied by collection of samples for analysis to be used for metabolism studies.

Each of these methods has its advantages and disadvantages. The recall method can be used as a basis for educational programs; it is easily obtained and gives a qualitative rather than a quantitative picture of the diet. The food record may be used in nutritional status

studies; its accuracy in the calculation of quantitative food intakes depends upon the ability of the subject to estimate quantities of food correctly and the correct application of food tables. The advantage of the food record is that it represents an unbiased picture of the meals served to an individual during a survey period. The dietary history has little use other than to study food habits, although it may also be useful in nutrition education programs for following the progress of children to determine whether or not education has improved their dietaries. While a weighed dietary intake is the most accurate procedure for collecting data to determine food intake, its disadvantage lies in the fact that it is very time consuming and persons are apt to deviate from their usual patterns of eating because it is too much trouble to weigh out a certain food.

Large Scale Food Consumption Studies

Two extensive studies of food consumption made by Stiebeling et al. have been mentioned previously (see Introduction). One was a study of the diets of families of employed wage earners and clerical workers in 43 industrial centers in eight major geographical regions of the United States (2). The families were mostly white, although some Negro families in the Middle Atlantic and southern cities were included in the sample.

Four thousand food inventories were kept for a period of seven days. These records were classified by region, color of family and season, and grouped into 10 categories according to the level of expenditure for food. The quantities of the different kinds of food purchased and the nutritive adequacy of the diets was determined.

The diets of the families in this study tended to be high in fats, sugars, meat, poultry, and fish, but low in milk products and fruits and vegetables other than potatoes. Forty to sixty per cent of the diets of white families were reported as needing improvement; also in this category were over 60 per cent of the Negro families in the South.

Seasonal variation, as far as the nutritive value of the diets was concerned, seemed slight. Intake of calories, protein, phosphorus, iron, thiamine and riboflavin tended to be highest in the fall and winter, while vitamin A was highest in the spring and ascorbic acid in the summer.

The higher the income level, the greater the consumption of eggs, meat, poultry and fish. In spite of this all families were reported to have an adequate protein intake, indicating the popularity of protein foods in the American dietary. The largest share of calories was derived from grain products in all regions and at all income levels.

It was reported that even the "good" diets fell short of the optimal allowances for protective foods.

The second study (3), referred to previously, is a study of family food consumption according to income of families in cities and villages in five regions: New England, Middle Atlantic and North Central, Plains and Mountain, Pacific and Southeast.

Size or composition of the family made little difference in the food spending patterns of the families in general. Income and family type did affect the level of consumption of some food groups. As incomes rose the consumption of fresh fruits, fresh vegetables, meat, poultry and fish increased. The smallest increases or a decline occurred in grain products and potatoes.

In analyzing the data, three broad regional groups were used, North, West and Southeast, to bring out regional similarities and differences. Egg consumption per capita varied little in the summer months of 1936 in the North, West or Southeast, but milk consumption was lower in the Southeast. More fresh fruits and vegetables other than potatoes were used in the Southeast and West than in the North.

The level of consumption of cheap energy producing foods followed typical regional patterns. Potato consumption was highest in the Northeast and Middle Atlantic and North Central regions while the Southeast had

an average grain product intake twice as high as in the North and West and a smaller proportion was purchased as baked goods. Less than one-tenth of the bread purchased in all three broad regions was made from part or entire whole wheat or rye flour.

The Southeast consumed more chicken, pork and fish but less beef, veal and lamb than the other regions. Less butter was used in the Southeast but more "fatty foods" such as fat pork were consumed.

Stiebeling (21) compared the national food consumption in 1941 with that of 1936 and found that there was an overall improvement during the five year period. In 1936, low and high income groups differed most with respect to calcium, vitamin A, ascorbic acid and riboflavin. Fewer than one-fifth of the families in this country had food supplies that met the National Research Council's recommendations. Diets of higher income groups tended to provide more protein, minerals and vitamins than those of low income groups.

From 1936 to 1941, consumption of fresh vegetables had increased 12 to 14 per cent, canned vegetables 5 to 8 per cent, citrus fruit 30 to 40 per cent, other fruit 10 to 15 per cent, meat and eggs 8 to 10 per cent and dairy products less than 5 per cent. The consumption of grain products decreased but the author felt that this would be offset by enrichment which began in 1941.

Dietary and Nutrition Surveys

The Department of Public Services of General Mills initiated an experimental nutrition education program in the schools in the spring of 1945. A survey of the food habits of 29,475 boys and girls (22) was conducted between April 1945 and June 1948 as a part of the program. The children represented all grades from kindergarten through twelfth, and all types of schools from the one-room rural to the large city school were represented.

The first surveys were made over a seven day period, but beginning September, 1946, the period was reduced to three days. Diets of the 29,475 children were classified as good, fair or poor on the basis of total scores and 14,217 were analyzed according to specific food groups. The scoring devices used were developed by Tinsley, Arny and Leichsenring, who based the standards on their interpretation of the National Research Council's Recommended Allowances (Revised 1945).

Three out of five of the entire group of children surveyed had diets which were said to be in need of improvement. The food groups eaten in amounts which met the recommended allowances included meat, bread and cereals, and potatoes. The recommended amounts of citrus fruits, milk and eggs were consumed by only 49 per cent of the children, while only 30 per cent received adequate amounts

of green and yellow vegetables and other fruits and vegetables. About one-fourth of the 29,475 children had no green and yellow vegetables during the period of the survey.

Regional differences were apparent; the Upper Midwest reported the highest percentage of good diets and the Southwest the lowest percentage. The lowest consumption of citrus fruits occurred in the Southeast, Southwest, and Mountain and Pacific regions. This is an interesting observation in the light of the fact that the greatest percentage of citrus fruits are grown in these areas. Potatoes played an important role in the diets of all children, the number eating the recommended amounts being almost twice those who had other fruits and vegetables, and over twice the number who had an adequate intake of green and yellow vegetables.

The breakfast pattern of 60 children selected from each region appeared to be similar throughout the country. The percentage of children who reported an intake equal to the recommended daily allowances (based upon the standards set up by Tinsley, Arny and Leichsenring) varied considerably. Only two-thirds of the boys and girls from the Northeast and 40 per cent from the Southwest had milk daily for breakfast. The Upper Midwest had the largest percentage (40 per cent) of pupils who had cereal every morning, while only 22 per cent of the group from the

Mountain and Pacific region ate cereal daily during the three day period. The daily occurrence of fruit for breakfast varied from 67 per cent in the Northeast to 15 per cent in the Southwest region.

An analysis of the breakfast records of 5,426 pupils of all ages showed that more older children were reported to have poor breakfasts than younger children. Only 10 per cent of this entire group ate breakfasts which were good and 25 per cent had breakfasts that rated poor.

A selected sample of 1500 pupils representing all grade levels was analyzed to determine the food pattern of the typical child. This sample was thought to be representative of the larger number of children as the smaller sample was found to have the same percentage of good diets and 2 per cent fewer poor diets than the entire group of 29,475 children. The typical child was reported to have eaten about 90 per cent of the recommended amounts of meat and meat substitutes and of whole grain and enriched bread and cereals, 85 per cent of potatoes, 84 per cent of milk and milk products, 75 per cent of citrus fruits, about 65 per cent of eggs, butter and fortified margarine and slightly more than 60 per cent of green and yellow vegetables and other fruits and vegetables.

The factors found to influence diets of school children included age and sex of the pupils, the occupation

of the parents, the section of the country in which the family lived and the school lunch program.

Suitable, representative, smaller samples were selected to determine the influence of the above factors on the diets of school children. Two studies were carried out to determine the effect of age. In the initial study, the diets of older boys and girls rated lower than those of younger children; the typical older child ate fewer citrus fruits and less milk, butter and margarine. They used milk, fruit and cereal less frequently than did younger children.

This downgrade, as age increased, was not apparent in the second study so that age may not be a factor in influencing the diets of these children. The authors feel that there may be two reasons for the results obtained in the second study. Firstly, there were no diets of high school students obtained in the first study. Secondly, nutrition education may have improved diets in the second study, as these data were obtained from surveys made later in the year.

The influence of sex was apparent in the fact that boys had a higher percentage of good diets than girls, except at the kindergarten-third-grade level. A larger percentage of boys ate recommended amounts of all food groups except green and yellow vegetables and other fruits and vegetables.

There were more good diets and fewer poor diets among urban children as compared with those from rural districts. Urban children consumed more green and yellow vegetables, more milk and citrus fruits and eggs than rural children, while the latter consumed more potatoes, bread and cereals.

Parental occupation exerted an influence upon the diets of school children as the percentage of good diets decreased from professional to skilled trades and day laborers. Analysis by food groups of the diets of children of professional men showed fairly high percentages of these children eating the recommended allowances of each food group. Over one-third of the children of day laborers had no green or yellow vegetables, and one-fourth had no milk.

It was found that extremes in the economic level of the family affect food habits of children. The food groups least affected by the income of parents were meat, potatoes, and bread and cereals. Only 23 per cent of the children from the high income school studied had poor breakfasts, while an inadequate breakfast meal was found in 58 per cent of the children from a low income school.

School lunch programs effected improvements in the diets of both rural and urban school children, as did teacher education and nutrition emphasis in the schools.

Foote and Eppright (23) made a dietary study of 50 Texas boys and girls, 14 to 19 years of age in which sex

showed a marked influence on the diets of school children. The average daily intakes for boys were 3,126 calories, 90 gms. of protein, 1.44 gms. calcium, 1.95 gms. phosphorus, and 0.0182 gms. iron while that of the girls was 2,017 calories, 53 gms. protein, 0.79 gms. calcium, 1.01 gms. phosphorus and 0.0094 gms. iron. Since the average weight of the boys (144 pounds) was 18 pounds greater than that of the girls (average weight, 126 pounds), the difference in food intake may have been related to differences in the food needs of the two groups. However when the nutritive value of the diets was expressed per 100 calories of intake, the food chosen by the girls was lower in calcium, phosphorus and iron content than that chosen by the boys.

The influence of age upon dietary intake was apparent in a study of 524 high school girls made in 1939 and 1940 by Leichsenring et al. (24). This dietary study included high school girls from Minnesota and Kansas. A progressive decrease in the nutrient intake with increase in age was observed in the 227 diets analyzed for food nutrients.

The factor of age also entered into the dietary patterns of 1,103 aircraft workers in Southern California (25). In this study, made by Wiehl, dietary histories on the consumption of selected foods during one week were collected, and the use of each of five food groups was compared with amounts recommended in the dietary pattern prepared by

the National Research Council's Committee on Food and Nutrition. Young men, under 25 years of age, were found to have somewhat better diets than older men. Young men ate more citrus fruits, but had a similar green and yellow vegetable and egg consumption to that of older men.

