United States
Environmental Protection
Agency

Office of
Radiation Programs
Washington, D.C. 20460

October 1984
EPA 520/1-84-021

Radiation

EPA

An Estimation of the Daily Average Food Intake by Age and Sex for Use in Assessing the Radionuclide Intake of Individuals in the General Population

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FOREWORD

The Office of Radiation Programs carries out a national program to evaluate the exposure of man to ionizing and nonionizing radiation and to develop guidance, standards, and criteria for the protection of public health and the quality of the environment.

This report describes a more refined methodology than heretofore used for estimating the daily food intake as food utilization factors in the assessment of environmental radionuclide intake by individuals through food consumption.

Readers are encouraged to bring to our attention any questions encountered in this report. Any comments and suggestions are also welcome. These comments should be directed to You-yen Yang, Bioeffects Analysis Branch, Analysis and Support Division, Office of Radiation Programs (ANR-461C), U.S. Environmental Protection Agency, Washington, D.C. 20460.

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Sheldon Meyers, Acting Director
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ACKNOWLEDGEMENT

Numerous people helped in the preparation of this report, but particular acknowledgement is due to Drs. Eleanor M. Pao and Kathryn H. Fleming of USDA for their assistance and support relative to the USDA study and to Mary Anne Culliton of EPA for her editorial contributions.

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Summary

A Nationwide Food Consumption Survey was conducted by the U.S. Department of Agriculture (USDA) in 1977-78 to investigate the food intake of various selected segments of the U.S. population and to identify changes in U.S. food intake patterns. In an earlier report (EPA, 84), we estimated the daily intake of each food subclass for the U.S. population and for subpopulations classified according to their geographical (census) characteristics. In this report we have used data from the USDA survey to determine food intake patterns by age and sex in the general population and to establish food utilization factors that can be used in assessing radionuclide intake through food consumption by individuals in the U.S. population.

The 3,735 food items in the Nationwide Food Consumption Survey (NFCS) were classified into eight major classes; each was then subdivided into two or more subclasses based upon the characteristics of radionuclide transport in the food pathway. The survey data were analyzed according to a statistical model to determine which factors have a significant effect on food intake.

Age and sex played an important role in patterns of food intake. Age significantly affects food intake for all of the major food classes and, with one exception, subclasses. The relationships between food intake and age are, in most cases, similar to growth curves: there is a rapid increase in intake at an early stage of physical development, then a plateau is reached in adulthood, followed by an occasional decrease after age 60.

When sex effects were significant, males, without exception, consumed more than females.

Age and sex interacted significantly on the intake of some subclasses. The peak intake age for females is reached earlier than that for males; for males, the peak is more pronounced. In all adult age groups, males consumed a greater amount of food than females. Adult males consumed

about 46% more foods derived from animals than adult females; the intake ratio of foods derived from animals to those derived from plants is approximately 1 to 4.

There were dietary changes for infants during the period 1966-78; i.e., from using fresh cow's milk to greater use of commercial infant formula; from eggs to greater intake of meat.

I. Introduction

EPA's objective in this study was to investigate food intake patterns by age and sex in the general population and to establish food utilization factors for assessing radionuclide intakes through food consumption by individuals in the U.S. population.

The data available on food intake patterns usually have been ad hoc values for average amounts of food consumed. Few investigators have included significance tests for reported class effects or confidence intervals for estimated parameters (Rupp, 1980A-B; USDA, 1980-1982; USDHEW, 1963, 1977).

Food intake studies by the USDA and the Department of Health, Education, and Welfare (now Department of Health and Human Services) have examined food intake patterns and investigated the nutritional status of different segments of the U.S. population (USDA, 1980-1982; USDHEW, 1963, 1977).

Data from the Nationwide Food Consumption Survey (NFCS) conducted by the Department of Agriculture in 1977-78 were considered the best available to meet EPA's objectives. The data were current and were collected from the general population in the conterminous United States. The USDA study and our statistical approach for other factors are described in (EPA, 1984). In this report we present some results of our statistical analyses and estimate mean daily intake and its standard error.

II. Design of the USDA Nationwide Food Consumption Survey

The Nationwide Food Consumption Survey used a stratified area probability sample of households in the 48 conterminous States and District of Columbia in each of the four quarters from April 1977 through March 1978. The sample was designed to be representative of the 48 conterminous States, 4 regions, and 3 urbanizations (Table 1). Data collection took place in 114 primary sampling units (PSUs), mostly cities and counties. Four seasonal samples were used, and households were scheduled for interviews by quarter, month, week, and day of the week (USDA, 1983). A more detailed discussion of the survey design is given in (EPA, 1984).

Table 1. Number of Strata in the Nationwide Food Consumption Survey by Region, Division, and Urbanization

Region	Division	Central City	Sub-urban	Nonmetro-politan	Total
Northeast	New England	2	3	2	7
	Middle Atlantic	8	9	4	21
North Central	East North Central	8	8	6	22
	West North Central	2	2	5	9
South	South Atlantic	4	6	7	17
	East South Central	2	1	4	7
	West South Central	4	2	5	11
West	Mountain	2	1	2	5
	Pacific	6	7	2	15
TOTAL		38	39	37	114

III. Food Classifications and Statistical Analysis

Because concentrations of radionuclides in foods can vary widely, we classified foods by categories for which we can measure or calculate concentrations of radioactivity and which we know comprise significant dietary intake. We divided foods into eight classes; in turn, each class was divided into subclasses as shown in Table 1 below.

For example, we classified produce into three subclasses: leafy vegetables, produce exposed to direct deposition from the atmosphere, and protected produce. Leafy vegetables, such as lettuce, have a broad flat leaf surface for direct interception of atmospherically deposited material. The edible portion of the plants primarily consists of leaves and stems. Exposed produce, tomatoes for example, also intercepts atmospherically deposited material, but surface areas (for exposure) are typically smaller than those of leafy vegetables. Edible parts are usually reproductive organs which accumulate additional radionuclides through soil uptake to a smaller extent than vegetative parts. Protected produce, such as potatoes, are not directly exposed to atmospherically deposited material. Edible portions are principally reproductive or storage organs which either grow underground or are protected by pods, shells or nonedible peels. The accumulation of radionuclides takes place through uptake of radionuclides from soil or transfer from nonedible portions.

Similar considerations were extended to other classifications of foods so that each classification is pertinent to specific radionuclide pathways.

Every food item in the NFCS was identified by a 7-digit code (USDA, 1979A). The first three digits represent food groups; the last four are associated with ingredients added to, or the preparation of, the food items. The following illustrates this coding system for the first two digits.

First digit = major food groups.
1 = milk and milk products,
2 = meat, poultry, fish, and mixtures,
3 = eggs, mixtures, substitutes,
etc.

