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**CHANGES IN NUTRIENT  
INTAKES  
OF INDIVIDUALS IN THE  
SOUTH  
RELATIVE TO THE UNITED  
STATES,  
1965-1977**

Ronald A. Schrimper  
and  
Christine J. Hager



ECONOMICS INFORMATION REPORT NO. 72  
DEPARTMENT OF ECONOMICS AND BUSINESS  
NORTH CAROLINA STATE UNIVERSITY  
RALEIGH, NORTH CAROLINA

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## ABSTRACT

Tabulations of nutrient intake evaluations of U.S.D.A. individual food consumption data indicate substantial changes in nutrient intake for various age-sex groups in the South as well as the nation between 1965 and 1977. For most nutrients, intakes in the South in 1977 were less than U.S. averages. Overall there was more improvement in vitamin content than in other nutrients in southern diets compared to U.S. diets between 1965 and 1977. In the case of total food energy and its sources as well as minerals, average intake for at least half of the southern groups decreased relative to U.S. averages. In most cases average nutrient intakes in the South and the entire United States exceeded RDA levels. Major exceptions were iron and calcium. Apparent deficiencies in iron intake for certain female groups were quite large and appeared to have increased in the South between 1965 and 1977.

## TABLE OF CONTENTS

	Page
INTRODUCTION.....	5
DATA AND PROCEDURES.....	6
RESULTS.....	8
Food Energy and Sources.....	8
Protein.....	13
Fat.....	13
Carbohydrates.....	14
Distribution of Food Energy Sources.....	14
Minerals.....	15
Iron.....	15
Calcium.....	19
Vitamins.....	20
Vitamin A.....	20
Vitamin C.....	24
Thiamin.....	24
Riboflavin.....	24
SUMMARY AND CONCLUSIONS.....	25
REFERENCES.....	28
APPENDIX TABLES.....	29

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# CHANGES IN NUTRIENT INTAKES OF INDIVIDUALS IN THE SOUTH RELATIVE TO THE UNITED STATES, 1965-1977

## INTRODUCTION

Since 1930, six nationwide surveys of household food consumption have been undertaken to assess adequacy of diets and study changes in patterns of nutrient intake in the United States. In the two latest surveys (1965-1966 and 1977-78), information also was collected on food intake of individual household members for detailed analysis by specific age-sex groups (Rizek, 1978).

In 1965, a higher proportion of households in the South than in other regions had diets satisfying less than two-thirds of the Recommended Dietary Allowances (RDA) for one or more nutrients (U.S.D.A. 1970 and 1972). Individual intake information for 1965 also indicated that a high proportion of the southern population failed to meet RDA levels for iron, calcium, vitamin A and vitamin C. Since 1965, however, many economic and social changes have occurred that are likely to have affected food selection, preparation, and nutrient intake. Some of these changes are increases in real income, expansion of government food programs, more publicity about nutrition, availability of new food products, nutrition labeling and wider use of convenience foods.

The purpose of this report is to examine the extent to which individual nutrient intakes in the South changed relative to those of the United States between 1965 and 1977. Nutrients selected for this analysis were restricted to those for which information was available in both the 1965-66 and 1977-78 nationwide surveys. It is convenient to classify the selected nutrients into the following three groups: (1) total food energy (calories) and its sources: protein, fat, and carbohydrates; (2) minerals: calcium and iron;

and (3) vitamins: A, C, thiamin, and riboflavin. The first section of this report discusses the data used in this study. Subsequent sections present comparisons for each of the three groups of nutrients.

#### DATA AND PROCEDURES

This study uses published tabulations of individual nutrient intakes for the spring components of the 1965-66 and 1977-78 Household Food Consumption Surveys. Average nutrient intakes for a 24-hour period for various age-sex groups in the two surveys are compared to identify regional changes for the South as related to those for the nation.

Although more information is available from the 1977-78 Survey than from the 1965-66 Survey, only tabulations of the 24-hour individual recall information from the 1977 spring component of the latest survey are used in this analysis. This is done to maintain as much comparability as possible between these data and those from the earlier survey. For example, in the 1965-66 Survey, individual intake data were obtained only in the spring of 1965. By using data from only the spring component of the 1977-78 survey, the influence of seasonality effects on comparisons is avoided.

Other differences between the two surveys are sample size and how the information was obtained. In 1965, information was collected for all individuals under 20 and over 64 years old in the sample households but for only half the members aged 20-64. Information for the latter group was double counted to adjust for the sub-sampling. In the spring of 1977, 24-hour food intakes were collected for all individuals in sample households. In 1965, the household respondent was asked to provide this information for all eligible family members. If the household respondent could not supply the information for other individuals who were expected to return home no later than the day after the interview, a form was left to be filled out and returned by mail. In 1977, each household member present at the time of the interview was asked to recall the previous day's food intake. Forms were left for absent members to fill out. The household respondent usually provided information for



members under 12 and those otherwise unable to answer for themselves (U.S.D.A., 1980).

The resulting sample sizes for various age-sex groups for the two surveys are reported in Appendix Table 1. In both years the South accounted for 31.9 percent of the observations, even though the 1977 survey contained approximately 50 percent fewer observations. The reduced sample size produced a relatively small number of observations for certain age-sex groups in the South in 1977. There also is a minor difference in the age groupings used in the two surveys for individuals between the ages of 15 and 64. In 1965, age groups were; 15-17, 18-19, 20-34, 35-54, and 55-64. In 1977, the age classifications were; 15-18, 19-22, 23-34, 35-50 and 51-64. The changes in age classification were made to be more consistent with the age categories for which RDAs are reported. For purposes of this report, the 1977 age classification is used for both years.

Another difference between the two surveys was that in 1965 eligible households had to have at least one member who ate at least ten meals from home food supplies during the previous week. This criteria was not used in selecting the 1977 sample. A final difference in survey methodology was that in 1977 an appointment was made with the respondent at least seven days before the interview, whereas in 1965 no advance notice was given. The results of a small bridging survey in 1977 using the 1965 procedures indicated the change in methods had little impact on the average intake of major food groups (U.S.D.A. 1983a).

The reported amount of food ingested by each individual during the 24-hour recall period in 1965 and 1977 was converted to various nutrients by U.S.D.A. The entire weight of a reported food serving was treated as edible except in the case of items served with parts not usually eaten.<sup>1</sup> Calculations of nutrient content in the 1965 survey were based primarily on values reported by Watt and Merrill

<sup>1</sup>For example, respondents were asked whether meat and poultry portions included fat or skin and whether the latter were eaten.