Similar findings were reported by Downes and Barandvsky (26) who made a study of the food habits of families in the Eastern Health District of Baltimore in the winter and spring of 1943. The data is presented according to the age of the housewife. Young families were found to have somewhat better diets than older families.

Brown (27) also reported a tendency for lowered food scores with increase of age.

The income level or economic status of families also exerted an influence on the diets of children. Among the studies carried out in the United States which showed this influence are those of Stiebeling and Phipard (2), Mack et al. (28,29), Wiehl (30), Reynolds et al. (31) and Cowles (32). These studies all showed an increasing dietary adequacy as the income levels rose. In general, low income diets had many more inadequacies than those of higher levels, especially in the more expensive food groups. Consumption of bread and potatoes was usually higher at lower economic levels.

Similar findings are reported by Canadian workers in dietary surveys made in Toronto by Patterson

and McHenry (33), in Winnipeg by Hilz (34), in Quebec by Sylvestre and Nadeau (35) and in Edmonton by Hunter and Pett (36).

Hardy et al. (6) made a study of nutritional and dietary inadequacies among Chicago children from different socio-economic groups. Physical examinations were made and dietary records kept for 7,363 children from 3,922 urban families. Inadequate diets occurred in all socio-economic groups but most frequently at the relief level (92 per cent) as compared to 41 per cent at the highest income level. Diets of Negro children were less adequate than those of white children with 89 per cent of the Negro and 67 per cent of the white children failing to meet a minimum adequate standard. As has been noted in other studies previously mentioned, protein foods were the most adequate and fruits and vegetables the least adequate food group.

Gray and Blackman (37) made a study in the fall of 1945 of 43 boys and 81 girls in two city and two consolidated rural schools in the Piedmont section of North Carolina, in which all but 4 of the 124 high school students reported inadequate diets. Rural diets were poorer than urban diets in this study. These findings were similar to those reported in the General Mills study.

Contrary to the findings of most workers are the findings of Sylvestre (38) who made a survey of 10 to 14

year old children in 25 county health units in Quebec. He found no correlation between sex, residence of parents and economic conditions of family, and inadequacy of diet.

Mack et al. (28) in a study of the nutritional status of 147 school children in a college community found that nutrition emphasis in the community and the better education of the parents, influenced the dietary practices of the family. The influence of nutrition education in improving the dietaries of school children was also noted by Evans and Lubschez (39) in a study of the comparison of diets of school children in New York City in 1917 and 1942.

The effectiveness of the school lunch program in improving the nutritional status of school children has already been mentioned (see Introduction).

Several studies have been made of the diets of rural school children in relation to their health. Reynolds (40) made a study of 576 white and 323 Negro children in Virginia, Davies (41) of two rural Massachusetts towns, Frayser and Moser (42) of 322 children, eight to ten years of age, in Laurens County, South Carolina and Brown (27) of six rural communities in Utah.

The diets of children in Virginia and South Carolina were found lacking in milk, fruits and vegetables; the latter especially so in winter. In Virginia coffee tended to replace milk in the diet. Whole grain cereals

were lacking in all the states that were studied. The best features of the diets included the use of eggs in South Carolina, fruits and vegetables in Carver, Massachusetts and milk in Southwick, Massachusetts, and milk, fruit and vegetables in Utah.

Reynolds et al. (31) made a study of the dietary practices of Wisconsin children from two counties. These workers found the consumption of green and yellow vegetables, milk, citrus fruits and tomatoes to be low.

Winter food consumption of 109 Wisconsin farm families during December, 1933 to January, 1934 was studied by Cowles (32). Protein was more nearly adequate than any other nutrient, due to high intakes of meat and moderately high intakes of milk furnished by the farms. As in the study by Reynolds et al. (31), the consumption of vegetables and citrus fruits was low. Whole grain cereals were found to be completely lacking.

Regional dietary patterns have been brought out in a number of studies carried out in the Southeast and Southwest sections of the country. Milam and Anderson (43), Milam (44), Milam and Bell (45) and Milam and Darby (5) studied the dietary intakes of village and rural families in North Carolina. The typical food pattern in this state included the use of biscuits, white bread, cornbread, fat pork and gravy as the more undesirable traits. The occurrence of dried beans and peas, green and yellow vegetables such as collards, turnip greens and sweet potatoes, eggs and

molasses were the good features of these diets.

In a study of family diets in the lower Costal Plains of South Carolina, Moser (46) found diets high in refined cereals, fats and fatty food and sugars with insufficient vegetables, fruits and milk. The dietary patterns were similar to those of North Carolina as would be expected.

Drake and Lamb (47) made a dietary study of 63 families living in Lubbock, Texas in which they found that fairly general use was made of "pot liquor" in meal preparation. Methods of cooking are very important from the standpoint of nutritive value, therefore, the practice of using "pot liquor" was found to be desirable in areas of poor nutrition such as the South.

The influence of Mexican food habits in the Southwestern region of the United States has been brought out in recent years by Thompson (8) in a nutritional survey in Tuscon, Arizona, by Winters (10) in a dietary study in San Antonio and Austin, Texas and by Robinson, Payne and Calvo (9) in a nutritional status study in Mexico City.

Basic foods in these diets included corn, dried beans, chili peppers and lard. The vegetables most frequently eaten were tomatoes and onions. Coffee, usually taken with significant amounts of milk in it, was served regardless of economic status. Only small amounts of fruit were eaten, bananas and oranges being the most popular of those that

were consumed.

Nutritional studies in Mexico itself, conducted by Cravioto et al. (48,49) revealed that certain eating habits of these people were of great value from a nutritional standpoint. The method of preparation of the corn for making tortillas resulted in a calcium increase in the finished product of 2010 per cent and an iron increase of 37 per cent above that of corn. The average daily consumption of 280 gms. of tortilla yielded more than 500 mgs. of calcium. This increase in calcium results from steeping the maize in 1 per cent lime solution before it is ground by hand.

Many varieties of beans and peas are used, which are important for their protein content. Chili peppers, rich in carotene and ascorbic acid are widely consumed. Another important source of ascorbic acid is from wild plants which are consumed in sufficient quantities by families of low economic status to make them a valuable source of this nutrient.

These studies are of value because they indicate the influence the traditional Mexican dietary has on the eating habits of the Southwestern region of the United States.

Evaluation of Dietary Studies

Huenemann and Turner (50) conducted a study to determine how a diet history obtained by an interview would

compare with an actual food record (in which the food is weighed and recorded as it is consumed), and whether repeated dietary investigation was necessary to determine food habits.

Diet histories were obtained by the interview method for 25 clinic patients, six to sixteen years of age. This was followed by weighed food intakes which were recorded three or four times during the period of a year in an attempt to learn how typical of a child's usual food habits a two week record was. The diet histories and records were calculated in terms of average daily intakes of the various food nutrients.

These calculations were compared and it was found that no history agreed with the weighed diet record within 20 per cent for all constituents. Approximately one-half of the histories differed significantly from the records in at least five constituents. The authors concluded that dietary histories obtained by the interview method have very little value as a source of quantitative data.

Comparison between successive diet records showed variations in the intake of all nutrients, hence the authors advocated repeated dietary investigations in order to establish a correlation between clinic and diet reports.

Burke (51) believed that the dietary history can be a valuable tool in research to correlate dietary intakes with clinical and laboratory findings. The subject was interviewed

to find out his usual pattern of food consumption and this was recorded in ordinary household measurements. Along with the history the food likes and dislikes were recorded. The worker then suggested that the history be followed by a three day food record. The combined records provided the basis for drawing up a typical day's dietary which was then calculated. The diets were evaluated by a rating scale containing a range of values wide enough to take care of any inaccuracies in the diet history.

The United States Public Health Service (52) advocated that diet and food consumption records are an essential part of nutrition surveys. They should consist of food inventory and purchase records on a family basis and/or individual records of food consumption, both covering the period of a week.

This same view was expressed by Youmans et al. (53) who believed that the study of food consumption offered a check and control of other methods of assessing nutritional status.

Stiebeling (54) maintained that food habit inquiries are of value as quick checks to uncover probable short comings in the diet.

In interpreting some of the findings of nutrition surveys, Darby (55) stated that "we are not justified in classifying a population as deficient because the dietary intake falls slightly below standards such as the

Recommended Daily Allowances. Inasmuch as variability is a fundamental attribute in biology it becomes impossible to fix a single figure as the requirement for a substance."

McHenry, Ferguson and Gurland (56) pointed out sources of error in dietary surveys. These included a sample which is not truly representative of the population, the fact that food consumption for one week may not be representative of individual food habits, waste in preparation and at the table and the actual composition of the foods not being considered in the computation of the nutrients in the dietaries, and the season of the year not being taken into account in the evaluation of the food habits.

Riggs et al. (57) made a nutritional survey of school children in East York township, Canada. A lack of correlation between dietary findings and simultaneous observations of nutritional status was found. These workers felt that dietary surveys alone do not provide a direct and accurate measure of the prevalence of malnutrition. This may be so, yet dietary surveys still furnish the best means available at the present time for uncovering likely areas of malnutrition. The dietary survey, therefore, is a valuable public health tool.

EXPERIMENTAL PROCEDURE

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Analysis of Food Records

A score sheet listing the types of foods in the American dietary was devised (see Appendix) to show the occurrence of each kind of food consumed during the five day period. The foods or food groups for which the records were checked included the number of times milk, green and yellow vegetables, potatoes - white and sweet, citrus fruits and tomatoes, other fruits, eggs, meat, fish or poultry, other protein foods - cheese, legumes and nuts, bread and cereals - wheat, corn and rice, soft drinks and candy occurred in each child's five day record. Also recorded were the number of meals in five days, the meals missed - breakfast, lunch or dinner, vitamin supplements, and whether or not the child had the hot school lunch. The consumption of tea and coffee was also recorded in the soft drink column in an attempt to see if the former were replacing milk in the diet. Oatmeal and wheat products, such as noodles, were recorded in the wheat column. Bread was not designated as being whole grain or enriched, so that the wheat column contains total wheat and oat consumption rather than whole grain and enriched products only, as is indicated by the column heading on the

Table 1

Distribution of 2,252 fourth and fifth grade school children selected from 39 states

State	Number of records
Arizona	44
New Mexico	35
Texas	78
Oklahoma	2
Arkansas	55
Louisiana	43
West Virginia	50
Virginia	154
Kentucky	113
Tennessee	45
Mississippi	22
South Carolina	61
North Carolina	57
Georgia	51
Florida	41
Alabama	67
Massachusetts	56
New York	80
New Jersey	119
Pennsylvania	145
Delaware	13
Vermont	5
District of Columbia	21
North Dakota	8
Minnesota	35
Wisconsin	67
Michigan	21
Nebraska	24
Kansas	63
Missouri	73
Illinois	26
Indiana	129
Iowa	31
Ohio	171
California	50
Colorado	18
Oregon	79
Utah	46
Washington	55
Total	2,252

score sheet.