First and second digits = major food subgroups.
11 = milk and milk drinks,
12 = cream and cream substitutes,
13 = milk desserts,
14 = cheeses,
21 = beef,
22 = pork,
23 = lamb, veal, game, other carcass meat,
24 = poultry,
etc.

We classified all 3,735 food items in the survey into our eight major classes; each class again was divided into two to four subclasses. There were many occasions where the appropriate classification was not clear. To classify them, we made a judgment based on the objectives of the study and the characteristics of the food items under consideration. Reconstituted milk, for example, could be classified as other dairy products or as water-based drinks. We considered the item from a radiological assessment perspective: what were the ingredients of the food items and what was the most important ingredient; had it been processed or stored for some time before it was served? After making those considerations, we classified reconstituted milk into the other dairy products subclass.

Stew, for another example, consists of meat, vegetables, starch, water, and unspecified ingredients. We considered the meat to be the most significant ingredient and identified the meat in the stew by using the USDA coding system. We separated bread and filling for sandwiches, including hamburgers, hot dogs, submarines, and tortillas. Our categories for the food items in the survey data are shown in Table 2.

Table 2. Classification of the Food Items in the NFCS into Major Classes and Subclasses

Major Class	Subclass
Dairy products	Fresh cow's milk, Other dairy products (dry milk, butter, cheese, etc.).
Eggs	Fresh eggs, Other egg products (powdered eggs and other prepared egg products).
Meats	Beef, veal, Pork, Poultry (chicken, duck, other birds), Other meats (game, organ meats, meat mixtures, etc.).
Fish	Fin fish, Shellfish, Other seafood (mixtures and unspecified fish products).
Produce	Leafy vegetables, Exposed produce, Protected produce, Other produce (unspecified vegetables or fruits; mixtures of vegetables or fruits).
Grains	Breads, pasta, cakes, etc., Cereals, Other grains (wheat, rice, raw millet, raw rye, etc.).
Beverages	Tap water, Water-based drinks (coffee, tea, etc.), Soups, Other drinks (soft drinks, fruitades, alcoholic drinks).
Miscellaneous	No subclasses (chocolate, sugar, salad dressings, etc.).

Because there are so many varieties of vegetables and fruits, the following indicate important produce belonging to each subclass.

Leafy vegetables:	cabbage, cauliflower, broccoli, celery, lettuce, spinach.
Exposed produce:	apples, pears, berries, cucumber, squash, grapes, peaches, apricots, plums, prunes, string beans, pea pods, tomatoes.
Protected produce:	carrots, beets, turnips, parsnips, citrus fruits, sweet corn, legumes (peas, beans, etc.), melons, onions, potatoes.
Other produce:	Unspecified vegetables or fruits and mixtures of vegetables or fruits.

The survey data were fit to a linear model (1) to assess any relationships between the factors of interest and food intake. This model and, in particular, the geographical factors are described in greater detail in (EPA, 1984).

$$y_{ijklmpqr} = \mu + R_i + D_{i(j)} + U_{k(i)} + DU_{jk(i)} + S_{l(i)} + P_{m(ijk)} + Sex_p + A_q + (Sex * A)_{pq} + e_{ijklmpqr} \tag{1}$$

where:

$y_{ijklmpqr}$ = the food intake of the rth individual in the qth age group of pth sex (male: p = 1; female: p = 2) in the m(ijk)th primary sampling unit (PSU) and in the lth season;

R_i = the ith census region, i = 1,2,3,4;

$D_{j(i)}$ = the jth geographic division in the ith census region, $j = 1,2,\ldots,n_i$ and $\Sigma\ n_i = 9$;

$U_{k(i)}$ = the kth urbanization in the ith region, k = 1,2,3;

$DU_{jk(i)}$ = the interaction effect of the jth division with the kth urbanization in the ith region;

$S_{l(i)}$ = the lth season in the region i, $l = 1,2,3,4$;

$P_{m(ijk)}$ = the mth PSU in the ith region, the jth division and the kth urbanization, $m = 1,2,\ldots,T_{ijk}$; $\sum_{i,j,k} T_{ijk} = 111$;

Sex_p = male ($p = 1$) or female ($p = 2$);

A_q = the qth age group, $q = 1,2,\ldots,10$;

$e_{ijklmpqr}$ = the random error associated with $y_{ijklmpqr}$.

The means of "effects" in equation (1) were estimated based on the concept of estimable functions (Searle, 1971). These means were weighted by the distributions of 1) geographical regions, 2) seasons, and 3) age and sex. The weights of these three categories are discussed below:

1) The geographical distributions are shown in Table 1. The weights for region, division, and urbanization are calculated according to the distribution.

2) Each season had the same three-month length of duration. Their distribution is, therefore, a uniform distribution with each season having equal weight, 0.25.

3) Ages were divided into 10 age groups by year to reflect physiological development stages: under 1, 1 to 4, 5 to 9, 10 to 14, 15 to 19, 20 to 24, 25 to 29, 30 to 39, 40 to 59, 60 and over. We generated the distributions of age and sex based on the 1969-71 U.S. stationary population (USDHEW, 1975) with age- and sex-specific mortality rates and a constant male-to-female birth ratio of 1.051 (Shryock, et al. 1976). The distributions of the resulting stationary population by age and sex are given in Table 3.

Table 3. Percent Distribution of Age by Sex

Age (years)	Male (%)	Female (%)	Total (%)
Under 1	.72	.68	1.40
1 to 4	2.83	2.70	5.53
5 to 9	3.52	3.37	6.89
10 to 14	3.51	3.37	6.88
15 to 19	3.50	3.36	6.86
20 to 24	3.46	3.35	6.81
25 to 29	3.42	3.33	6.75
30 to 39	6.73	6.61	13.34
40 to 59	12.31	12.58	24.89
60 and over	8.56	12.09	20.65
TOTAL	48.56	51.44	100.00

From the above information, we provided the weights required by the general linear models (GLM) procedure (SAS, 1979) to estimate means by age and sex.

The stationary population was based on the life table technique. A stationary population is one whose total number and distribution by age do not change with time; where birth rate (number of births per year) remains constant (100,000 in the present study) and each cohort of births experiences the life table mortality rate throughout life; no external migration is assumed. For our life tables we use 1969-1971 mortality rates (USDHEW, 1975).

With a stationary population, the per caput expectation value of a quantity, (e.g., daily intake of milk, meat, or produce) is the same as the expected value for an individual in the population averaged over the individual's lifetime; therefore, a single analysis provides the basis for both population and individual estimation.

The stationary population also facilitates comparisons between different periods of time which are independent of the corresponding changes in age distribution. For example, a comparison of milk intake averaged for a stationary population at two different periods of time a decade apart can reveal a change in milk drinking habits as distinct from the change in the age distribution of the milk drinking population at these two periods of time.