(1963). Nutritive values for 1977 were calculated from partially updated composition values of foods.<sup>2</sup>

## RESULTS

Tabulations and discussion of the findings are presented in three sections, one section for each group of nutrients identified earlier.

### Food Energy and Sources

The average amounts of food energy, protein, fat, and carbohydrates for various age-sex groups in the United States and the South in 1965 and 1977 are reported in Table 1. The data indicate that average calorie intake decreased during this twelve-year period for every age-sex group in the South as well as in the nation.

Decreases in calorie intake are not consistent with the trend in calorie availability indicated by U.S.D.A. time series data. The latter data, based on estimates of per-capita aggregate food production and utilization information, indicate a 5 percent increase in calories per-capita between 1965 and 1977 (U.S.D.A. 1983b). An important distinction is that the latter data pertain to calorie availability, whereas the data in Table 1 provide estimates of the quantity of calories actually ingested. If both sets of data are reasonably accurate, they imply that a greater amount of food was wasted, fed to pets, etc. in 1977 than in 1965.

Decreases in the actual quantity of calories ingested may have occurred for many reasons. For example, decreases in calorie intake are consistent with increased consciousness about weight control. However, as Hegsted (1980) noted, decreases in calorie intake may not have been sufficient to offset changes in nutrient requirements associated with more sedentary life styles.

<sup>2</sup>For new or unusual foods, nutrient values were based on manufacturer's data, similar foods, calculated from ingredients or a composite of these sources.

Table 1. Average intakes of food energy, protein, fat and carbohydrates in the United States and the South 1965 and 1977, by age and sex

Age-Sex Group	<u>FOOD ENERGY</u>				<u>PROTEIN</u>			
	United States 1965	United States 1977	South 1965	South 1977	United States 1965	United States 1977	South 1965	South 1977
	Kilocalories				Grams			
<b>Males and Females</b>								
Under 1	962	794	962	791	38.9	29.2	39.5	29.6
1-2	1,405	1,164	1,331	1,118	56.3	46.1	52.7	40.9
3-5	1,703	1,435	1,594	1,382	64.9	55.1	58.3	50.0
6-8	2,017	1,711	1,898	1,589	75.8	65.9	69.9	61.0
<b>Males</b>								
9-11	2,354	2,000	2,260	1,832	88.1	78.0	83.0	73.0
12-14	2,658	2,366	2,540	2,243	99.9	89.7	96.6	85.2
15-18	2,989	2,698	2,744	2,586	113.8	106.6	103.2	103.9
19-22	3,049	2,569	2,802	2,313	118.4	105.3	110.2	95.8
23-34	2,917	2,449	2,804	2,345	118.6	98.1	113.8	93.9
35-50	2,632	2,314	2,606	2,277	106.2	95.6	103.1	94.4
51-64	2,422	2,148	2,324	2,075	98.0	90.1	94.9	86.5
65-74	2,058	1,970	2,069	1,923	82.5	81.0	82.8	82.8
75 and over	1,870	1,808	1,879	1,820	73.0	74.6	75.5	76.0
<b>Females</b>								
9-11	2,009	1,865	1,925	1,735	75.1	70.4	71.9	68.2
12-14	2,146	1,903	1,980	1,930	80.6	73.2	73.7	74.0
15-18	1,999	1,791	1,854	1,796	78.0	70.7	69.1	71.3
19-22	1,918	1,621	1,898	1,522	75.5	66.7	72.6	60.4
23-34	1,803	1,616	1,875	1,500	72.3	65.9	72.4	61.3
35-50	1,652	1,514	1,634	1,492	68.3	63.9	67.0	63.7
51-64	1,619	1,522	1,642	1,436	67.4	65.2	66.9	60.4
65-74	1,473	1,444	1,417	1,359	60.3	60.4	58.1	58.0
75 and over	1,459	1,367	1,450	1,289	58.8	54.1	59.2	50.5

Table 1 (Continued)

Age-Sex Group	United States		South		United States		South	
	1965	1977	1965	1977	1965	1977	1965	1977
			<u>FAT</u>				<u>CARBOHYDRATES</u>	
<i>Males and Females</i>								
Under 1	41.6	30.4	42.6	33.9	105.6	97.0	103.7	85.5
1-2	64.6	48.9	62.4	45.8	152.5	137.8	142.1	138.6
3-5	78.6	61.0	71.7	56.3	188.7	170.5	183.1	171.6
6-8	93.5	72.4	84.4	66.4	224.2	203.3	219.9	189.9
<i>Males</i>								
9-11	109.6	87.6	103.0	79.2	260.7	228.8	256.0	209.4
12-14	125.8	105.5	117.8	100.6	287.9	270.0	277.2	252.1
15-18	144.0	123.3	131.3	116.1	315.4	294.8	291.2	284.1
19-22	149.0	118.4	131.5	105.5	311.9	256.8	296.2	240.0
23-34	146.1	114.8	140.9	106.2	271.6	241.6	266.6	242.9
35-50	132.4	109.8	130.4	106.7	246.3	220.8	251.4	225.9
51-64	121.3	101.6	115.0	97.1	226.9	208.8	223.8	213.1
65-74	100.6	92.8	101.6	91.3	203.2	205.3	202.0	197.0
75 and over	90.3	86.2	90.7	88.8	190.6	184.8	189.4	191.4
<i>Females</i>								
9-11	92.2	79.1	85.5	72.3	225.9	222.6	221.1	207.0
12-14	100.4	85.3	91.8	89.5	235.3	214.3	218.5	209.4
15-18	93.9	80.5	83.3	79.3	214.5	198.5	210.5	202.5
19-22	89.8	75.9	88.7	68.9	205.4	168.8	204.8	167.1
23-34	86.5	73.7	88.2	67.9	182.6	165.2	196.6	157.6
35-50	80.2	70.8	78.8	69.2	161.5	151.2	163.6	153.4
51-64	79.9	71.2	78.9	64.2	157.5	153.8	165.9	154.8
65-74	70.4	65.8	64.8	60.9	151.0	155.4	150.4	146.7
75 and over	68.3	59.0	66.7	56.8	154.5	157.4	155.2	144.3