It was felt that the above classification would yield a descriptive evaluation of the food records and would provide a basis for the comparison of the food habits of children according to the section of the country in which they lived.

The records were numbered according to states (Table 1) and the tabulations made. The occurrences of the various food groups for the five day period were totalled for each child. The records were then grouped by states and the mean values per child (average number of times each food was served) for each state was summarized. The states were classified into six main geographical regions as shown in Table 2.

Table 2

Regional classification of states

Region	States included in region
Mountain and Pacific	Utah, Colorado, Oregon, Washington, California
Southeast	Tennessee, Florida, Georgia, West Virginia, Virginia, North Carolina, South Carolina, Alabama, Mississippi, Kentucky.
Northeast	Vermont, Delaware, Massachusetts, New York, New Jersey, Pennsylvania, District of Columbia
Central Midwest	Nebraska, Iowa, Kansas, Illinois, Indiana, Ohio, Missouri

Table 2 (Cont.)

Regional classification of states

Region	States included in region
Southwest	Oklahoma, Arizona, New Mexico, Louisiana, Arkansas, Texas
Upper Midwest	North Dakota, Michigan, Wisconsin, Minnesota

In an attempt to determine whether or not the food habits of the children were influenced by participation in the school lunch program, the mean occurrences of the various food groups for those students who received the school lunch in each state and those who did not receive the lunch were also tabulated.

A careful examination of the records revealed that very few meals had been missed. The meal most frequently missed was the noon meal on Sunday. This two meal Sunday pattern was not confined to any particular region or regions and seemed to be fairly generally distributed throughout the country. Consequently, this factor was eliminated from further analysis.

Also eliminated, was the occurrence of vitamin supplements for they appeared so infrequently it was felt that many of the children had not considered them a part of their daily food intake and had not recorded them.

DISCUSSION OF RESULTS

DISCUSSION OF RESULTS

The fourth and fifth grade school children who provided these records listed the food that was served to them; measures or size and number of servings were not generally recorded. In order to evaluate the records, these data were summarized according to the number of times each of the various food groups occurred during a five day period. Tables 4 - 9 (Appendix) show the mean occurrences of each of the various food groups per child per five day period for each state. Each table represents one of the six main geographical regions.

No information was available concerning the economic status, racial background, occupation or educational attainment of the parents of these school children. It was therefore impossible to determine what effect, if any, these factors had upon the dietary habits of the group studied.

State and Regional Trends in the American Food Pattern

Figures 1 - 7 present a summary of the average occurrence of milk, eggs, green and yellow vegetables, citrus fruits and tomatoes, all fruits plus tomatoes, legumes and corn in the diets of school children in the

SUMMARY OF THE OCCURRENCE OF MILK IN THE FIVE DAY DIETS OF SCHOOL CHILDREN IN THE MAIN GEOGRAPHICAL REGIONS OF THE UNITED STATES

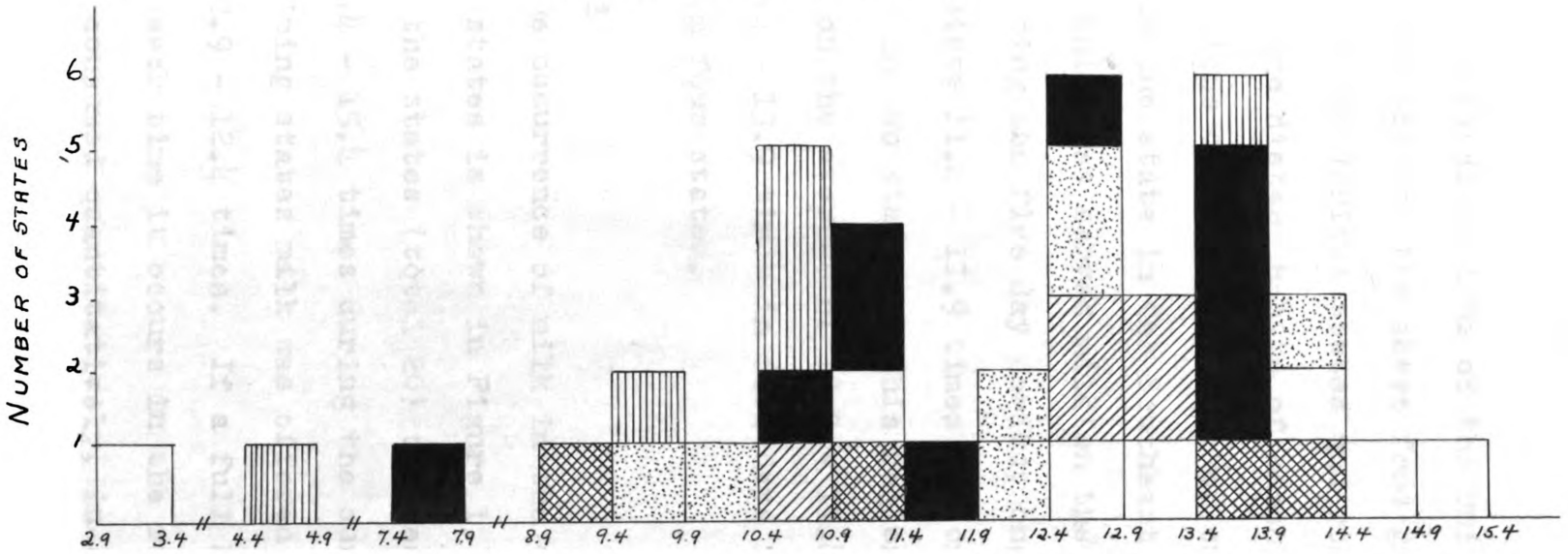


FIGURE 1

six main geographical regions of the United States. The number of times each of the above food groups were reported by children in the various states and regions indicates the trend in the dietary habits of school children living in these sections of the country. For example, Figure 1 shows that in one state in the Southeast region (shown in black) each child was served milk on the average of 7.4 - 7.9 times during the five day period; one state 10.4 - 10.9 times, one state 11.4 - 11.9 times and one state 12.4 - 12.9 times. In two states in this region each child was served milk on the average of 10.9 - 11.4 times and milk occurred 13.4 - 13.9 times in five days in the diets of children from four states.

State trends

The occurrence of milk in the diets of children from the 39 states is shown in Figure 1. In approximately one-half of the states (total 20) the mean occurrence of milk was 12.4 - 15.4 times during the survey period; in the 19 remaining states milk was offered to each child an average of 2.9 - 12.4 times. If a full half pint of milk was offered each time it occurs in the record, and if this serving was consumed quantitatively, in only one state would the average child consume one and one-half pints of milk per day.

SUMMARY OF THE OCCURRENCE OF EGGS IN THE FIVE DAY DIETS OF SCHOOL CHILDREN IN THE MAIN GEOGRAPHICAL REGIONS OF THE UNITED STATES

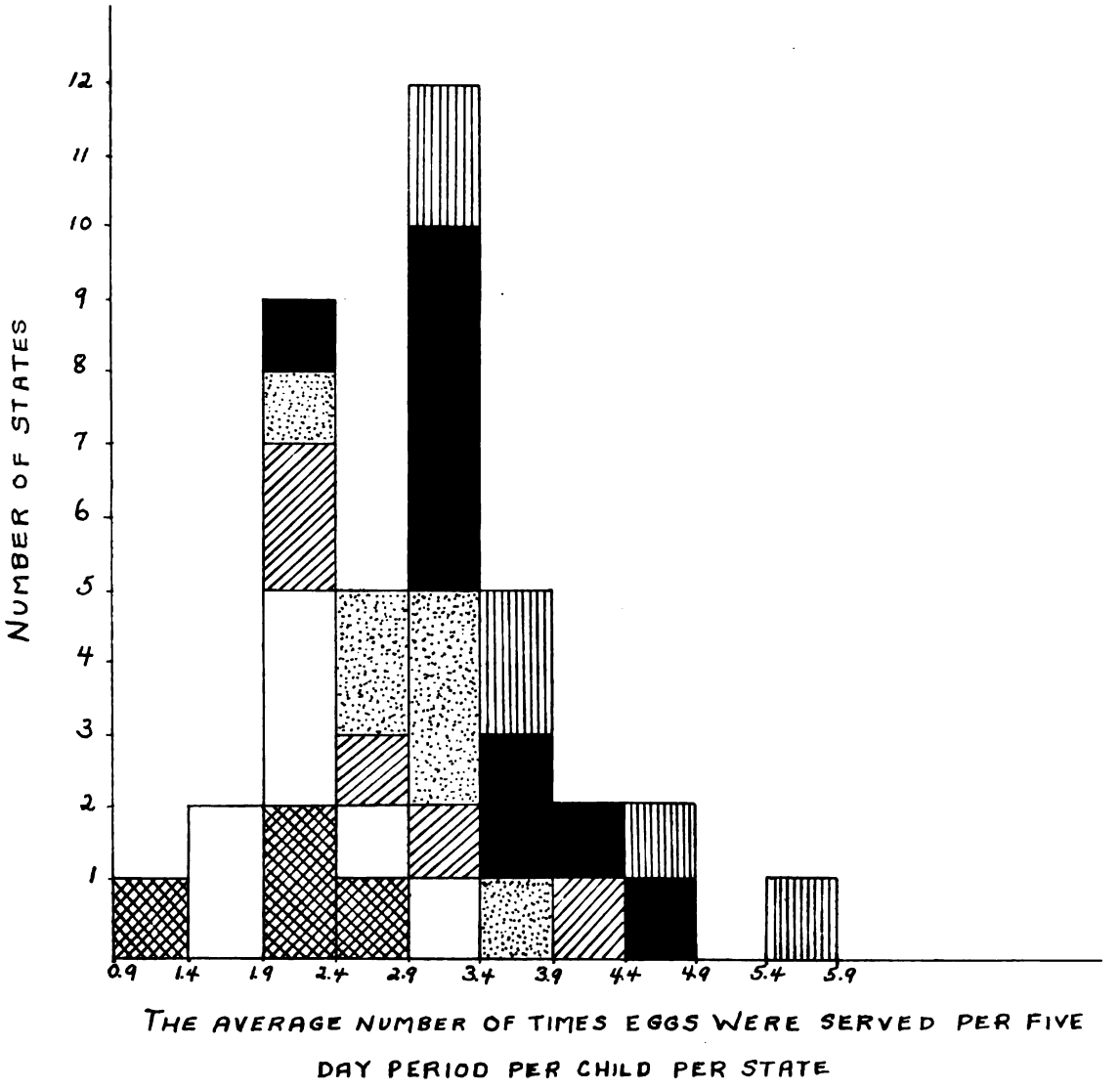


FIGURE 2

Summary of the occurrence of green and yellow vegetables in the five day diets of school children in the main geographical regions of the United States