IV. Analytical Results

The results of analysis of variance by food class and subclass are given in Table 4.

Table 4. Analysis of Variance by Food Class and Subclasses (F values for sources of variation)

Food class/ Subclass	Source of variation			Sampling Error (in grams)
	Sex	Age	Age*Sex	
Degrees of Freedom	(1)	(9)	(9)	(84)
DAIRY PRODUCTS	42.78**	70.90**	4.62**	807.3
Fresh fluid milk	46.06**	78.22**	4.68**	753.7
Other	.84	117.23**	.89	179.4
EGGS	63.84**	19.95**	4.42**	75.7
MEATS	224.20**	67.96*	13.92**	252.3
Beef	134.37**	46.57**	10.26**	176.0
Pork	70.58**	21.66**	4.83**	85.7
Poultry	11.86**	5.43**	.64	115.9
Other	87.74**	15.78**	3.62**	66.1
FISH	3.02	12.13**	.47	81.5
Fin fish	3.61	10.07**	.52	67.5
Shellfish	.04	3.88**	.18	35.3
PRODUCE	30.51**	26.42**	1.81	538.0
Leafy	.14	43.49**	.09	116.8
Exposed[a]	3.92	17.55**	.58	232.4
Protected[a]	46.96**	14.66**	2.27*	348.6
Other	3.40	13.15**	.25	43.2
GRAINS	79.32**	17.78**	3.28**	451.5
Breads	219.16**	66.46**	10.18**	218.9
Cereals	6.24*	6.81**	.20	194.3
Other	1.31	1.03	.14	259.0
BEVERAGES	48.44**	99.37**	2.67**	2098.5
Tap water	20.29**	18.57**	.96	1513.0
Water based	2.35	165.53**	.23	1034.0
Soups	.88	8.72**	.63	186.0
Other	69.65**	55.39**	7.80**	724.6
MISCELLANEOUS	19.84**	9.02**	1.05	107.7

Notes: *: $.01 < P \leq .05$ **: $P \leq .01$.

The F statistics given in Table 4 can be expressed by:

$$F = MS(A)/MS(PSU),$$

where MS(A) and MS(PSU) are the mean squares of A and PSU, respectively. "A" represents any factor under hypothesis testing, such as sex, age or age by sex interaction. The test statistic, under the null hypothesis, has an F-distribution with degrees of freedom f_A and f_{PSU}, i.e., $F(f_A, f_{PSU})$. For a given level of significance, say α, when

$$MS(A)/MS(PSU) \geq F_{1-\alpha}(f_A, f_{PSU}),$$

we reject the null hypothesis and declare that the test result is (statistically) significant at the α level, which is usually 0.05.

Two subclasses, other egg products and other fish products, were not considered because the quantities consumed were less than one gram per day. However, they are both included in the corresponding main classes.

Tables 5 through 8 contain mean daily intake on the basis of age and sex for major food classes and subclasses. Unless otherwise indicated, intake is per day per caput.

Some satistical findings are as follows.

Age (Tables 4, 5 and 6)

Age significantly affected food intake in every category, except for other grain products (Table 4). Intake patterns of (main) food classes changed as age progressed. With the exception of dairy products, the amount of food intake increased from infancy until late teens or adulthood, then food intake patterns became quite diverse (Table 5). The intake pattern of dairy products was quite uneven. The peak intake was at infancy (569 grams), decreasing drastically to 418 grams at ages 5 to 9, rising to 510 grams at ages 10 to 14, decreasing again to 458 grams at ages 15 to 19 (458 grams). A further decrease was seen (308 grams) at ages 20-24 before the intake leveled off around 240 grams.

With the exception of fresh cow's milk and other dairy products, the intake of items in food subclasses consisting of a large quantity of animal protein, such as eggs, beef, pork, poultry, other meats, fin fish, and shellfish increased gradually from infancy, reaching a maximum in the late teens or adulthood. The levels of intake remained fairly constant thereafter, although there might be a slight decrease in intake for the age category 60 years or more. The intake of fresh cow's milk increased from 272 grams at infancy to 457 grams in the early teens, decreased gradually to 169 grams at ages 45 to 49; then increased slightly (192 grams) at age 60 and over. The intake of other dairy products (dry milk, butter, cheese, etc.) was maximal (297 grams) in infancy, decreasing sharply at age 1 to 4, then remained fairly constant, about 50 grams, thereafter.

The intake of leafy and protected produce, increased gradually from infancy. The increment was small but persisted into the oldest age group.

Infants consumed large quantities of exposed produce (76 grams) and other produce (26 grams). They consumed at least as much as children or adults did. Many frequently-served baby foods have been assigned to one of these two subclasses. For example, apple sauce, pears, peaches, and many other exposed fruits are in the exposed produce subclass. An unspecified vegetable mixed with other ingredients, such as chicken, ham, or bacon, belongs to the other produce subclass. For other age groups, the intake patterns of these two subclasses are very similar to those of leafy and protected produce.

Bread intake increased sharply at age 1 through 14 years (from 16 grams to 186 grams), but then gradually decreased and reached 122 grams in the over 60 age group. The intake pattern of cereals was different. The amount consumed in the early and late years (under 1 year to 14 years, and over 60 years) was approximately the same; it decreased during adulthood (15 to 59 years). The intake of other grains increased from 2 grams for those under 1 year to 15 grams for the age group 1 to 4 and then stayed at about 25 grams thereafter.

The intake patterns for liquids, for example, fresh cow's milk, tap water, water-based drinks, soups, and other drinks, were rather diverse. The intake of fresh cow's milk has been described in the second paragraph of this page.

The intake of tap water and water-based drinks was similar--almost always increasing as age progressed, reaching a maximum intake of 763 grams of tap water for the age 60 and over. The amount of water-based drinks consumed reached a maximum (687 grams) at age 40 to 59, but there was a slight decrease at age 60 and over (561 grams). There was a dramatic increase in soup intake between infancy and age 1 to 4, from 10 grams to 44 grams; practically no further change was observed until age 60 and over (59 grams).

There was a gradual increase from infancy (116 grams) to age 20 to 24 (447 grams) in the consumption of other beverages, then a gradual decrease to 165 grams at age 60 and over.

The intake of miscellaneous foods varied irregularly with age, reaching a plateau around age 30 (35 grams).

Sex (Tables 4, 7 and 8)

Sex significantly affected the intake of every major classes except for fish and the following food subclasses: fresh cow's milk, eggs, beef, pork, poultry, other meats, protected produce, breads, cereals, tap water, and other beverages. Without exception, males consumed significantly more foods of these subclasses than females.

Age by Sex Interaction (Tables 4, 7 and 8)

Age and sex factors interacted significantly on the mean daily intake of the following major classes and subclasses: dairy products, eggs, meats, grains, beverages; fresh cow's milk, eggs, beef, pork, other meats, protected produce, breads, and other beverages.