Source: 1965 data obtained from *Food and Nutrient Intake of Individuals in the United States, Spring 1965, Household Food Consumption Survey 1965-66, Report No. 11, U.S. Department of Agriculture, Agricultural Research Service, January 1972.* 1977 data obtained from *Food and Nutrient Intakes of Individuals in 1 Day in the United States, Spring 1977, Nationwide Food Consumption Survey 1977-78, Preliminary Report No. 2, U.S. Department of Agriculture, Science and Education Administration, September 1980.*

Decreases in food energy intakes in the South were larger in many instances than those observed for corresponding age-sex groups in the entire country. This is reflected in decreases in the ratio of calorie intakes of the South compared to those of the United States in 1965 and 1977 for approximately two-thirds of the age-sex categories (Table 2).<sup>3</sup> Children 1 to 6 years old, teenage females, and 15-18 year-old males were among the few groups for which calorie intake declined less in the South than in the nation. The only other two groups for which a similar pattern occurred were males 51 to 64 years old and 75 and older. In all other cases, the ratio of calorie intake in the South to that of the United States declined between 1965 and 1977.

Decreases in the ratios indicate that the gap in calorie intakes between the South and the nation increased during this period. It is surprising that this occurred for so many groups. The increase in average incomes in the South relative to those of the nation, expansion in government-subsidized food programs, and interregional population movements would be expected to have produced more similarity in food consumption among regions of the nation in 1977 than had been the case in 1965.<sup>4</sup> The data suggest, however, that other factors must have contributed toward changing calorie consumption in the opposite direction for many population subgroups.

The smallest relative changes in calorie intake occurred in some of the teenage and elderly groups in the South and the nation. Preteenage children and young adults generally had larger percentage decreases in calorie intake than did other groups. Overall changes in calorie intake for all groups of males in the South were more similar to the national changes than were those for females.

<sup>3</sup>Actual differences and percentage changes in total food energy and its sources for each age-sex group in the South and the United States are reported in Appendix Table 3.

<sup>4</sup>Between 1965 and 1977 median family income in real terms increased by 35.2 percent in the South compared to 19.8 percent for the entire United States (U.S. Bureau of Census, 1979).

Table 2. Ratio of average intakes of food energy, protein and fat in the South to the United States 1965 and 1977, by age and sex

Age-Sex Group	<u>Food Energy</u>		<u>Protein</u>		<u>Fat</u>		<u>Carbohydrates</u>	
	1965	1977	1965	1977	1965	1977	1965	1977
<b>Males and Females</b>								
Under 1	1.000	.996	1.015	1.014	1.024	1.115	.982	.881
1-2	.947	.961	.936	.887	.966	.937	.932	1.006
3-5	.936	.963	.898	.907	.912	.923	.970	1.007
6-8	.941	.929	.922	.926	.903	.917	.981	.934
<b>Males</b>								
9-11	.960	.916	.942	.936	.940	.904	.982	.915
12-14	.956	.948	.967	.950	.936	.954	.963	.934
15-18	.947	.958	.907	.975	.912	.942	.923	.964
19-22	.919	.900	.931	.910	.883	.891	.950	.935
23-34	.961	.958	.960	.957	.964	.925	.982	1.005
35-50	.990	.984	.971	.987	.985	.972	1.021	1.023
51-64	.960	.966	.968	.960	.948	.956	.986	1.021
65-74	1.005	.976	1.004	1.022	1.010	.984	.994	.960
75 and over	1.005	1.007	1.034	1.019	1.004	1.030	.994	1.036
<b>Females</b>								
9-11	.958	.930	.957	.969	.927	.914	.979	.930
12-14	.923	1.014	.914	1.011	.914	1.049	.929	.977
15-18	.927	1.003	.886	1.008	.887	.985	.981	1.020
19-22	.990	.939	.962	.906	.988	.908	.997	.990
23-34	1.040	.928	1.001	.930	1.020	.921	1.077	.954
35-50	.989	.985	.981	.997	.983	.977	1.013	1.015
51-64	1.014	.943	.993	.926	.987	.902	1.053	1.007
65-74	.962	.941	.964	.960	.920	.926	.996	.944
75 and over	.994	.943	1.007	.933	.977	.963	1.005	.917

Source: Calculated from data in Table 1.

Protein. The pattern of changes in protein intakes was similar to that for total calories in several respects. First, average protein intake decreased in the South as well as the entire nation between 1965 and 1977 for nearly all age-sex groups. Again, this trend is opposite from the 5.2 percent increase in protein availability reflected by U.S.D.A. aggregate time series data (U.S.D.A. 1983b).

A second similarity between the changes in protein and total calories is the larger relative changes in many instances in protein intake in the South compared to the national sample. Consequently, the ratio of protein intake in the South to average U.S. levels decreased between 1965 and 1977 for approximately two-thirds of the groups. Nevertheless, average protein intake in 1977 still exceeded by a considerable margin the RDA for each age-sex group. This can be seen by comparing data in Table 1 to RDA values presented in Appendix Table 2.

A third similarity is that changes in protein as well as in calorie intake for males in the South were more like the national pattern than were changes for females. The major exception was in the 15-18 year-old male group for which there was a slight increase in protein intake in the South compared to a decrease for the national sample. Teenage females in the South also increased protein intake between 1965 and 1977; teenage females in the nation, however, decreased their protein consumption.

Some elderly groups were the only others besides the teenage groups that reported increases in protein intake between 1965 and 1977. Elderly males in the South continued to have higher protein intake than their national counterparts in 1977. This is similar to what was observed in 1965. On the other hand, protein intake by elderly females in the South declined between 1965 and 1977, and generally were less than U.S. averages.

Fat. Changes in fat intake also were similar in many respects to those observed for total calorie and protein intake. All groups in the United States and the South decreased fat intake between 1965 and 1977. Again, this contrasts with the 4 percent increase in fat

availability indicated by U.S.D.A. aggregate time series estimates (U.S.D.A. 1983b).

Infants, teenage females and elderly males were the only groups for which fat intake in the South in 1977 exceed that reported by the national sample. These groups, as well as Southern male teenagers did not reduce their intakes of fat as much as corresponding groups in the entire nation.

Most adult age groups in the South generally decreased fat intake proportionately more than the national sample (see Table 2). Decreases in fat intake by the 65 and over age groups in the South and the entire United States generally were smaller than changes for other adult groups. One exception is the 75-and-older females, who decreased average fat intake by 13 to 15 percent between 1965 and 1977. This is in sharp contrast to the smaller decreases in fat intake by males in the same age category.