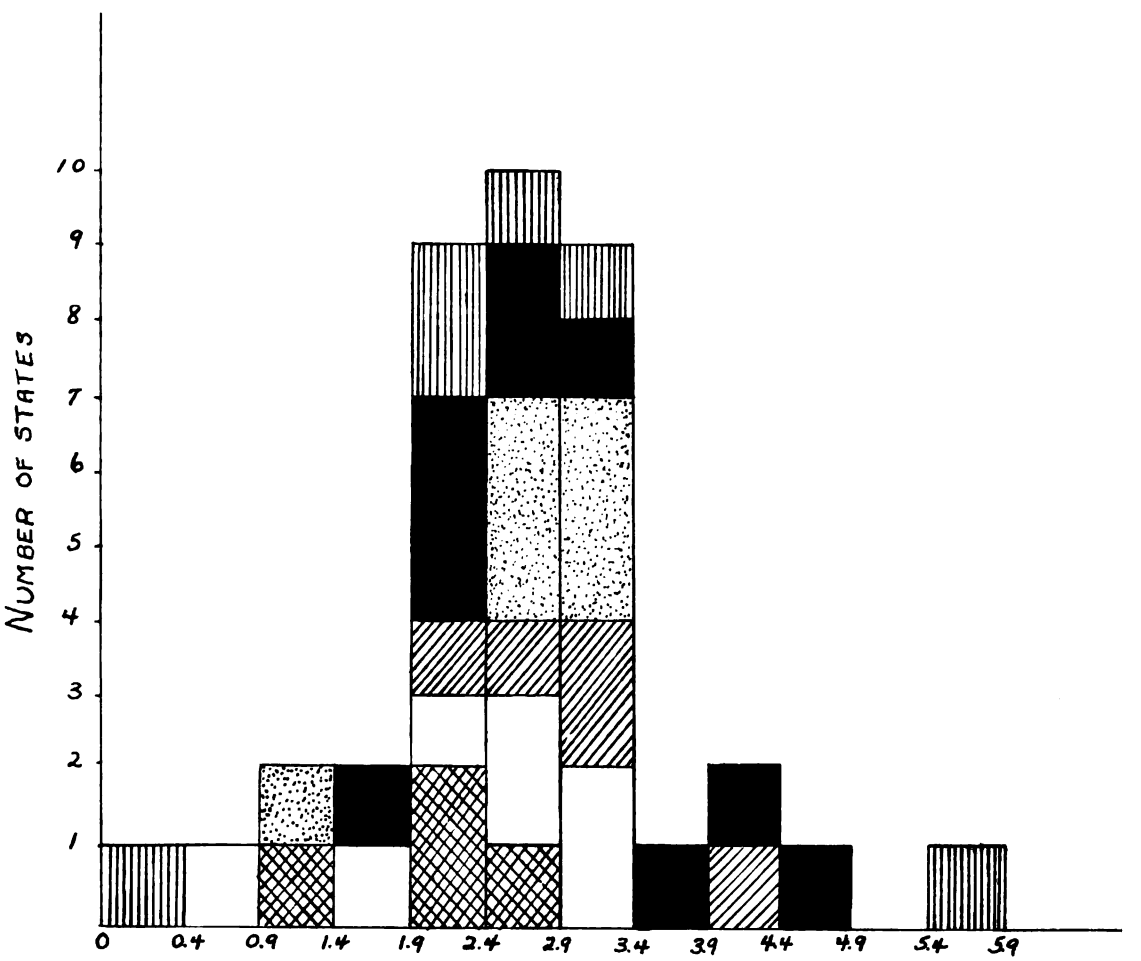
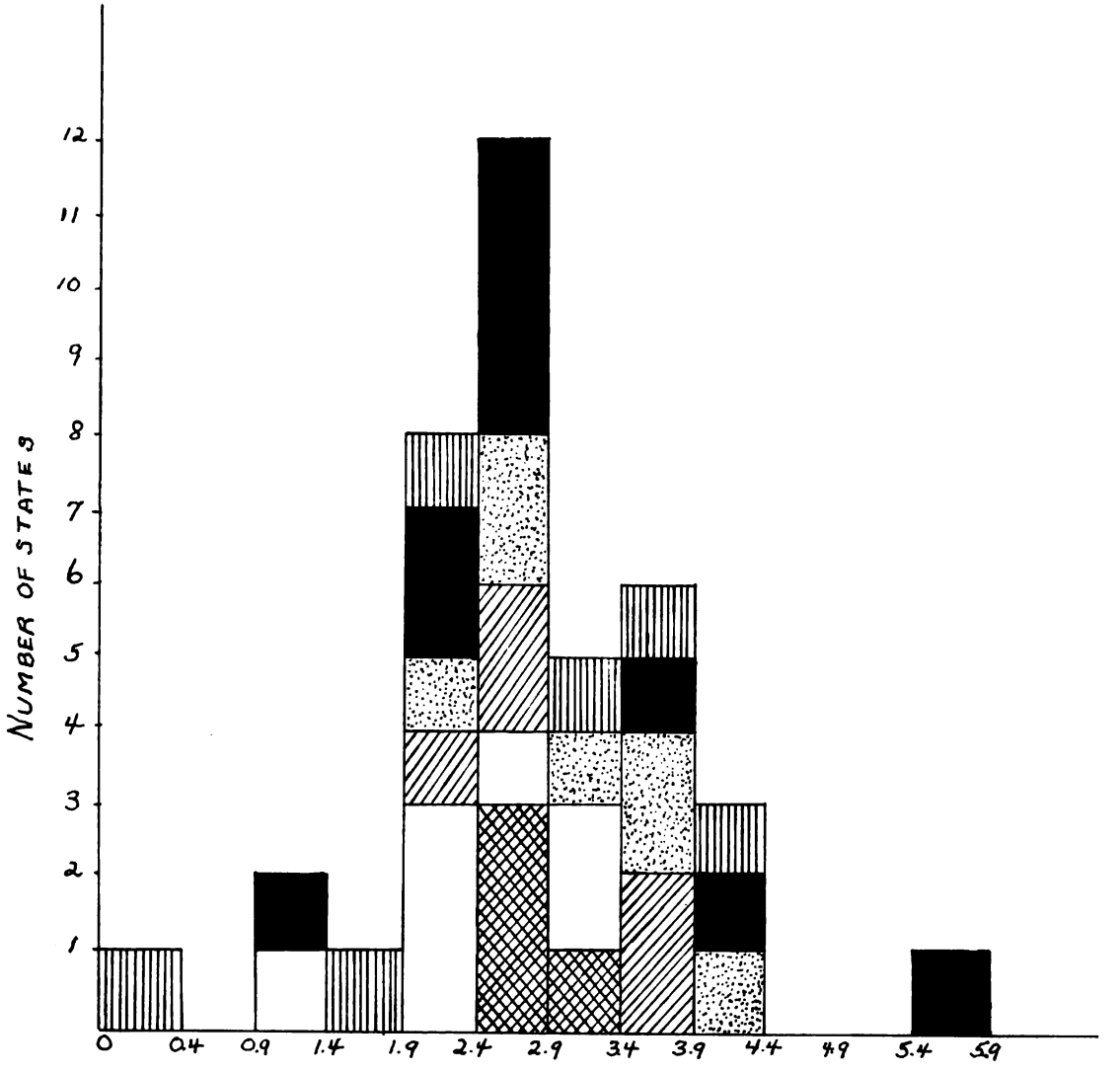


Figure 3

SUMMARY OF THE OCCURRENCE OF CITRUS FRUITS AND TOMATOES IN THE FIVE DAY DIETS OF SCHOOL CHILDREN IN THE MAIN GEOGRAPHICAL REGIONS OF THE UNITED STATES



THE AVERAGE NUMBER OF TIMES CITRUS FRUITS AND TOMATOES WERE SERVED PER FIVE DAY PERIOD PER CHILD PER STATE

FIGURE 4

The mean occurrence of meat, fish or poultry for the five day period was not summarized in chart form as this food group occurred on the average of at least once per day in each child's record for all states except Utah (Table 4). The children from this state were served meat on the average of 4.9 times during the survey period.

It may be seen from Figure 2 that the children from slightly more than half of the states studied (22 states) were served eggs three or more times in a five day period, while in 17 states the children were served eggs less than three times in the same period.

The information in Table 8 has been presented graphically in Figure 3. An examination of this figure reveals that in the majority of the states (28 out of 39) the mean occurrence of green and yellow vegetables, including sweet potatoes, was 1.9 - 3.4 times in the five day period.

Figure 4 shows the occurrence of citrus fruits and tomatoes in the five day diets of the 2,252 school children studied. In only one state, Florida, did the children report citrus fruit as a daily component of the diet (Table 5). It was not surprising to find the generous use of citrus fruits reported in the diets of children in Florida, inasmuch as this state produces a large quantity of this food. However, the equally generous use of citrus fruits was not reported in Texas (Table 8 -

Summary of the occurrence of citrus fruits, tomatoes and other fruits in the five day diets of school children in the main geographical regions of the United States