For both sexes, there is typically a pattern of increasing intake of all these subclasses through childhood. Then there is a decreasing intake of fresh cow's milk, breads, and other beverages throughout the adult period. The intake of eggs, beef, pork, other meats, and protected produce, reached a plateau in adulthood with a possible slight decrease at age over 60. The peak intake age for females is generally younger than that for males; for males, the peak is more pronounced. In all adult age groups, food intake of males is greater than that of females.

For completeness, the mean daily food intake by age and sex is presented in Tables 6, 7, 8 and 9 for major classes and subclasses whether or not the analysis of variance (see Table 4) indicates statistically significant differences.

From these tables, we observe the following:

1) The mean daily intake of fresh cow's milk, eggs, beef, pork, other meats, protected produce, breads, and other beverages was about the same for both sexes in the preteen years; after this period, the difference in intake diverged until about age 25; the difference remained almost constant thereafter.

2) Except for fresh cow's milk and beverages, the mean daily intakes for females reached a plateau by the late teens; male intakes did not reach a plateau until age 20 or 30.

3) More liquids than solid foods were consumed by both sexes.

4) For a given food class or subclass, the age group under one (infants) had the greatest standard error. This was most likely due to the vast difference in nutritional needs between newborns and the older infants in the same group as well as the small sample size (compared to other age groups).

V. Intake of Foods Derived from Animals Versus Those from Plants

We observed some effects of age and sex on the intake of foods derived from animals (FDFA) and those derived from plants (FDFP). FDFA includes the first four major classes listed in Table 2 (dairy products, eggs, meats, and fish); the rest are in the category of foods derived from plants. The daily intake of these two groups by age and sex is given in Table 9.

We also compared intake patterns by age for these two food groups, by calculating the ratios of FDFA to FDFP by sex and the amount of FDFA and FDFP consumed by males to that by females (Table 10).

For both males and females, the contribution of FDFP increases with age until at age 60 and over (Table 9).

The ratio of FDFA to FDFP for any given age is strikingly similar in both sexes (Table 10). Approximately 20% more FDFA than FDFP was consumed in infancy, chiefly due to the relatively large quantity of fresh cow's milk consumed by infants. Then there is a 53% to 66% reduction in the intake ratio from childhood to late teens. The ratio then remains fairly constant (about 25%) throughout the entire adulthood for both sexes.

However, the ratio of FDFA to FDFA by sex is quite different (Table 10). Both sexes consume about the same amount of FDFA in infancy and in childhood. With the exception of the age group 60 and over, males, age 15 and over, consume, on average, 46% more FDFA than females in the same age. The relative pattern of the FDFP intake for males and females is very much like that of FDFA but the differences are less; there was about a 24% increase for males at age 15 and over as compared to adult females in the same age.

VI. Comparisons between the EPA Study and Rupp's Report

We have compared our results to Rupp's "best estimates" (Rupp, 1980) even though there were difficulties in making direct comparisons because age and food items had been grouped differently. The differences in the results of these two studies are rather striking (except for the category, leafy produce) (Table 11).

With the exception of leafy produce, Rupp indicated that her estimates had been based on a variety of sources, although the predominant source was the USDA survey of 1965, which was conducted almost 2 decades ago. By using different sources for her estimates, she may have unintentionally introduced uncontrollable factors into her estimates; in addition, changes in diet intake may have occurred in the general population during this time span.

Four observations are worth mentioning:

1) Except for the age group under 1 year, Rupp reported a greater intake of foods than we did for most food items. It appears that the population is consuming less food than it was a decade ago.

2) Much more fresh milk was consumed by infants in Rupp's estimates than in EPA's, while the reverse was true for other dairy products.

3) For meat intake in the EPA study, beef was the predominant meat while pork was consumed at about the same level as poultry. However, in Rupp's report the intakes of beef and pork were about the same, but, with an exception of the age group under 1 year, beef and pork intakes were more than twice as much as that of poultry. Poultry intake was about the same in both studies, although it was slightly higher in the EPA study.

   The infant group consumed as much poultry as the 1 to 9 age group in EPA's study. This may be due to the fact that we classified junior chicken dinner as poultry, although it consisted of chicken, cereal, and other constituents. EPA reported considerably lower egg and more beef and poultry intake among infants than Rupp.

4) In both studies, the intake of leafy produce was very similar; however, in the EPA study there was less intake of other produce than in Rupp's report. It was not clear to us why the intake of leafy produce was not greater in the 1970s when there was a strong advocacy for natural foods and fresh produce.

VII. Conclusion and Discussion

The estimates in this report could be low-biased because of the recollection process used in the food consumption survey; respondents might forget to report food items or to report less than was actually consumed.

The infant group (age less than 1 year) had the largest standard errors (Tables 5 through 8) among the age groups because this group had the smallest sample size and vast differences in nutritional requirements.

Of the two factors, age and sex, age played a far more important role in food intake. Age significantly affects the intake of almost all foods under study. The intake patterns for age are, in general, very similar to a growth curve, with the occasional exception of a small decrease at age 60 and over.

Whenever sex significantly affects intake, males consume more than females.

The food intake pattern in the EPA study is different from that in Rupp's report. Except for leafy produce, beef and poultry, food intake in general was less in the EPA study than in Rupp's report. Some changes in the infant diet were apparent: from fresh cow's milk to infant formula, from eggs to more meat.

A greater amount of FDFA consumed by adult males than by females is rather striking, 46% above the average level of intake by adult females, while FDFP is only 24% above the average level. Today, there is persuasive evidence that diet, FDFA intake in particular, has a negative effect on human health, such as heart disease, cancer, and stroke (Abelson, 1983). Although EPA's study was not designed as an epidemiological investigation per se, the relatively higher intake of FDFA by male adults to female adults may have some significance, not only in the area of food intake, but also in the domain of epidemiology.