Carbohydrates. Carbohydrate intakes also generally decreased between 1965 and 1977, except for a few of the elderly age groups. One difference in the pattern of changes for carbohydrates compared to that for total food energy, protein and fat is that in many more cases carbohydrate consumption in the South exceeded national levels. In 1977, the number of groups for which intake of carbohydrates in the South exceeded the U.S. level had nearly doubled from the number observed in 1965. This occurred primarily because several adult male groups in the South did not decrease their intake of carbohydrates as much as the national sample. Most adult female groups in the South, however, decreased carbohydrate intake a little more than similarly aged individuals in the entire nation. Also, the magnitude of the relative changes for carbohydrates did not vary with age as much as did total food energy, protein, or fat intake.

Distribution of Food Energy Sources. Another dimension of the changes in protein, fat, and carbohydrate intake is gained by examining the proportion of total calories derived from each source in 1965 and 1977. The proportion of total calories from fat in 1977 compared to



to 1965 decreased in the South as well as in the entire nation for most age-sex groups, Table 3. Carbohydrates and protein each accounted for larger proportions of total calories in 1977 than in 1965 in most cases. Major exceptions to this general pattern were in protein for young children, 23-34 year old males, and 75 and older females.

### Minerals

Changes in food consumption between 1965 and 1977 affected average intake of iron and calcium somewhat differently (Table 4). Decreases in calcium intake were much more common than for iron. Overall availability of iron and calcium in the nation's per-capita food supply indicated an increase of 8.2 percent for iron and a decrease of 3.3 percent for calcium between 1965 and 1977 (U.S.D.A. 1983b).

Iron. Substantial increases in iron intake were reported by individuals less than 19 and those 65 and older<sup>5</sup>. Most other adult groups, except females 51-64 years of age, reported decreased iron intake. Iron intake by infants more than doubled between the two national surveys, reflecting in part increased fortification of infant formulas and cereals (Pac, 1980). The ratio of iron intake in the South to that of the United States decreased between 1965 and 1977 for children 3 to 8, males less than 19 years of age, and 75 and older males (Table 5). Ratios increased for male groups 19 to 64 years of age, whereas they declined for some groups of adult females in the South between 1965 and 1977. Females less than 19 years of age

<sup>5</sup>Actual differences and percentage changes in iron and calcium intakes for each age-sex group in the South and the United States are reported in Appendix Table 4.

Table 3. Percentages of total calories from protein, fat and carbohydrates in the United States and the South, 1965 and 1977, by age and sex.

Age-Sex Group	PROTEIN				FAT				CARBOHYDRATES			
	United States		South		United States		South		United States		South	
	1965	1977	1965	1977	1965	1977	1965	1977	1965	1977	1965	1977
<b>Males and Females</b>												
Under 1	16.32	14.98	16.50	15.45	39.17	35.01	39.95	39.71	44.51	50.01	43.55	44.84
1-2	15.88	15.66	15.70	14.45	40.90	37.29	41.75	36.33	43.22	47.05	42.55	49.22
3-5	15.06	15.16	14.46	14.33	40.94	37.69	39.91	36.23	44.00	47.15	45.63	49.44
6-8	14.83	15.23	14.55	15.22	41.08	37.56	39.44	37.18	44.09	47.22	46.01	47.60
<b>Males</b>												
9-11	14.78	15.46	14.52	15.83	41.27	38.97	40.46	38.55	43.95	45.57	45.02	45.62
12-14	14.87	15.00	15.10	15.10	42.05	39.62	41.35	40.01	43.08	45.38	43.55	44.89
15-18	15.09	15.68	14.94	15.98	42.87	40.73	42.68	40.10	42.04	43.59	42.38	43.92
19-22	15.45	16.74	15.67	16.70	43.65	42.24	41.99	41.27	40.90	41.02	42.34	42.03
23-34	16.48	16.39	16.30	16.29	45.59	43.05	45.32	41.36	37.93	40.56	38.38	42.35
35-50	16.32	16.95	15.90	16.83	45.66	43.71	45.14	42.70	38.02	39.34	38.96	40.47
51-64	16.38	17.06	16.42	16.68	45.51	43.20	44.67	42.03	38.11	39.74	38.91	41.29
65-74	16.10	16.34	16.11	17.04	44.06	42.03	44.39	42.20	39.84	41.63	39.50	40.76
75 and over	15.62	16.44	16.08	16.25	43.39	42.64	43.37	42.62	40.99	40.92	40.55	41.13
<b>Females</b>												
9-11	14.75	14.92	14.79	15.55	40.66	37.65	39.49	37.01	44.59	47.43	45.72	47.44
12-14	14.86	15.25	14.76	15.25	41.55	39.89	41.27	41.39	43.59	44.86	43.97	43.36
15-18	15.46	15.68	14.77	15.75	41.79	40.08	39.99	39.31	42.74	44.24	45.24	44.94
19-22	15.62	16.40	15.22	15.77	41.69	41.89	41.65	40.39	42.69	41.71	43.13	43.84
23-34	16.07	16.58	15.47	16.47	43.15	41.64	42.31	40.96	40.78	41.78	42.22	42.57
35-50	16.63	17.05	16.41	17.07	43.85	42.41	43.32	41.62	39.52	40.54	40.27	41.31
51-64	16.64	17.17	16.29	16.77	44.28	42.11	43.12	40.03	39.08	40.72	40.59	43.20
65-70	16.29	16.58	16.38	16.95	42.70	40.55	41.01	39.96	41.01	42.87	42.61	43.09
75 and over	16.01	15.69	16.22	15.63	41.73	38.42	41.04	39.48	42.26	45.89	42.74	44.89

Source: Calculated from data in Table 1 using 4.0 calories per gram of protein, 8.98 calories per gram of fat and 4.02 calories per gram of carbohydrate.