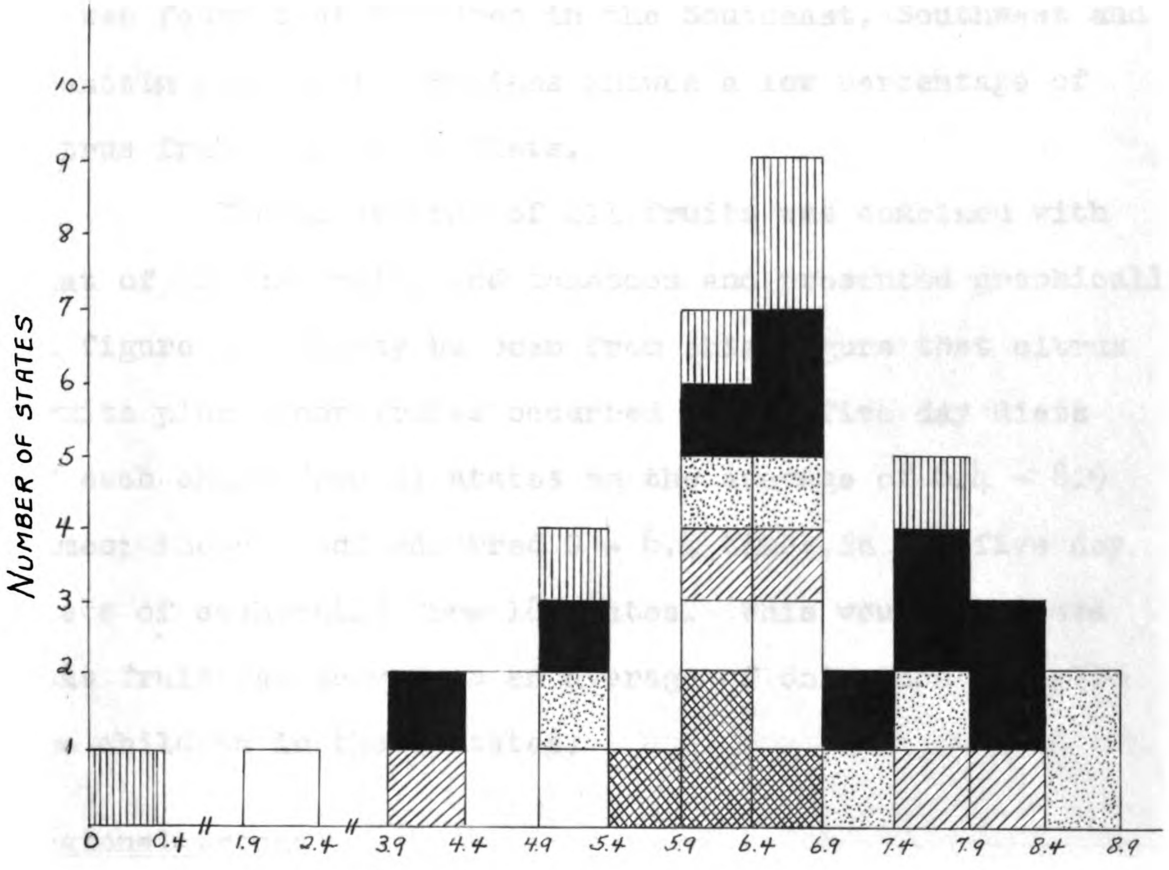


Figure 5

mean occurrence of 1.9 times per five day period) or California (Table 4 - mean occurrence of 3.1 times per five day period), the other two states which are noted for the growing of citrus fruits. Similar findings were reported by General Mills (22) in a study of the food habits of 29,475 school children from all parts of the United States. It was found that children in the Southeast, Southwest and Mountain and Pacific regions showed a low percentage of citrus fruits in their diets.

The occurrence of all fruits was combined with that of citrus fruits and tomatoes and presented graphically in figure 5. It may be seen from this figure that citrus fruits plus other fruits occurred in the five day diets of each child from 21 states on the average of 6.4 - 8.9 times; these foods occurred 0 - 6.4 times in the five day diets of each child from 18 states. This would indicate that fruit was served on an average of only once a day to the children in these states.

Regional trends

There were no definite regional trends in the occurrence of milk in the diets of the school children studied, although those children in the Northeast, Upper Midwest, Central Midwest and Mountain and Pacific regions had milk served to them more often than did the children from the Southeast and Southwest (Figure 1). Low intakes

of milk in the South have also been reported by several workers (2,3,31,40,42,46).

Figure 2 shows the regional trends for the occurrence of eggs in the five day diets of children in the main geographical regions. Children in the Southeast and Southwest reported a higher intake of eggs than was reported in the other regions. Higher intakes of eggs in the South have also been reported by Stiebeling (2), Milam and Darby (5), Frayser and Moser (42), Milam and Anderson (43), Milam (44) and Milam and Bell (45). The regions in which the lowest mean occurrence of eggs were reported included the Upper Midwest and Northeast.

Green and yellow vegetables, including sweet potatoes, occurred in the five day diets of school children from the Southeast and Southwest more often than in any other region (Figure 3). No occurrence of green and yellow vegetables, citrus fruits and tomatoes, and other fruits or corn was reported for Oklahoma (Table 8) in the five day period, but it was felt that the number of records from this state (Table 1) was too small to consider this a reasonable estimate of the average number of times these food groups were served. Oklahoma is the one state (Figures 3 - 5 and Figure 7) in the Southwest region where the average child was served green and yellow vegetables, citrus fruits and tomatoes or all fruits plus tomatoes on

the average of 0 - 0.4 times in the five day period. There is reason to believe, therefore, that this state should not be regarded as being indicative of the food patterns of the Southwest region.

Sweet potatoes were tabulated apart from green and yellow vegetables in an attempt to determine whether or not any regional trends were apparent. No definite trends were found; sweet potatoes did not occur frequently in the five day diets of any children in any region. These potatoes were not served at all during the period of the survey in Utah, Vermont, District of Columbia, Illinois, Oklahoma, North Dakota, Michigan and Minnesota (Tables 4, 6,7,8,9) and only were served 1.2 times in Delaware (Table 6).

Citrus fruits and tomatoes occurred most frequently in the five day diets of school children from the Southeast, Central Midwest, Mountain and Pacific and Southwest regions (Figure 4), while they occurred the least often in the menus reported by children in the Northeast. The regional pattern was similar when other fruits were combined with citrus fruits and tomatoes (Figure 5).

No regional differences were observed in the occurrence of cheese, which varied from not being served at all to being served 1.3 times in the five days of the survey. (Tables 4 - 9), nor were there any regional trends

Summary of the occurrence legumes in the five day diets of school children in the main geographical regions of the United States

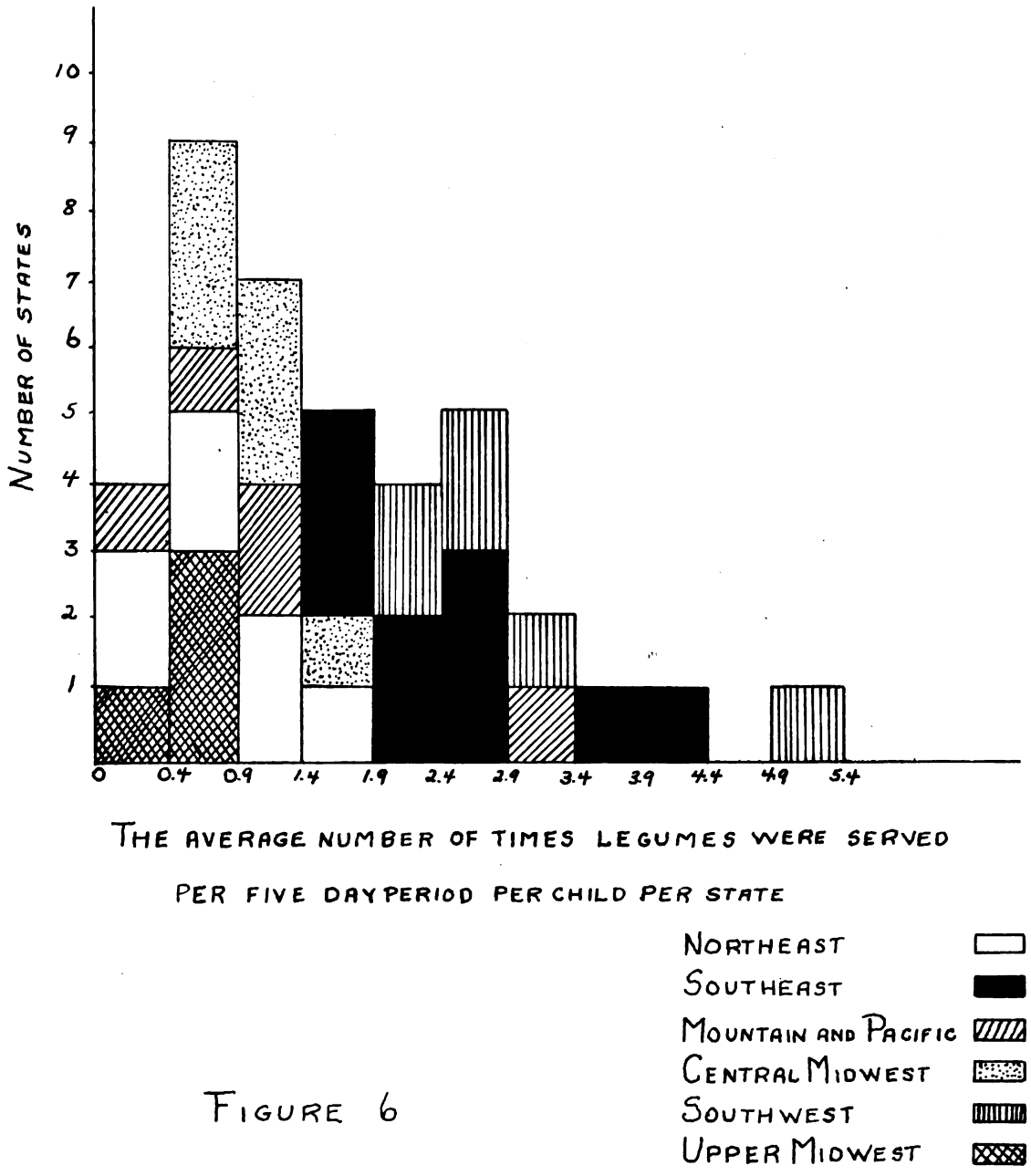


Figure 6

SUMMARY OF THE OCCURRENCE OF CORN IN THE FIVE DAY DIETS OF SCHOOL CHILREN IN THE MAIN GEOGRAPHICAL REGIONS OF THE UNITED STATES