Table 5. Mean and Standard Error for the Daily Intake of Major Food Classes Per Caput by Age (in grams)

Age (yr)	Major Food Class: Dairy Products	Fresh Eggs	Meats	Fin fish & Shellfish
All ages	308.6± 5.3	26.9± .5	172.± 1.6	17.5± .5
Under 1	568.7±34.1	4.9±3.2	45.2±10.7	0.9±3.5
1 to 4	418.3±16.8	19.8±1.6	92.3± 5.0	6.8±1.7
5 to 9	493.5±14.0	17.0±1.3	128.5± 4.2	10.9±1.4
10 to 14	509.9±13.2	19.3±1.2	160.1± 3.9	13.3±1.3
15 to 19	457.7±13.8	24.8±1.3	189.6± 4.2	16.6±1.4
20 to 24	308.4±18.0	28.3±1.7	195.1± 5.4	18.7±1.8
25 to 29	269.0±18.5	27.9±1.7	198.3± 5.5	20.8±1.9
30 to 39	236.7±14.5	30.1±1.4	201.1± 4.4	19.5±1.5
40 to 59	221.3±11.2	31.1±1.0	193.8± 3.4	22.0±1.1
60 and over	248.2±12.6	28.7±1.2	154.3± 3.8	17.2±1.3

Age (yr)	Major Food Class: Produce	Grains	Beverages	Miscellaneous
All ages	282.6± 3.5	200.0± 3.0	1434±13.7	34.6± .7
Under 1	155.0±22.7	56.0±19.1	307±89.2	5.5±4.5
1 to 4	164.2±11.2	157.8± 9.4	743±43.5	25.4±2.2
5 to 9	225.6± 9.4	216.5± 7.9	861±36.5	36.5±1.9
10 to 14	262.9± 8.8	248.2± 7.4	1025±34.2	40.6±1.8
15 to 19	266.0± 9.2	245.0± 7.8	1241±35.9	38.0±1.9
20 to 24	250.4±12.0	211.7±10.1	1484±46.9	29.8±2.4
25 to 29	271.6±12.3	214.9±10.3	1531±48.0	32.5±2.4
30 to 39	278.1± 9.7	202.0± 8.1	1642±37.7	34.2±1.9
40 to 59	315.9± 7.5	192.4± 6.3	1732±29.3	36.5±1.5
60 and over	331.1± 8.4	183.9± 7.1	1547±32.8	35.5±1.7

Table 6. Mean and Standard Error for the Daily Intake of Food Subclasses Per Caput by Age (in grams)

Age (yr)	Dairy Products		Meat	
	Fresh Cow's milk	Other	Beef	Pork
All ages	253.5± 4.9	55.1±1.2	87.6±1.1	28.2± .6
Under 1	272.0±31.9	296.7±7.6	18.4±7.4	5.8±3.6
1 to 4	337.3±15.6	41.0±3.7	42.2±3.7	13.6±1.8
5 to 9	446.2±13.1	47.3±3.1	63.4±3.1	18.2±1.5
10 to 14	456.6±12.3	53.3±2.9	81.9±2.9	22.2±1.4
15 to 19	404.8±12.9	52.9±3.1	99.5±3.0	29.5±1.5
20 to 24	264.3±16.4	44.2±4.0	103.7±3.9	29.6±1.9
25 to 29	217.6±17.2	51.5±4.1	103.8±4.0	31.8±2.0
30 to 39	182.9±13.5	53.8±3.2	105.8±3.2	33.0±1.5
40 to 59	169.1±10.5	52.0±2.5	99.0±2.5	33.5±1.2
60 and over	192.4±11.8	55.9±2.8	74.3±2.8	27.5±1.3

Age (yr)	Meat		Fin fish and Shellfish	
	Poultry	Other	Fin fish	Shellfish
All ages	31.3± .8	25.1± .4	14.7± .4	2.6± .2
Under 1	18.4±4.9	2.6±2.8	0.6±2.9	0.3±1.5
1 to 4	19.0±2.4	17.6±1.4	6.4±1.4	0.3±0.7
5 to 9	24.7±2.0	22.3±1.2	10.0±1.2	0.9±0.6
10 to 14	30.0±1.9	26.1±1.1	11.9±1.1	1.3±0.6
15 to 19	33.0±2.0	27.6±1.1	14.4±1.2	2.1±0.6
20 to 24	33.0±2.6	28.8±1.5	15.9±1.5	2.8±0.8
25 to 29	33.8±2.7	28.9±1.5	17.4±1.5	3.4±0.8
30 to 39	34.0±2.1	28.4±1.2	15.6±1.2	3.9±0.6
40 to 59	33.8±1.6	27.4±0.9	17.5±0.9	3.8±0.5
60 and over	31.5±1.8	21.1±1.0	15.3±1.1	1.9±0.6

Table 6. Mean and Standard Error for the Daily Intake of Food Subclasses Per Caput by Age (in grams)--Continued

Age (yr)	Produce			
	Leafy	Exposed	Protected	Other
All ages	39.2± .8	86.0±1.5	150.4± 2.3	7.0± .3
Under 1	3.2±4.9	75.5±9.8	50.8±14.7	25.5±1.8
1 to 4	9.1±2.4	55.6±4.8	94.5± 7.2	5.1±0.9
5 to 9	20.1±2.0	69.2±4.8	128.9± 6.1	7.3±0.8
10 to 14	26.1±1.9	76.8±3.8	151.7± 5.7	8.2±0.7
15 to 19	31.4±2.0	71.9±4.0	156.6± 6.0	6.2±0.7
20 to 24	35.3±2.6	65.6±5.2	144.5± 7.8	5.0±1.0
25 to 29	41.4±2.7	73.4±5.3	149.8± 8.0	7.0±1.0
30 to 39	44.4±2.1	77.1±4.2	150.5± 6.3	6.1±0.8
40 to 59	51.3±1.6	94.7±3.3	162.9± 4.9	6.9±0.6
60 and over	45.4±1.8	114.2±3.6	163.9± 5.5	7.6±0.7

Age (yr)	Grains			Beverages
	Breads	Cereals	Other	Tap water
All ages	147.3±1.4	29.9±1.3	22.9± 1.7	662.5± 9.9
Under 1	16.2±9.2	37.9±8.2	1.8±10.9	170.7±64.5
1 to 4	104.6±4.5	38.4±4.0	14.8± 5.4	434.6±31.4
5 to 9	154.3±3.8	39.5±3.4	22.7± 4.5	521.0±26.4
10 to 14	186.2±3.6	36.4±3.2	25.6± 4.2	620.2±24.7
15 to 19	188.5±3.7	28.8±3.3	27.8± 4.4	664.7±26.0
20 to 24	166.5±4.9	20.2±4.3	25.0± 5.8	656.4±33.9
25 to 29	170.0±5.0	18.2±4.4	26.6± 5.9	619.8±34.6
30 to 39	156.8±3.9	18.8±3.5	26.4± 4.6	636.5±27.2
40 to 59	144.4±3.1	24.7±2.7	23.3± 3.6	735.3±21.1
60 and over	122.1±3.4	42.5±3.0	19.3± 4.0	762.5±23.7

Table 6. Mean and Standard Error for the Daily Intake of Food Subclasses Per Caput by Age (in grams)--Continued