Table 4. Average intakes of iron and calcium in the United States and the South, 1965 and 1977, by age and sex

Age-Sex Group	United States		IRON		South		United States		CALCIUM		South	
	1965	1977	1965	1977	1965	1977	1965	1977	1965	1977	1965	1977
	Milligrams						Milligrams					
<b>Males and Females</b>												
Under 1	5.9	17.4	6.4	16.9	1,046	791	1,112	763				
1-2	6.9	7.9	6.5	7.5	930	729	863	598				
3-5	8.5	9.5	8.2	8.9	883	713	764	587				
6-8	10.1	11.1	9.9	10.2	975	876	853	717				
<b>Males</b>												
9-11	12.0	13.3	11.8	12.8	1,080	920	968	830				
12-14	13.8	15.3	14.2	15.3	1,185	1,077	1,023	937				
15-18	15.9	17.1	15.5	16.6	1,231	1,194	968	959				
19-22	16.6	16.0	16.6	16.1	1,183	983	880	772				
23-34	17.9	15.9	17.4	15.5	893	830	780	703				
35-50	16.7	15.8	16.3	16.0	778	764	807	739				
51-64	15.9	15.5	15.0	15.5	715	702	742	724				
65-74	13.5	14.5	13.5	14.5	691	729	725	664				
75 and over	11.5	13.4	12.0	13.3	607	679	624	635				
<b>Females</b>												
9-11	10.2	11.9	10.3	12.6	951	845	823	761				
12-14	11.1	11.6	10.8	11.9	947	864	772	750				
15-18	11.0	11.1	10.7	11.6	821	774	712	708				
19-22	10.9	10.5	11.4	10.1	709	630	592	536				
23-34	11.3	10.7	11.8	10.2	587	604	564	476				
35-50	10.9	10.7	10.7	10.6	524	515	510	492				
51-64	10.8	11.4	10.7	11.1	526	532	544	522				
65-74	9.9	10.6	9.1	10.0	502	566	524	540				
75 and over	9.2	10.1	9.4	9.6	513	591	495	610				

Source: 1965 data obtained from Food and Nutrient Intake of Individuals in the United States, Spring 1965, Household Food Consumption Survey 1965-66, Report No. 11, U.S. Department of Agriculture, Agricultural Research Service, January 1972. 1977 data obtained from Food and Nutrient Intakes of Individuals in 1 Day in the United States, Spring 1977, Nationwide Food Consumption Survey 1977-78, Preliminary Report No. 2, U.S. Department of Agriculture, Science and Education Administration, September 1980.

Table 5. Ratio of average intakes of iron and calcium in the South to the United States in 1965 and 1977, by age and sex

Age-Sex Group	<u>IRON</u>		<u>CALCIUM</u>	
	1965	1977	1965	1977
<i>Males and Females</i>				
Under 1	1.085	.971	1.063	.965
1-2	.942	.949	.928	.820
3-5	.965	.937	.865	.823
6-8	.980	.919	.875	.819
<i>Males</i>				
9-11	.983	.962	.896	.902
12-14	1.029	1.000	.863	.870
15-18	.975	.971	.786	.803
19-22	1.000	1.006	.744	.785
23-34	.972	.975	.873	.847
35-50	.976	1.013	1.037	.967
51-64	.943	1.000	1.038	1.031
65-74	1.000	1.000	1.049	.911
75 and over	1.043	.993	1.028	.935
<i>Females</i>				
9-11	1.010	1.059	.865	.901
12-14	.973	1.026	.815	.868
15-18	.973	1.045	.867	.915
19-22	1.046	.962	.835	.851
23-34	1.044	.953	.961	.788
35-50	.982	.991	.973	.955
51-64	.991	.974	1.034	.981
65-74	.919	.943	1.044	.954
75 and over	1.022	.950	.965	1.032

Source: Calculated from data in Table 4

in the South, however, not only increased iron intake between 1965 and 1977, but their averages were larger than those of the national sample.

Average iron intake for most female groups in the South and nation in 1977 failed to meet RDA levels and in several cases were less than two-thirds of the RDA levels. Exceptions, however, were the groups of females between 51 and 65 years of age in the South and the United States. Their diets appeared to have sufficient iron content. Infants, children 6 and 8 years of age and all adult male groups also reported iron intake greater than RDA levels. In addition to iron intake deficiencies for many of the female groups, males 9-18 and children 1-5 years old were other groups with amounts of iron slightly under RDA values. Iron deficiencies for females in the child-bearing ages increased more in the South than in the United States from 1965 to 1977.

Calcium. The only groups in the South that increased calcium intake between 1965 and 1977 were the 65-and-older females and the 75-and-older males. All other age-sex groups in the South reported less calcium intake in 1977 than in 1965. The pattern for the national sample was fairly similar, except that a few of the adult groups reported slight increases in calcium intake. Percentage declines in calcium intake of infants and children up to nine years of age were much greater in the South than in the nation. Among preschool age groups in the United States, calcium decreases of more than 20 percent were observed.

Smaller decreases in calcium intake occurred in the South than in the nation for males and females 9-22 years of age. Just the opposite tended to occur for all but one of the older age groups. In only two instances did calcium intake in the South exceed national levels in 1977. In 1965, calcium intake of all male groups 35 and older as well as that of females aged 51-74 in the South exceeded national averages. In 1977, calcium intake for males 51-64 years old and females 75 years of age and older exceeded national averages.

Average calcium intake for all groups in the South, other than those under one year of age, were below RDA levels. Deficiencies in calcium intake were generally not as large at the national level as in the South. A few age-sex groups reported calcium intake above RDA levels in 1977.

### Vitamins

The Southern population experienced substantial gains in the intakes of some, but not all, vitamins between 1965 and 1977 (Table 6). A number of age-sex groups reported increases in vitamin A and riboflavin intake.<sup>6</sup> Vitamin C intake increased across all groups. Thiamin intake also increased for most groups. National production and utilization data indicated percentage increases of 2.7, 24.2, 13.6, and 7.2 in per-capita availability of vitamin A, vitamin C, thiamin, and riboflavin, respectively, between 1965 and 1977 (U.S.D.A. 1983b).

Vitamin A. According to the household food consumption surveys, increases in vitamin A intake in the United States were observed primarily among the older age groups. In the South, increases in vitamin A intakes were observed for the elderly as well as for most male groups. For all but three groups, the ratio of vitamin A intake in the South to that of the United States increased between 1965 and 1977 (Table 7).

Although most non-elderly female groups in the South and the United States reported decreases in vitamin A, their 1977 average intakes generally satisfied RDA levels. This was not true, however, for 19-35 year old females in the South or 19-22 year old U.S. females, for which diets appeared to be deficient in vitamin A.

<sup>6</sup>Actual differences and percentage changes in intake of the selected vitamins by each age-sex group in the South and the United States are reported in Appendix Table 5.