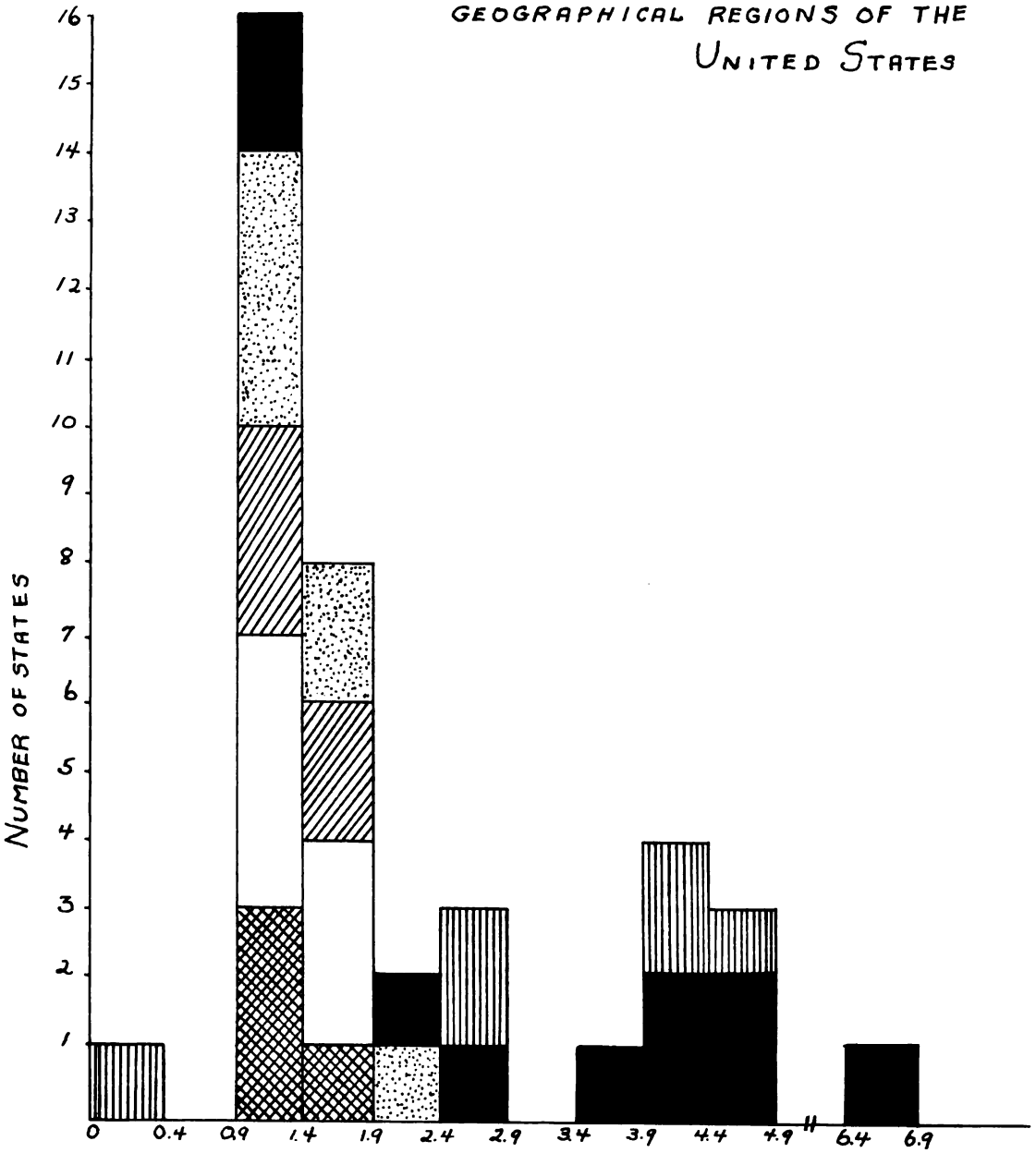


FIGURE 7

in the use of nuts. The range of the latter food group was no times served to 1.3 times served.

On the other hand, the third "other protein" food, legumes, fell into definite regional patterns as can be seen in Figure 6. The Southeast and Southwest sections of the country reported the highest mean occurrence of this food group; the Upper Midwest and Northeast the lowest mean occurrence of legumes. There is wide use of dried legumes of all types in the Southern sections of the United States. The lower economic status of population groups in the South may be a contributing factor to the high consumption of legumes in these areas.

Figure 7 summarizes the number of times corn occurred in the diets of school children in the various regions. The frequent use of corn in the Southern dietary shows up in the fact that this cereal was found most frequently in the diet records of the children from the Southeast and Southwest. The Northeast, Upper Midwest and Central Midwest reported the least frequent use of corn, with the exception of one state, Oklahoma (Table 8).

Some apparent differences were noted in the occurrence of rice; the Southeast and Southwest regions reported that this cereal was served more often during the survey period than was reported in any other region.

The foods which were recorded in the column "high calorie foods other than those listed" (Tables 4 - 9)

were summarized according to the number of times fats and carbohydrates appeared on the five day diet records of each child for each state. Fats and "fatty foods" included in the tabulations were bacon, fat pork, gravy, whipped cream and mayonnaise. The carbohydrates, tabulated under the heading of other high calorie foods, included such foods as cake, cookies, pie, jam, syrup, gelatin desserts, crackers and quick breads.

Diets high in fats and "fatty foods" have been reported to be characteristic of Southern food patterns (3,5,9,10,44,45,46). However, the school children in the present study reported an occurrence of fats which showed no regional trends. The range of the average number of times fats occurred in the diets of the children was 1.1 - 5.1 times for the five days of the survey.

No apparent regional differences were found for the mean occurrence of carbohydrates which ranged from 16.2 - 18.0 times for the period studied.

Occurrence of Tea and Coffee in the Menus

Since tea and coffee did not occur in sufficient quantities to replace milk in the diet, no definite relationship was found to exist between the two classes of beverages. The only state which showed any evidence that tea and coffee might account for lowered milk intake was

South Carolina. In this state milk was served on the average of 11.2 times to each child during the five day period, whereas tea or coffee was served 3.3 times (Table 5).

Several workers (40,50,51,52) have reported that coffee is consumed in large quantities in the South. Reynolds (40) found that coffee tended to replace milk in the diets of rural school children in Virginia. Thompson (8) reported similar findings in Arizona. In a dietary study of high school students in the Piedmont section of North Carolina, Gray and Blackman (37) reported that the consumption of tea, coffee and soft drinks was apparently not responsible for lowered milk intake.

Occurrence of Soft Drinks and Candy in the Menus

Soft drinks and candy appeared in the menus on the average of about one-half to two and one-half times during the five day period. If this rather low occurrence of soft drinks and candy is a true picture of the food habits of the group studied, it is indeed encouraging to all nutritionists. However, these data were collected early in 1947, at a time when "cokes" were still restricted as they had been during the war. It is quite possible that the intakes of these sweets might be higher at the present time, especially among those children attending schools where "coke" and candy machines have been installed. It may be that the children did not consider soft drinks and

candy as part of their daily diet; if so, the intakes of sweets may not have been recorded.

School Lunch

Little difference was observed in the food habits of those children who participated in the school lunch program and those who did not (Tables 4 - 9). This is contrary to the findings of Moser (15) who found that the nutritional status and dietary habits of school children who had the complete lunch were superior to those who had no school lunch, or even the partial lunch. Similar findings were reported by Abbott et al. (16) who made a five year study of the effectiveness of the school lunch in improving the nutrition of rural school children in Florida. Bransby and Wagner (18), in a study of the diets of school children in two northern industrial towns in England, also emphasized that good school feeding was a valuable contribution to the nutrition of children.

General Mills, in a study of the diets of 3,562 children in 42 rural and urban schools in Minnesota (22), reported that the factor of school lunch influenced considerably the diets of the children involved. A higher percentage of "good" diets was found in both rural and urban schools with school lunch programs.

Evaluation

In order to evaluate the results obtained, minimum adequate standards for the occurrence of certain protective food groups were set up for the five day period as follows:-

1. Milk - 15 times
2. Meat, fish or poultry - 5 times
3. Eggs - 3 times
4. Green and yellow vegetables - 5 times
5. Citrus fruits and tomatoes - 5 times
6. Other fruits - 5 times
7. Potatoes (white) - 5 times

In terms of a daily food pattern this would mean three servings of milk, one-half egg, and one serving each of meat, fish or poultry, green and yellow vegetables, citrus fruits and tomatoes, other fruits and potatoes. The Seven Basic Food Groups as established by the United States Department of Agriculture includes, in addition to these foods, whole grain or enriched cereals and butter or fortified margarine. The protective foods for which standards were set up together with whole grain or enriched cereals and fats would tend to assure each child of at least a minimum adequate intake of all nutrients. Fats appeared to be generously used by the children studied (Tables 4 - 9). Cereals also appear to have been used

generously. The children in those states having enrichment laws at the time these data were collected (Alabama, Arkansas, Georgia, Indiana, Louisiana, Mississippi, New Jersey, New York, North Carolina, North Dakota, South Carolina, Texas, Washington and West Virginia*) would be assured of having adequate intakes of whole grain or enriched cereals (Tables 4 - 9).

The above standards were used in summarizing the data in Table 3. In this table, the average occurrences of each food group are summarized by states. Thus in one state in the Northeast region, milk was served to each child on the average of 15 times in the five day period. In 38 of the states milk occurred less often than 15 times per child per five day period.

On the other hand in only one state was meat, fish or poultry reported less often than five times during the survey period. The frequent use of high protein foods together with the generous use of cereals, would tend to assure a relatively adequate intake of protein.

In 22 of the 39 states, eggs were served three or more times per child per five days. Even in the 17 states where eggs appeared fewer times than the standard, the protein intake should not have been affected adversely

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* Personal correspondence with the American Institute of Baking, Chicago.

Table 3

Occurrence of certain protective foods in the five day period

by states within regions

Food Groups	Number of Times Foods were served in 5 Day Period	Number of states within regions						
		Mountain and Pacific	South-east	North-east	Central Midwest	South-west	Upper Mid-west	All States
Milk	15 times or more	0	0	1	0	0	0	1
	less than 15 times	5	10	6	7	6	4	38
Meat, Fish or Poultry	5 times or more	4	10	7	7	6	4	38
	less than 5 times	1	0	0	0	0	0	1
Eggs	3 times or more	2	9	1	4	6	0	22
	less than 3 times	3	1	6	3	0	4	17
Green and Yellow Vegetables	5 times or more	0	0	0	0	1	0	1
	less than 5 times	5	10	7	7	5	4	38
Citrus Fruits and Tomatoes	5 times or more	0	1	0	0	0	0	1
	less than 5 times	5	9	7	7	6	4	38
Other Fruits	5 times or more	0	1	0	1	0	0	2
	less than 5 times	5	9	7	6	6	4	37
Potatoes (white)	5 times or more	0	1	1	1	1	4	8
	less than 5 times	5	9	6	6	5	0	31

since foods containing this nutrient appeared frequently in the menus. However, the vitamin A content of eggs would be an important contribution to the dietary since the infrequent use of green and yellow vegetables by children in all regions and in all states except one suggests that the intake of vitamin A may be inadequate.

Citrus fruits and tomatoes, as well as other fruits, were also used infrequently by the children in all states. White potatoes were reported in sufficient amounts in the diets of children from only eight states, four of which made up the Upper Midwest region. In the majority of the states studied, therefore, the ascorbic acid intake could be assumed to be low since other fruits and potatoes were not used in large enough quantities to compensate for the lack of citrus fruits and tomatoes.

The data suggest that the food habits of the children in all regions, as judged by the standards of adequacy set for this study, are in need of improvement, particularly in relation to the use of fruits, vegetables and milk.

SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSIONS

Dietary habits of 2,252 fourth and fifth grade school children from 39 states have been studied. Twenty-four hour recall records, kept by children for five consecutive days, were evaluated.