Age (yr)	Beverages		
	Water-based drinks	Soups	Other
All ages	457.1± 6.7	45.9±1.2	269.9± 4.7
Under 1	8.3±43.7	10.1±7.9	116.2±30.6
1 to 4	97.9±21.5	43.8±3.9	166.5±15.0
5 to 9	116.5±18.0	36.6±3.2	187.6±12.6
10 to 14	140.0±16.9	35.4±3.0	231.4±11.8
15 to 19	201.5±17.7	34.8±3.2	342.2±12.4
20 to 24	343.1±23.1	38.9±4.2	447.3±16.2
25 to 29	441.6±23.6	41.3±4.2	427.8±16.6
30 to 39	601.0±18.6	40.6±3.3	364.8±13.0
40 to 59	686.5±14.4	51.6±2.6	260.1±10.1
60 and over	561.1±16.2	59.4±2.9	164.7±11.3

Table 7. Mean and Standard Error for Daily Intake (grams) of Major Food Classes by Age and Sex

Age (yr)	Major Food Class: Dairy Products	Eggs	Meats	Fin fish & Shellfish
	MALE			
All ages	348.9± 7.7	32.5±0.7	205.2± 2.4	18.7±0.8
Under 1	571.0±49.1	5.7±4.6	46.7±14.7	1.1±5.0
1 to 4	416.9±23.0	20.2±2.2	94.0± 6.9	7.3±2.3
5 to 9	503.3±19.7	17.8±1.9	132.2± 5.9	11.4±2.0
10 to 14	564.6±18.6	21.3±1.7	174.2± 5.6	13.4±1.9
15 to 19	561.5±19.8	31.2±1.9	227.9± 5.9	16.2±2.0
20 to 24	370.8±26.8	32.2±2.5	236.9± 8.0	20.3±2.7
25 to 29	305.5±27.7	33.0±2.6	243.4± 8.3	24.1±2.8
30 to 39	277.9±22.0	37.5±2.1	247.1± 6.6	20.0±2.2
40 to 59	251.5±17.1	38.4±1.6	234.0± 5.1	23.4±1.7
60 and over	273.1±20.2	37.3±1.9	186.1± 6.0	19.6±2.0
	FEMALE			
All ages	270.6± 6.8	21.6±0.6	141.1± 2.1	16.3±0.7
Under 1	566.2±47.2	4.0±4.4	43.6±14.2	0.7±4.8
1 to 4	419.8±24.2	19.4±2.3	90.5± 7.3	6.2±2.4
5 to 9	483.2±19.8	16.1±1.9	124.7± 5.9	10.4±2.0
10 to 14	452.7±18.4	17.2±1.7	145.3± 5.5	13.1±1.9
15 to 19	349.6±19.1	18.1±1.8	149.7± 5.7	17.0±1.9
20 to 24	244.0±23.8	24.3±2.2	151.9± 7.1	17.1±2.4
25 to 29	231.6±24.1	22.7±2.3	152.0± 7.2	17.5±2.4
30 to 39	194.7±18.6	22.5±1.7	154.3± 5.6	19.0±1.9
40 to 59	191.2±14.4	23.9±1.3	154.5± 4.3	20.5±1.5
60 and over	230.6±16.0	22.7±1.5	131.7± 4.8	15.5±1.6

Table 7. Mean and Standard Error for Daily Intake (grams) of Major Food Classes by Age and Sex (Continued)

Age (yr)	Major Food Class			
	Produce	Grains	Beverages	Miscellaneous
		MALE		
All ages	305.9± 5.1	232.9± 4.3	1547± 20.0	38.9±1.0
Under 1	156.2±32.7	59.3±27.4	309±128.0	5.4±6.5
1 to 4	170.7±15.4	165.4±12.9	778± 59.8	26.1±3.1
5 to 9	223.4±13.2	224.2±11.0	893± 51.3	36.6±2.6
10 to 14	277.6±12.4	272.0±10.4	1061± 48.3	44.7±2.5
15 to 19	300.0±13.2	294.9±11.1	1366± 51.4	42.4±2.6
20 to 24	282.6±17.9	249.9±15.0	1686± 69.7	33.1±3.6
25 to 29	301.2±18.5	260.3±15.5	1706± 72.0	36.8±3.7
30 to 39	311.1±14.7	238.5±12.3	1808± 56.0	39.7±3.0
40 to 59	346.8±11.4	230.0±9.6	1874± 44.5	41.6±2.3
60 and over	359.4±13.5	214.1±11.3	1650± 52.4	41.9±2.7
		FEMALE		
All ages	260.6± 4.5	169.0± 3.8	1328± 7.6	30.5±0.9
Under 1	153.8±31.5	52.5±26.4	304±123.7	5.6±6.3
1 to 4	157.4±16.1	149.8±13.5	706± 62.9	24.8±3.2
5 to 9	227.9±13.2	208.5±11.1	828± 51.4	36.3±2.6
10 to 14	247.5±12.3	223.4±10.3	988± 47.8	36.2±2.4
15 to 19	230.6±12.7	193.1±10.7	1110± 49.5	33.4±2.5
20 to 24	217.1±15.9	172.2±13.3	1275± 61.8	26.3±3.2
25 to 29	241.2±16.1	168.2±13.5	1351± 62.7	28.1±3.2
30 to 39	244.5±12.4	164.8±10.4	1472± 48.3	28.6±2.5
40 to 59	285.6±9.6	155.6±8.0	1593± 37.4	31.5±1.9
60 and over	311.1±10.6	162.5±8.9	1475± 41.4	30.9±2.1

Table 8. Mean and Standard Error for Daily Intake (grams) of Major Food Subclasses by Age and Sex

Age (years	Dairy Products		Eggs	Meat
	Fresh cow's milk	Other		Beef
		MALE		
All ages	291.0± 7.2	57.9± 1.7	32.5+0.7	105.5±1.7
Under 1	288.4±45.8	282.7±10.7	5.7±4.7	16.8±10.7
1 to 4	376.4±21.5	40.6± 5.1	20.2±2.2	42.8± 5.0
5 to 9	454.8±18.4	48.5± 4.4	17.8±1.9	64.6± 4.3
10 to 14	508.9±17.4	55.8± 4.1	21.3±1.8	87.5± 4.1
15 to 19	502.4±18.5	59.1± 4.4	31.2±1.9	120.3± 4.3
20 to 24	323.2±25.1	47.5± 6.0	32.2±2.5	129.0± 5.9
25 to 29	250.8±25.9	54.6± 6.2	33.0+2.6	130.8± 6.0
30 to 39	219.4±20.6	58.5± 4.9	37.3±2.1	132.0± 4.8
40 to 59	196.6±16.0	54.9± 3.8	38.0±1.6	119.8± 3.7
60 and over	214.9±18.8	58.2± 4.5	36.8±1.9	90.6± 4.4
		FEMALE		
All ages	218.0± 6.3	52.5± 1.5	21.5±0.6	70.7±1.5
Under 1	254.8±44.1	311.4±10.5	4.0±4.5	20.0±10.3
1 to 4	378.3±22.6	41.5± 5.4	19.4±2.3	41.4± 5.3
5 to 9	437.2±18.5	46.0± 4.4	16.1±1.9	62.1± 4.3
10 to 14	402.0±17.2	50.8± 4.1	17.2±1.7	76.0± 4.0
15 to 19	303.1±17.8	46.5± 4.2	18.0±1.8	77.9± 4.2
20 to 24	203.3±22.2	40.7± 5.3	24.3±2.3	77.4± 5.2
25 to 29	183.4±22.5	48.2± 5.4	22.7±2.3	76.1± 5.3
30 to 39	145.8±17.4	49.0± 4.1	22.5±1.8	79.0± 4.1
40 to 59	142.1±13.5	49.1± 3.2	23.8±1.4	78.7± 3.1
60 and over	176.4±14.9	54.2± 3.5	22.4±1.5	62.7± 3.5