Table 6. Average intakes of selected vitamins in the United States and South, 1965 and 1977, by age and sex

Age-Sex Group	VITAMIN A				VITAMIN C			
	United States		South		United States		South	
	1965	1977	1965	1977	1965	1977	1965	1977
	I.U.				Milligrams			
<b>Males and Females</b>								
Under 1	4,550	3,511	4,390	3,913	36	77	31	78
1-2	3,800	3,281	3,400	3,151	45	68	36	52
3-5	3,960	3,694	3,290	3,273	49	70	42	70
6-8	4,480	4,533	3,940	4,151	56	85	49	75
<b>Males</b>								
9-11	5,200	4,500	4,500	4,330	69	85	66	78
12-14	4,810	5,429	5,310	6,038	70	92	64	85
15-18	6,320	5,746	4,500	4,834	75	112	61	95
19-22	5,500	5,015	4,130	4,510	75	88	53	73
23-34	7,010	5,278	5,930	4,822	73	95	65	81
35-50	6,380	5,690	5,950	6,109	73	86	67	84
51-64	8,900	6,945	6,990	7,332	72	98	60	92
65-74	5,800	6,834	6,060	7,455	66	100	63	98
75 and over	4,560	6,693	4,180	6,454	55	96	57	80
<b>Females</b>								
9-11	5,080	4,225	5,050	4,737	59	87	54	85
12-14	4,750	4,066	4,210	4,033	66	81	57	75
15-18	5,150	4,195	5,490	4,337	60	80	50	87
19-22	4,480	3,796	4,290	3,838	57	79	50	76
23-34	4,620	4,335	5,130	3,699	56	76	56	62
35-50	5,310	4,264	4,820	4,337	59	79	51	72
51-64	5,220	6,044	4,520	6,117	63	93	54	82
65-74	4,940	6,218	3,980	5,220	57	92	52	83
75 and over	4,300	5,931	4,320	5,523	55	90	43	70

Table 6 (continued)

Age-Sex Group	United States		South		United States		South	
	1965	1977	1965	1977	1965	1977	1965	1977
	<u>THIAMIN</u>				<u>RIBOFLAVIN</u>			
	Milligrams				Milligrams			
<b>Males and Females</b>								
Under 1	.68	.89	.64	.84	1.73	1.53	1.81	1.50
1-2	.78	.87	.74	.81	1.67	1.43	1.56	1.24
3-5	.92	1.06	.82	1.02	1.68	1.57	1.46	1.35
6-8	1.07	1.30	1.00	1.19	1.89	1.86	1.69	1.63
<b>Males</b>								
9-11	1.24	1.52	1.19	1.41	2.13	2.10	1.94	1.95
12-14	1.35	1.71	1.35	1.69	2.35	2.39	2.14	2.20
15-18	1.56	1.82	1.53	1.72	2.56	2.57	2.11	2.21
19-22	1.65	1.56	1.59	1.55	2.50	2.20	2.11	1.94
23-34	1.59	1.55	1.55	1.52	2.25	1.98	2.04	1.79
35-50	1.40	1.45	1.42	1.54	1.98	1.88	1.98	1.89
51-64	1.42	1.47	1.48	1.50	2.05	1.88	1.93	1.91
65-74	1.17	1.40	1.17	1.42	1.70	1.85	1.73	1.90
75 and over	1.09	1.41	1.10	1.44	1.42	1.73	1.50	1.77
<b>Females</b>								
9-11	1.04	1.37	1.01	1.32	1.89	1.87	1.69	1.75
12-14	1.11	1.29	1.04	1.27	1.88	1.81	1.60	1.69
15-18	1.07	1.19	.96	1.22	1.74	1.65	1.53	1.57
19-22	1.04	1.04	1.13	.97	1.55	1.37	1.46	1.28
23-34	.99	1.02	1.03	.96	1.47	1.35	1.43	1.18
35-50	.93	1.01	.95	1.02	1.34	1.27	1.32	1.25
51-64	.94	1.05	.97	1.05	1.35	1.40	1.35	1.43
65-74	.84	1.07	.83	1.07	1.25	1.41	1.23	1.31
75 and over	.84	1.01	.83	.96	1.18	1.40	1.17	1.40

Source: 1965 data obtained from Food and Nutrient Intake of Individuals in the United States, Spring 1965, Household Food Consumption Survey 1965-66, Report No. 11, U.S. Department of Agriculture, Agricultural Research Service, January 1972. 1977 data obtained from Food and Nutrient Intakes of Individuals in 1 Day in the United States, Spring 1977, Nationwide Food Consumption Survey 1977-78, Preliminary Report No. 2, U.S. Department of Agriculture, Science and Education Administration, September 1980.



Table 7. Ratio of average intakes of selected vitamins in the South to the United States in 1965 and 1977, by age and sex

Age-Sex Group	<u>Vitamin A</u>		<u>Vitamin C</u>		<u>Thiamine</u>		<u>Riboflavin</u>	
	1965	1977	1965	1977	1965	1977	1965	1977
<i>Males and Females</i>								
Under 1	.965	1.114	.861	1.013	.941	.944	1.046	.980
1-2	.895	.960	.800	.765	.949	.931	.934	.867
3-5	.831	.886	.857	1.000	.891	.962	.869	.860
6-8	.880	.916	.875	.882	.935	.915	.894	.876
<i>Males</i>								
9-11	.865	.962	.957	.918	.960	.928	.911	.929
12-14	1.104	1.112	.914	.924	1.000	.988	.911	.921
15-18	.712	.841	.813	.848	.981	.945	.824	.860
19-22	.751	.899	.707	.830	.964	.994	.844	.882
23-34	.846	.914	.890	.853	.975	.981	.907	.904
35-50	.933	1.074	.918	.977	1.014	1.062	1.000	1.005
51-64	.785	1.056	.833	.939	1.042	1.020	.941	1.016
65-74	1.045	1.091	.955	.980	1.000	1.014	1.018	1.027
75 and over	.917	.964	1.036	.833	1.009	1.021	1.056	1.023
<i>Females</i>								
9-11	.994	1.121	.915	.977	.971	.964	.894	.936
12-14	.886	.992	.864	.926	.937	.984	.851	.934
15-18	1.066	1.034	.833	1.088	.897	1.025	.879	.952
19-22	.958	1.011	.877	.962	1.087	.933	.942	.934
23-34	1.110	.853	1.000	.816	1.040	.941	.973	.874
35-50	.908	1.017	.864	.911	1.022	1.010	.985	.984
51-64	.866	1.012	.857	.882	1.032	1.000	1.000	1.021
65-74	.806	.839	.912	.902	.988	1.000	.984	.929
75 and over	1.005	.931	.782	.778	.988	.950	.992	1.000

Source: Calculated from data in Table 6.