A descriptive evaluation of the food records was used as a basis for the comparison of the food patterns of elementary school children throughout the main geographical regions of the United States. These regions included the Northeast, Southeast, Southwest, Central Midwest, Upper Midwest and Mountain and Pacific sections of the country.

A score sheet, listing the types of foods in the American dietary was devised to show the kinds of food which occurred in the diets of these children. The data were summarized according to the average number of times each food group occurred in the five day diet of each child for each state in the various regions.

No definite regional trends were found in the occurrence of such foods as milk, meat, cheese, nuts and sweet potatoes, nor were any regional differences apparent in the number of times "other high calorie foods" (fats and carbohydrates) appeared in the five day diets of the school children studied.

Regional differences were suggested in the average number of times the following food groups were served to each child in each state during the survey period:- eggs, green and yellow vegetables, citrus fruits and tomatoes, other fruits, legumes, corn and rice.

In the diets of these children, no definite relationship was found to exist between the mean occurrence of tea and coffee and that of milk. Tea and/or coffee did not appear to have replaced milk in the diet.

A relatively low mean occurrence of soft drinks and candy was found in the diets of the children studied.

Very little difference was observed in the diets of those children who participated in the school lunch program and those who did not.

In order to evaluate the results obtained, minimum standards for the occurrence of certain of the protective food groups were set up for the five day period. On the basis of these standards, it would appear that:-

1. The only protective food group which occurred in adequate amounts in the diets of the 2,252 children studied was meat, fish or poultry.

2. The diets of the majority of the children in this study are in need of improvement, particularly in relation to the use of fruits, vegetables and milk.

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LITERATURE CITED

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APPENDIX

IF CEREAL IS EATEN ANY TIME DURING THE DAY, PLEASE GIVE NAME OF CEREAL

the Food I Ate This Week

My Name _____

My Age _____ My Grade _____

Name of My School _____

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
THE FOOD I ATE FOR BREAKFAST AND IN THE MORNING					
THE FOOD I ATE AT NOON AND IN THE AFTERNOON					
THE FOOD I ATE FOR THE EVENING MEAL AND BEFORE BEDTIME					

Teacher's Comments: _____

_____

_____

_____

_____

Signature of Teacher

Date

HE 21-1-47

SCORE SHEET FOR CHECKING FOOD INTAKE RECORDS

Record Number

Meals Missed B_1 / L_2 / D_3

Total milk in 5 days

Potatoes: White / Sweet

Occurrence of Green or Yellow Vegetables

Occurrence of Citrus Fruits or Tomatoes

Occurrence of Other Fruits

Eggs

Occurrence of Meat, Fish or Poultry

Occurrence of Other Protein Foods C_4 / Le_5 / N_6

Occurrence of Cereal and Bread W_7 / Co_8 / R_9

Hot School Lunch

Vitamin Supplements

Occurrence of Soft Drinks and Candy

Occurrence of High Calorie Foods Other Than Those Listed FATS / CHO

Legend

1. Breakfast
2. Lunch
3. Dinner
4. Cheese
5. Legumes
6. Nuts
7. Wheat and oats
8. Corn
9. Rice

Table 4

The occurrence of various foods in five day diets of school children in each state of the Mountain and Pacific region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child																	
			Milk	Potatoes		Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods			Cereals and Bread			Soft Drinks and Candy	Tea or Coffee	High Calorie Foods	
				White	Sweet						Cheese	Legumes	Nuts	Wheat	Corn	Rice			Fats	CHO
Ore.	No	79*	13.0	3.9	0.04	3.3	3.5	3.3	2.8	5.4	0.3	1.2	0.1	16.4	1.3	0.3	0.8	-	3.0	7.7
Utah	No	46*	12.8	4.5	-	2.3	3.8	4.3	4.1	4.9	1.0	0.4	0.2	18.4	1.6	0.5	0.5	0.3	2.3	7.9
Colo.	No	18*	10.9	3.7	0.1	2.8	2.8	4.7	2.1	7.4	0.3	0.9	0.2	13.0	1.6	0.2	0.9	0.6	3.6	8.0
Calif.	No	50*	13.0	3.8	0.1	3.1	2.3	2.1	3.4	5.9	0.5	3.0	0.1	16.9	1.4	0.7	0.8	0.04	4.3	8.6
Wash.	No	36	12.9	4.2	-	4.4	2.5	4.1	1.9	6.2	0.3	0.8	0.6	17.6	1.1	0.4	0.6	0.1	2.3	8.0
	Yes	19	12.1	4.6	0.2	4.1	2.8	2.5	2.2	5.9	0.1	2.5	0.3	15.2	1.4	0.2	0.4	-	4.3	8.6
		55*	12.6	4.3	0.1	4.3	2.6	3.5	2.0	6.1	0.2	1.4	0.5	16.8	1.2	0.3	0.5	0.1	3.0	8.2

* Total number of children in each state

Table 5

The occurrence of various foods in five day diets of school children in each state of the Southeast region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child: Milk	Potatoes White	Potatoes Sweet	Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods: Cheese	Legumes	Nuts	Cereals and Bread: Wheat	Corn	Rice	Soft Drinks and Candy	Tea or Coffee	High Calorie Foods: Fats	CHO
Tenn.	No	26	9.5	3.4	0.1	1.8	4.2	4.8	2.4	6.5	1.4	3.1	0.6	16.0	2.8	0.5	0.9	0.5	4.8	10.3
	Yes	19	12.5	4.7	0.3	2.7	3.4	3.2	3.9	6.7	1.2	4.3	0.05	15.4	2.5	0.2	0.3	0.9	4.2	6.6
		45*	10.8	3.9	0.2	2.2	3.9	4.1	3.0	6.6	1.3	3.6	0.4	15.7	2.7	0.4	0.6	0.7	4.5	8.7
Fla.	No	14	12.5	2.9	-	3.5	3.7	1.1	1.5	3.1	-	1.4	0.4	13.1	1.8	1.4	-	0.2	1.0	5.0
	Yes	27	14.5	3.6	0.5	2.7	6.7	2.6	2.5	6.4	0.3	3.0	-	16.9	1.1	0.9	0.2	0.5	3.9	8.3
		41*	13.8	3.4	0.3	3.0	5.7	2.1	2.2	5.3	0.2	2.4	0.1	15.6	1.3	1.1	0.1	0.4	2.9	7.2
W. Va.	No	50*	13.9	4.4	0.04	2.4	2.7	4.5	3.2	5.1	0.3	2.9	0.4	18.9	1.3	0.6	1.0	0.3	2.3	6.8
N.C.	No	57*	12.7	4.0	0.2	1.6	2.3	5.7	3.1	6.1	0.5	2.7	1.3	12.7	4.0	0.2	0.7	0.5	5.1	12.8
Va.	No	154*	11.5	3.8	0.3	2.0	2.7	3.9	3.8	7.6	0.6	1.6	0.5	17.1	2.1	0.7	1.1	0.7	3.1	10.0
Ala.	No	41	15.4	3.3	0.6	3.3	3.8	4.8	4.0	6.5	0.7	3.0	-	17.2	4.2	0.2	0.2	0.2	2.9	16.0
	Yes	26	10.5	4.2	1.2	5.2	4.2	2.3	1.9	8.0	1.0	2.7	0.3	8.3	5.9	0.7	0.1	1.6	3.7	17.8
		67*	13.5	3.6	0.8	4.0	4.0	3.8	3.2	7.1	0.8	2.9	0.1	13.7	4.9	0.4	0.2	0.7	3.2	16.7
Miss.	No	15	9.5	3.1	0.1	3.1	2.1	2.4	4.0	6.3	0.7	1.3	0.1	8.3	5.9	1.7	0.5	0.7	2.9	11.3
	Yes	7	15.0	2.3	0.1	7.0	2.4	3.6	4.6	9.0	-	2.6	-	15.0	2.7	1.9	0.4	-	1.7	6.1
		22*	11.2	2.8	0.1	4.3	2.2	2.8	4.2	7.2	0.5	1.7	0.1	10.4	4.9	1.8	0.5	0.5	2.5	9.6
S.C.	No	41	10.4	2.5	0.5	1.9	2.3	3.3	4.7	8.2	1.0	1.5	0.2	14.2	6.4	1.3	0.8	2.7	3.3	7.7
	Yes	20	12.9	3.0	1.3	1.8	3.4	4.4	4.6	9.3	0.6	2.8	0.7	9.3	7.2	1.0	1.8	4.4	3.3	14.0
		61*	11.2	2.7	0.8	1.9	2.7	3.7	4.7	8.6	0.9	1.9	0.4	12.6	6.7	1.2	1.1	3.3	3.3	9.8
Ga.	No	37	8.6	2.7	0.3	2.5	1.4	2.9	3.4	6.3	0.6	1.9	0.7	13.8	4.2	2.1	0.9	0.6	2.5	7.9
	Yes	14	5.1	2.5	0.3	4.9	1.1	2.2	3.3	8.4	0.4	2.9	2.4	5.1	4.9	1.0	1.1	1.0	3.6	13.4
		51*	7.6	2.6	0.3	3.2	1.3	2.7	3.4	6.9	0.5	2.2	1.2	11.4	4.4	1.8	1.0	0.7	2.8	9.4
Ky.	No	59	12.8	4.8	0.3	2.3	2.8	4.3	3.3	7.0	0.9	4.0	0.7	14.1	3.7	0.9	1.7	0.3	4.0	12.8
	Yes	54	14.9	5.2	0.4	2.8	2.5	3.7	4.2	5.7	1.0	4.0	0.1	14.5	3.4	0.2	0.5	0.2	4.3	9.3
		113*	13.8	5.0	0.3	2.5	2.7	4.0	3.7	6.4	0.9	4.0	0.4	14.3	3.6	0.6	1.1	0.2	4.1	11.1