Table 8. Mean and Standard Error for Daily Intake (grams) of Major Food Subclasses by Age and Sex (Continued)

Age (yr)	Meat			Fin fish & Shellfish
	Pork	Poultry	Other	Fin fish
		MALE		
All ages	34.8±0.8	34.4±1.1	30.5±0.6	15.7±0.6
Under 1	6.9±5.2	20.1±7.1	2.9±4.0	0.6±4.1
1 to 4	13.8±2.4	19.1±3.3	18.2±1.9	7.0±1.9
5 to 9	18.8±2.1	24.9±2.8	23.9±1.6	10.3±1.6
10 to 14	24.4±2.0	33.3±2.7	29.0±1.5	12.5±1.6
15 to 19	36.5±2.1	37.7±2.8	33.3±1.6	14.0±1.7
20 to 24	35.8±2.8	36.4±3.9	35.5±2.2	17.2±2.2
25 to 29	39.4±2.9	37.3±4.0	36.0±2.3	20.6±2.3
30 to 39	41.9±2.3	38.6±3.2	34.6±1.8	16.2±1.8
40 to 59	42.4±1.8	37.7±2.5	34.0±1.4	18.3±1.4
60 and over	35.3±2.1	33.7±2.9	26.5±1.7	17.2±1.7
		FEMALE		
All ages	22.0±0.7	28.4±1.0	20.0±0.6	13.8±0.6
Under 1	4.6±5.0	16.7±6.8	2.2±3.9	0.6±3.9
1 to 4	13.3±2.6	18.9±3.5	16.9±2.0	5.8±2.0
5 to 9	17.6±2.1	24.4±2.8	20.6±1.6	9.6±1.7
10 to 14	19.8±2.0	26.5±2.6	23.0±1.5	11.2±1.5
15 to 19	22.1±2.0	28.1±2.7	21.6±1.6	14.7±1.6
20 to 24	23.2±2.5	29.4±3.4	21.8±2.0	14.5±2.0
25 to 29	24.1±2.6	30.3±3.5	21.6±2.0	14.0±2.0
30 to 39	23.9±2.0	29.2±2.7	22.1±1.5	15.0±1.6
40 to 59	24.8±1.5	30.0±2.1	20.9±1.2	16.7±1.2
60 and over	21.9±1.7	29.9±2.3	17.3±1.3	13.9±1.3

Table 8. Mean and Standard Error for Daily Intake (grams) of Major Food Subclasses by Age and Sex (Continued)

Age (yr)	Fin fish & Shellfish	Produce			
	Shellfish	Leafy	Exposed	Protected	Other
			MALE		
All ages	2.7±0.3	39.1±1.1	89.3± 2.2	169.9± 3.3	7.5±0.4
Under 1	0.5±2.1	3.1±7.1	72.0±14.1	53.7±21.2	27.5±2.6
1 to 4	0.3±1.0	9.2±3.3	56.7± 6.6	99.5±10.0	5.3±1.2
5 to 9	1.1±0.9	19.8±2.9	67.5± 5.7	128.9± 8.5	7.2±1.1
10 to 14	0.9±0.8	26.0±2.7	77.8± 5.4	165.6± 8.0	8.2±1.0
15 to 19	2.0±0.9	33.0±2.9	79.5± 5.7	180.9± 8.6	6.8±1.1
20 to 24	3.0±1.2	35.8±3.9	71.3± 7.7	170.3±11.6	5.2±1.4
25 to 29	3.5±1.2	41.5±4.0	78.6± 8.0	173.5±12.0	7.6±1.5
30 to 39	3.8±1.0	45.6±3.2	82.4± 6.5	176.4± 9.5	6.7±1.2
40 to 59	3.9±0.8	51.4±2.5	100.4± 4.9	187.8± 7.4	7.3±0.9
60 & over	2.4±0.9	45.4±2.9	120.3± 5.8	184.9± 8.7	8.4±1.1
			FEMALE		
All ages	2.5±0.3	39.2±1.0	82.8± 2.0	132.0± 2.9	6.6±0.4
Under 1	0.0±2.1	3.4±6.8	79.2±13.6	47.8±20.4	23.3±2.5
1 to 4	0.4±1.1	9.0±3.5	54.4± 7.0	89.2±10.5	4.8±1.3
5 to 9	0.7±0.9	20.4±2.9	71.0± 5.7	129.0± 8.6	7.4±1.1
10 to 14	1.8±0.8	26.3±2.7	75.7± 5.3	137.3± 8.0	8.2±1.0
15 to 19	2.2±0.8	29.8±2.8	64.0± 5.5	131.4± 8.2	5.5±1.0
20 to 24	2.6±1.0	34.9±3.4	59.7± 6.9	117.7±10.3	4.8±1.3
25 to 29	3.4±1.0	41.3±3.5	68.0± 6.9	125.6±10.4	6.3±1.3
30 to 39	4.0±0.8	43.2±2.7	71.7± 5.4	124.2± 8.0	5.4±1.0
40 to 59	3.7±0.6	51.3±2.1	89.1± 4.1	138.6± 6.2	6.5±0.8
60 & over	1.6±0.7	45.3±2.3	109.8± 4.6	149.0± 6.9	7.0±0.8

Table 8. Mean and Standard Error for Daily Intake (grams) of Major Food Subclasses by Age and Sex (Continued)