All Southern male groups except the 9-11 and 23-34 year-old categories reported an increase in vitamin A intake between 1965 and 1977. Diets of 15-35 year-old males in the South in 1977 fell short of the RDA standards for vitamin A. All other groups of males in the South had adequate vitamin A intakes as did all male groups in the national sample.

Vitamin C. Intake of vitamin C increased for all age-sex groups in the South as well as in the nation. The 1977 averages in the South were still slightly less than national averages in most cases. Nevertheless, the ratio of Southern vitamin C intake to U.S. averages increased for nearly three-fourths of the groups between 1965 and 1977. Major exceptions to this pattern were males and females 23-34 years of age or 75 and older. Vitamin C intakes by the latter groups did not increase as rapidly in the South as in the nation. In all cases, 1977 intakes of vitamin C in the South as well as in the United States surpassed RDA levels.

Thiamin. The intake of thiamin also increased between 1965 and 1977 for all age-sex groups in the South, except those between 19 and 35 years of age. In 1965 as well as in 1977, the ratio of thiamin intake in the South to U.S. averages generally tended to be higher among older groups. This was even more evident in 1977 than in 1965. For those less than 35 years of age, average intakes of thiamin in the South generally were less than national rates, but above RDA values. This pattern suggests an age-related regional difference in consumption of foods containing different amounts of thiamin.

Riboflavin. Increases in intake of riboflavin between 1965 and 1977 occurred for a few age-sex groups in the South as well as for the national sample. The 65 and older groups in both the South and nation consistently reported increases in riboflavin intake. In the

South, 9-18 year-old males and females also increased their intake of riboflavin relative to U.S. intake. The only other groups in the national sample with increases in riboflavin intake were teenage males and 51-64 aged females.

The largest relative decreases in riboflavin intake occurred in preschool age children and young adults between 19 and 35 years of age. Decreases in riboflavin by Southern females 19-35 years of age were responsible for these individuals being practically the only groups for which 1977 intake levels failed to meet RDA values. Average intake of riboflavin by individuals 35 or more years of age in the South were very close to, or exceeded, national averages and RDA values in 1977. Average intakes of riboflavin for all age groups less than 35 years of age in the South were less than national levels, but in most cases exceeded RDA values. This age-related pattern of regional difference in riboflavin intake resembles the pattern for thiamin.

#### SUMMARY AND CONCLUSIONS

Tabulations of nutrient intake evaluations of U.S.D.A. individual food consumption data indicate substantial changes in nutrient intake for various age groups in the South as well as the nation between 1965 and 1977. Decreases in food energy from protein, fat, and carbohydrates occurred for nearly all age groups. Elderly individuals had smaller relative changes in food energy and its sources than other age groups in the South and the United States. Some of the largest decreases were observed for preschool and young adult age groups. The rates of change in total calorie intake and its sources by Southern males were very similar to those of the nation. On the other hand, these rates of change for adult females in the South generally were much larger and more variable than for similar groups in the United States. The proportion of total calories derived from fat generally decreased. These were offset by increases in the proportions of total calories obtained from carbohydrates and protein.

Substantial increases in iron intake were reported by individuals less than 19 and those 65 and older. Most of the other adult groups except females 51-64 years of age decreased iron intake between 1965 and 1977. The ratio of iron intake in the South to that of U.S. levels for younger females and older males tended to increase. Similar ratios for most of the other groups decreased. Intake levels of iron for most female groups in the South and the United States fell short of RDA levels by a wide margin.

Increases in calcium intake occurred only in some of the older age groups. Among preschool children, calcium decreases generally exceeded 20 percent in the South and in the United States. Elderly age groups in the South and the entire nation reported higher calcium intake in 1977 than in 1965, but the rates of change were slightly smaller in the South than in the United States.

Vitamin intakes appeared to increase in the South relative to the United States between 1965 and 1977. A number of age-sex groups, especially the elderly and Southern males, reported increases in vitamin A intake. Vitamin C intake increased substantially for all age groups. Average levels of vitamin C in the South in 1977 still tended to be below national levels even though the rates of increase since 1965 generally were greater than the national rate of increase.

Intake of thiamin increased for all age groups in the South except those between 19 and 35. In the national sample decreases in thiamin intake occurred only for males ages 19-35. Riboflavin intake decreased for many age-sex groups between 1965 and 1977. Average intakes of riboflavin by Southern adults 35 or over exceeded or approached national levels in 1977. For younger age groups, average intakes in the South were substantially less than national levels but still exceeded RDA levels.

The comparisons indicate a number of similarities and differences in nutrient content of southern diets as compared to other parts of the country. For most nutrients, intakes in the South in 1977 were less than U.S. averages. However, for each nutrient considered, two or more groups in the South had average intakes greater than the

national average in both years. In the case of carbohydrates, iron, vitamin A, and thiamin, more than five age-sex groups in the South had average intakes greater than the national average in both years.

Overall, there was more improvement in the vitamin content than in other nutrients in southern diets compared to U.S. diets between 1965 and 1977. For the other nutrients considered, average intakes for 50 percent or more of the southern groups decreased relative to U.S. averages. Many of the relative changes were not large, and in most cases average intakes in the South as well as in the United States exceeded RDA levels. Major exceptions were iron and calcium; apparent deficiencies in iron intake for certain female groups were quite large and appeared to have increased in the South between 1965 and 1977.