* Total number of children in each state

Table 6

The occurrence of various foods in five day diets of school children in each state of the Northeast region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child																		
			Milk	Potatoes White	Potatoes Sweet	Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods Cheese	Other Protein Foods Legumes	Other Protein Foods Nuts	Cereals and Bread Wheat	Cereals and Bread Corn	Cereals and Bread Rice	Soft Drinks and Candy	Tea or Coffee	High Calorie Foods Fats	High Calorie Foods CHO
Vt.	No	5*	15.0	5.6	-	1.6	2.2	4.2	2.6	5.6	-	0.4	0.4	19.8	1.8	0.6	-	-	4.4	7.0
Del.	No	13*	3.2	1.8	1.2	0.8	1.4	1.0	2.3	7.8	0.6	1.5	0.8	12.1	1.2	0.1	0.9	-	1.6	6.2
D. C.	No	21*	13.3	4.8	-	1.1	3.2	2.1	3.2	5.8	0.4	0.4	0.4	19.3	1.0	0.7	2.5	0.8	2.1	7.0
N. Y.	No	74	14.4	4.2	0.1	2.4	2.8	3.7	2.1	5.9	0.6	0.8	0.4	17.6	1.3	0.6	0.5	0.7	1.8	8.0
	Yes	6	16.5	5.8	0.2	2.7	3.8	2.2	2.3	7.5	0.3	0.7	0.2	15.7	0.5	0.3	0.3	-	1.7	10.5
		80*	14.6	4.3	0.1	2.4	2.9	3.6	2.1	6.0	0.6	0.8	0.4	17.5	1.2	0.6	0.5	0.6	1.8	8.2
Mass.	No	56*	14.1	4.1	0.04	3.3	2.3	2.5	1.8	6.3	0.6	1.1	0.2	18.3	1.1	0.2	0.7	0.4	1.6	9.1
N. J.	No	119*	12.8	3.3	0.4	2.8	3.2	3.7	2.3	6.1	0.6	0.9	0.5	18.0	1.9	0.9	0.9	0.8	1.9	8.3
Pa.	No	145*	11.0	4.2	0.2	2.5	2.2	2.7	1.9	5.9	0.4	1.1	0.3	16.9	1.7	0.8	1.2	0.9	2.2	9.0

* Total number of children in each state

Table 7

The occurrence of various foods in five day diets of school children in each state of the Central Midwest region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child: Milk	Potatoes White	Potatoes Sweet	Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods Cheese	Other Protein Foods Legumes	Other Protein Foods Nuts	Cereals and Bread Wheat	Cereals and Bread Corn	Cereals and Bread Rice	Soft Drinks and Candy	Tea or Coffee	High Calorie Foods Fats	High Calorie Foods CHO
Nebr.	No	24*	14.2	3.5	0.1	3.2	2.9	3.2	2.8	6.0	0.1	0.8	0.1	16.7	1.1	0.3	0.5	1.5	1.9	6.8
Iowa	No	31*	9.7	5.2	0.1	1.3	3.5	4.1	2.6	5.9	0.4	0.9	0.5	17.4	1.3	0.5	2.7	1.4	3.3	8.8
Kans.	No	63*	10.3	4.4	0.1	2.7	3.4	3.9	3.2	6.0	0.7	1.3	0.2	16.0	1.9	0.6	0.9	0.4	3.8	8.9
Ill.	No	26*	12.5	4.7	-	2.8	4.0	4.5	3.5	5.7	0.6	0.7	0.5	16.4	1.6	0.6	0.5	0.2	2.4	6.0
Ind.	No	120	12.3	4.6	0.02	3.0	2.2	3.1	3.2	6.0	0.6	1.4	0.2	17.3	1.2	0.3	0.8	0.5	2.6	7.1
	Yes	9	12.6	4.1	0.1	4.0	1.6	4.6	1.0	6.6	0.2	0.7	0.7	18.7	1.8	0.7	1.2	0.6	2.6	7.4
		129*	12.3	4.6	0.03	3.1	2.2	3.2	3.0	6.0	0.6	1.4	0.2	17.4	1.2	0.3	0.8	0.5	2.6	7.1
Ohio	No	115	11.8	4.2	0.03	2.7	3.4	4.8	2.3	5.9	0.5	1.1	0.5	18.8	0.9	0.3	1.4	0.8	2.3	10.7
	Yes	56	13.6	5.0	0.1	3.8	3.9	5.6	1.7	7.6	0.7	0.9	0.3	19.1	1.6	0.2	0.9	0.4	2.3	10.1
		171*	12.4	4.5	0.01	3.1	3.6	5.1	2.1	6.5	0.6	1.0	0.4	18.9	1.1	0.3	1.2	0.7	2.3	10.5
Mo.	No	60	12.4	4.7	0.1	2.9	3.0	3.5	3.3	5.6	0.8	1.5	0.5	17.4	1.7	0.4	0.6	0.9	4.7	9.2
	Yes	13	14.3	5.4	0.1	2.5	2.1	5.3	3.4	8.0	0.9	2.2	1.3	15.8	4.2	0.3	0.8	0.2	5.1	15.8
		73*	12.7	4.8	0.1	2.8	2.8	3.8	3.3	6.0	0.8	1.6	0.6	17.1	2.1	0.4	0.6	0.8	4.8	10.4

* Total number of children in each state

Table 8

The occurrence of various foods in five day diets of school children in each state of the Southwest region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child																	
			Milk	Potatoes		Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods			Cereals and Bread			Soft Drinks and Candy	Tea or Coffee	High Calorie Foods	
				White	Sweet						Cheese	Legumes	Nuts	Wheat	Corn	Rice			Fats	CHO
Okla.	No	2*	4.5	-	-	-	-	-	5.5	7.5	-	2.0	-	16.0	-	-	2.0	-	1.0	18.0
Ariz.	No	44*	10.8	3.8	0.2	2.6	4.2	2.5	4.5	6.8	1.1	5.2	0.6	12.4	4.4	0.4	1.2	1.3	2.5	8.8
N. Mex.	No	35*	9.8	3.9	0.1	2.1	3.7	3.8	3.5	5.7	0.3	2.7	0.7	15.1	2.7	0.2	1.5	0.3	2.7	9.9
La.	No	43*	13.7	3.4	0.4	5.1	3.0	3.6	3.1	8.8	0.6	2.0	0.02	12.5	4.7	1.6	0.4	0.1	5.1	11.3
Ark.	No	25	11.7	4.6	0.5	1.2	1.8	3.8	4.3	5.4	0.6	2.2	1.0	10.6	4.7	0.1	1.4	0.04	3.4	13.7
	Yes	30	9.8	5.8	1.0	1.5	2.5	4.2	3.2	6.4	0.1	4.4	0.9	13.3	4.1	0.2	0.5	-	3.1	9.7
		55*	10.7	5.3	0.8	1.4	2.2	4.0	3.7	5.9	0.3	3.4	0.9	12.1	4.4	0.2	0.9	0.02	3.2	11.5
Texas	No	29	9.3	3.4	0.1	2.9	2.2	2.7	2.9	5.9	0.1	2.8	0.2	14.8	2.3	0.7	1.3	0.3	3.9	8.9
	Yes	49	11.8	4.0	0.1	3.6	1.8	3.5	3.5	7.2	0.2	2.9	0.1	15.6	2.7	0.6	0.8	0.5	3.6	9.6
		78*	10.9	3.8	0.1	3.3	1.9	3.2	3.3	6.7	0.2	2.9	0.1	15.3	2.6	0.6	0.9	0.4	3.7	9.3

* Total number of children in each state

Table 8

The occurrence of various foods in five day diets of school children in each state of the Southwest region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child																	
			Milk	Potatoes		Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods			Cereals and Bread			Soft Drinks and Candy	Tea or Coffee	High Calorie Foods	
				White	Sweet						Cheese	Legumes	Nuts	Wheat	Corn	Rice			Fats	CHO
Okla.	No	2*	4.5	-	-	-	-	-	5.5	7.5	-	2.0	-	16.0	-	-	2.0	-	1.0	18.0
Ariz.	No	44*	10.8	3.8	0.2	2.6	4.2	2.5	4.5	6.8	1.1	5.2	0.6	12.4	4.4	0.4	1.2	1.3	2.5	8.8
N. Mex.	No	35*	9.8	3.9	0.1	2.1	3.7	3.8	3.5	5.7	0.3	2.7	0.7	15.1	2.7	0.2	1.5	0.3	2.7	9.9
La.	No	43*	13.7	3.4	0.4	5.1	3.0	3.6	3.1	8.8	0.6	2.0	0.02	12.5	4.7	1.6	0.4	0.1	5.1	11.3
Ark.	No	25	11.7	4.6	0.5	1.2	1.8	3.8	4.3	5.4	0.6	2.2	1.0	10.6	4.7	0.1	1.4	0.04	3.4	13.7
	Yes	30	9.8	5.8	1.0	1.5	2.5	4.2	3.2	6.4	0.1	4.4	0.9	13.3	4.1	0.2	0.5	-	3.1	9.7
		55*	10.7	5.3	0.8	1.4	2.2	4.0	3.7	5.9	0.3	3.4	0.9	12.1	4.4	0.2	0.9	0.02	3.2	11.5
Texas	No	29	9.3	3.4	0.1	2.9	2.2	2.7	2.9	5.9	0.1	2.8	0.2	14.8	2.3	0.7	1.3	0.3	3.9	8.9
	Yes	49	11.8	4.0	0.1	3.6	1.8	3.5	3.5	7.2	0.2	2.9	0.1	15.6	2.7	0.6	0.8	0.5	3.6	9.6
		78*	10.9	3.8	0.1	3.3	1.9	3.2	3.3	6.7	0.2	2.9	0.1	15.3	2.6	0.6	0.9	0.4	3.7	9.3

* Total number of children in each state

Table 9

The occurrence of various foods in five day diets of school children in each state of the Upper Midwest region

State	School Lunch	No. of Children	Values expressed as the average number of times each food was served per 5 day period per child: Milk	Potatoes: White	Potatoes: Sweet	Green and Yellow Vegetables	Citrus Fruits and Tomatoes	Other Fruits	Eggs	Meat Fish or Poultry	Other Protein Foods: Cheese	Other Protein Foods: Legumes	Other Protein Foods: Nuts	Cereals and Bread: Wheat	Cereals and Bread: Corn	Cereals and Bread: Rice	Soft Drinks and Candy	Tea or Coffee	High Calorie Foods: Fats	High Calorie Foods: CHO
N. Dak.	No	8*	9.2	6.2	-	1.0	2.8	3.8	2.5	6.0	0.8	0.4	0.2	17.8	1.2	1.1	1.0	0.2	1.8	12.0
Mich.	No	21*	11.2	5.0	-	2.0	2.6	3.8	2.2	5.1	0.4	0.8	0.2	17.7	1.6	0.1	-	-	2.4	6.8
Wis.	No	67*	13.6	5.6	0.01	2.5	2.9	2.8	2.2	5.8	0.4	0.6	0.3	18.0	1.1	0.5	0.8	0.3	2.9	10.0
Minn.	No	21	13.9	5.6	-	2.1	3.0	3.5	0.8	4.9	0.3	0.6	0.4	18.7	1.3	0.4	0.9	-	3.1	10.7
	Yes	14	15.1	4.7	-	2.9	3.3	2.6	2.1	7.5	0.3	0.3	0.1	17.6	0.8	0.8	0.1	-	5.0	10.3
		35*	14.4	5.2	-	2.4	3.1	3.1	1.3	5.9	0.3	0.5	0.3	18.3	1.1	0.6	0.6	-	3.9	10.5

* Total number of children in each state