Age (yr)	Grains			Beverages
	Breads	Cereals	Other	Tap water
		MALE		
All ages	174.1± 2.1	33.2± 1.8	25.7± 2.5	713.4±14.5
Under 1	17.7±13.3	40.1±11.8	1.4±15.8	146.4±92.7
1 to 4	108.9± 6.2	41.5± 5.5	15.1± 7.4	458.4±43.2
5 to 9	160.8± 5.3	40.5± 4.8	22.9± 6.3	546.7±37.0
10 to 14	204.7± 5.0	41.4± 4.5	25.9± 6.0	651.4±34.9
15 to 19	227.9± 5.4	34.9± 4.8	32.1± 6.4	755.6±37.1
20 to 24	200.5± 7.3	23.1± 6.5	26.3± 8.6	746.8±50.4
25 to 29	208.7± 7.5	19.9± 6.7	31.7± 8.9	683.7±52.0
30 to 39	187.6± 6.0	21.7± 5.3	29.2± 7.1	703.2±41.4
40 to 59	174.7± 4.6	28.9± 4.1	26.3± 5.5	795.2±32.1
60 and over	143.6± 5.5	47.3± 4.9	23.2± 6.5	810.3±37.8
		FEMALE		
All ages	122.0± 1.8	26.8± 1.6	20.2± 2.2	614.5±12.7
Under 1	14.7±12.8	35.7±11.4	2.1±15.1	196.3±89.3
1 to 4	100.2± 6.6	35.1± 5.8	14.5± 7.7	409.7±45.4
5 to 9	147.5± 5.4	38.5± 4.8	22.5± 6.4	494.2±37.1
10 to 14	167.0± 5.0	31.2± 4.4	25.2± 5.9	587.6±34.6
15 to 19	147.4± 5.2	22.5± 4.6	23.2± 6.1	570.1±35.8
20 to 24	131.4± 6.4	17.1± 5.7	23.7± 7.6	563.0±44.6
25 to 29	130.2± 6.5	16.5± 5.8	21.4± 7.7	554.2±45.3
30 to 39	125.5± 5.0	15.9± 4.5	23.4± 6.0	568.5±34.9
40 to 59	114.7± 3.9	20.6± 3.5	20.3± 4.6	676.6±27.0
60 and over	106.9± 4.3	39.1± 3.8	16.5± 5.1	728.6±29.9

Table 8. Mean and Standard Error for Daily Intake (grams) of Major Food Subclasses by Age and Sex (Continued)

Age (yr)	Beverages: Water-based drinks	Beverages: Soups	Beverages: Other
	MALE		
All ages	467.4± 9.9	47.5± 1.8	319.6± 6.9
Under 1	10.0±62.9	11.5±11.3	140.9±44.1
1 to 4	103.7±29.5	43.5± 5.3	172.1±20.7
5 to 9	121.4±25.3	33.9± 4.6	191.8±17.7
10 to 14	146.3±23.8	34.9± 4.3	230.3±16.7
15 to 19	207.2±25.4	37.9± 4.6	367.2±17.8
20 to 24	352.9±34.4	39.6± 6.2	549.0±24.1
25 to 29	450.4±35.5	41.6± 6.4	530.2±24.9
30 to 39	618.3±28.2	43.8± 5.1	443.7±19.8
40 to 59	714.0±21.9	57.2± 3.9	309.4±15.4
60 and over	586.2±25.8	60.8± 4.6	193.0±18.1
	FEMALE		
All ages	447.3± 8.7	44.3± 1.6	223.0± 6.1
Under 1	6.7±60.5	8.6±10.9	90.4±42.4
1 to 4	91.9±31.0	44.1± 5.6	160.8±21.7
5 to 9	111.4±25.4	39.5± 4.6	183.2±17.8
10 to 14	133.4±23.6	36.0± 4.2	232.6±16.5
15 to 19	195.5±24.4	31.5± 4.4	316.2±17.1
20 to 24	333.0±30.5	38.1± 5.5	342.1±21.4
25 to 29	432.5±30.9	40.9± 5.6	322.6±21.7
30 to 39	583.3±23.8	37.3± 4.3	284.4±16.7
40 to 59	659.5±18.4	46.1± 3.3	211.8±12.9
60 and over	543.3±20.4	58.3± 3.7	144.6±14.3

Table 9. Daily Intake of FDFA and FDFP by Age and Sex (in grams)

Age	Food derived from animals		Food derived from plants	
	Male	Female	Male	Female
Under 1	625	615	530	515
1 - 4	538	536	1140	1038
5 - 9	665	634	1377	1301
10 - 14	774	628	1655	1495
15 - 19	837	534	2003	1567
20 - 24	660	437	2252	1691
25 - 29	606	424	2304	1789
30 - 39	583	391	2397	1910
40 - 59	547	390	2492	2066
60 and over	516	401	2265	1980

Table 10. Intake Patterns of FDFA to FDFP: Ratio of FDFA to FDFP by Sex and the Amount Consumed of FDFA and FDFP by Males to Females

Age	FDFA/FDFP		Male/Female	
	Male	Female	FDFA	FDFP
Under 1	1.18	1.19	1.02	1.03
1 - 4	.47	.52	1.00	1.10
5 - 9	.48	.49	1.05	1.06
10 - 14	.47	.42	1.23	1.11
15 - 19	.42	.34	1.57	1.28
20 - 24	.29	.26	1.51	1.33
25 - 29	.26	.24	1.43	1.29
30 - 39	.24	.20	1.49	1.21
40 - 59	.22	.19	1.40	1.21
60 and over	.23	.20	1.29	1.14

FDFA Food derived from animals.
FDFP Food derived from plants.

Table 11. Comparisons of Food Intake Estimates by EPA and Rupp (in grams)

Age	Fresh Milk	Other Dairy Products	Fresh Eggs	Beef	Pork	Poultry	Leafy Produce	Other Produce
				EPA				
Under 1	272	297	5	18	6	18	3	152
1 to 9	398	44	18	54	16	22	15	183
10 to 19	431	53	22	91	26	31	29	236
Over 19	192	53	30	94	31	33	46	257
				Rupp				
Under 1	696	99	17	7	4	3	2	220
1 to 11	542	64	25	38	41	18	20	333
12 to 18	485	109	31	66	69	27	30	404
Over 18	261	45	41	86	76	26	50	393

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☆ U.S. Government Printing Office : 1984 - 421-545/11835

TECHNICAL REPORT DATA
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1. REPORT NO. 520/1-84-021	2.	3. RECIPIENT'S ACCESSION NO. PB85 115327
4. TITLE AND SUBTITLE An Estimation of the Daily Average Food Intake by Age and Sex for Use in Assessing the Radionuclide Intake of Individuals in the General Population		5. REPORT DATE October 1984
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) You-yen Yang, Christopher B. Nelson		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

A Nationwide Food Consumption Survey was conducted by the U.S. Department of Agriculture (USDA) in 1977-78 to investigate the food intake of various selected segments of the U.S. food intake patterns. In this report data was used from the USDA survey to determine food intake patterns by age and sex in the general population and to establish food utilization factors that can be used in assessing radionuclide intake through food consumption by individuals in the U.S. population.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS (This Report) unclassified	21. NO. OF PAGES
	20. SECURITY CLASS (This page) unclassified	22. PRICE