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Appendix Table 1. Number of individuals in the United States and the South by age and sex category, 1965 and 1977<sup>a</sup>

Age-Sex Group	1965 <sup>b</sup>		1977	
	United States	South	United States	South
<b>Males or females</b>				
Under 1	408	138	78	28
1-2	810	258	264	91
3-5	1405	460	437	142
6-8	1412	438	469	161
<b>Males</b>				
9-11	665	223	216	56
12-14	627	215	313	98
15-18 <sup>C</sup>	562	200	400	129
19-22 <sup>C</sup>	251	76	287	98
23-34 <sup>C</sup>	1406	448	770	236
35-50 <sup>C</sup>	2050	614	784	238
51-64 <sup>C</sup>	742	228	634	212
65-74	460	178	295	104
75 and over	219	65	127	41
<b>Females</b>				
9-11	599	187	241	67
12-14	626	211	309	99
15-18 <sup>C</sup>	538	184	402	135
19-22 <sup>C</sup>	232	89	337	94
23-34 <sup>C</sup>	1846	596	949	289
35-50 <sup>C</sup>	2492	796	942	290
51-64 <sup>C</sup>	916	308	792	276
64-74	624	233	377	125
75 and over	340	113	197	62
<b>Total</b>	<b>19,230</b>	<b>6,258</b>	<b>9,620</b>	<b>3,071</b>

<sup>a</sup> 1965 data obtained from Food and Nutrient Intake of Individuals in the United States, Spring 1965, Household Food Consumption Survey 1965-66, Report No. 11, U.S. Department of Agriculture, Agricultural Research Service, January 1972. 1977 data obtained from Food and Nutrient Intakes of Individuals in Day 1 in the United States, Spring 1977, Nationwide Food Consumption Survey 1977-78, Preliminary Report No. 2, U.S. Department of Agriculture, Science and Education Administration, September 1980.

<sup>b</sup> Data for individuals in age groups 20-64 were counted twice in tabulation.

<sup>c</sup> Data for 1965 correspond to age groups 15-17, 18-19, 20-34, 35-54, and 55-64.

Appendix Table 2. Recommended dietary allowances, 1980, expressed as levels of intake

Age-Sex Group	Food	Protein	Iron	Calcium	Vitamin A	Vitamin C	Thiamin	Riboflavin
	Energy							
	Kcal	G	Mg	Mg	IU	IU	Mg	Mg
Males and females:								
0.0-0.5	a	b	10	360	1,400	35	0.3	0.4
0.6-0.9	c	d	15	540	2,000	35	0.5	0.6
1-2	1,199	22	15	726	2,000	42	0.6	0.7
3-5	1,567	28	12	800	2,333	45	0.8	0.9
6-8	2,100	32	10	800	3,071	45	1.1	1.2
Males:								
9-11	2,513	38	13	950	4,063	47	1.3	1.5
12-14	2,713	46	18	1,200	5,000	51	1.4	1.6
15-18	2,800	56	18	1,200	5,000	60	1.4	1.7
19-22	2,900	56	10	800	5,000	60	1.5	1.7
23-50	2,700	56	10	800	5,000	60	1.4	1.6
51-64	2,462	56	10	800	5,000	60	1.2	1.4
65-74	2,400	56	10	800	5,000	60	1.2	1.4
75 and over	2,050	56	10	800	5,000	60	1.2	1.4
Females:								
9-11	2,325	39	13	950	3,688	47	1.2	1.4
12-14	2,188	46	18	1,200	4,000	51	1.1	1.3
15-18	2,100	46	18	1,200	4,000	60	1.1	1.3
19-22	2,100	44	18	800	4,000	60	1.1	1.3
23-50	2,000	44	18	800	4,000	60	1.0	1.2
51-64	1,842	44	10	800	4,000	60	1.0	1.2
65-74	1,800	44	10	800	4,000	60	1.0	1.2
75 and over	1,600	44	10	800	4,000	60	1.0	1.2

<sup>a</sup>Weight (kg) x 115 = kilocalories.

<sup>b</sup>Weight (kg) x 2.2 = protein (g).

<sup>c</sup>Weight (kg) x 105 = kilocalories.

<sup>d</sup>Weight (kg) x 2.0 = protein (g)

Source: From Table 7.1 in *Food and Nutrient Intakes of Individuals in 1 Day in the United States, Spring 1977, Nationwide Food Consumption Survey, Preliminary Report No. 2, U.S. Department of Agriculture, Science and Education Administration, September 1980.*



Appendix Table 3. Changes in average intakes of food energy, protein, fat and carbohydrates in the United States and the South between 1965 and 1977 by age and sex<sup>a</sup>

Age-Sex Group	<u>Food Energy</u>				<u>Protein</u>			
	Actual Change		Relative Change		Actual Change		Relative Change	
	United States	South	United States	South	United States	South	United States	South
	Kilocalories		Percent		Grams		Percent	
<b>Males and Females</b>								
Under 1	-168	-171	-17.5	-17.8	- 9.7	- 9.9	-24.9	-25.1
1-2	-241	-213	-17.2	-16.0	-10.2	-11.8	-18.1	-22.4
3-5	-268	-212	-15.7	-13.3	- 9.2	- 8.3	-15.1	-14.2
6-8	-306	-309	-15.2	-16.3	- 9.9	- 8.9	-13.1	-12.7
<b>Males</b>								
9-11	-354	-428	-15.0	-18.9	-10.1	-10.0	-11.4	-12.0
12-14	-292	-297	-11.0	-11.7	-10.2	-11.4	-10.2	-11.8
15-18	-291	-158	- 9.3	- 5.8	- 7.2	.7	- 6.3	.7
19-22	-480	-489	-15.7	-17.5	-13.1	-14.4	-11.1	-13.1
23-34	-469	-459	-16.0	-16.4	-20.5	-19.9	-17.3	-17.5
35-50	-318	-329	-12.1	-12.6	-10.6	- 8.7	-10.0	- 8.4
51-64	-274	-249	-11.3	-10.7	- 7.9	- 8.4	- 8.1	- 8.9
65-74	- 88	-146	- 4.3	- 7.1	- 1.5	0	- 1.9	0
75 and over	- 62	- 59	- 3.3	- 3.1	1.6	.5	2.2	.7
<b>Females</b>								
9-11	-144	-190	- 7.2	- 9.9	- 4.7	- 3.7	- 6.3	- 5.1
12-14	-243	- 50	-11.3	- 2.5	- 7.4	.3	- 9.2	.4
15-18	-208	- 58	-10.4	- 3.1	- 7.3	2.2	- 9.4	3.2
19-22	-297	-376	-15.5	-19.2	- 8.8	-12.2	-11.7	-16.2
23-34	-187	-375	-10.4	-20.0	- 6.4	-11.1	- 8.9	-15.3
35-50	-138	-142	- 8.4	- 8.7	- 4.4	- 3.3	- 6.4	- 5.9
51-64	- 97	-206	- 6.0	-12.5	- 2.2	- 6.5	- 3.3	- 9.7
65-74	- 29	- 58	- 2.0	- 4.1	.1	.1	.2	.2
75 and over	- 92	-161	- 6.3	-11.1	- 4.7	- 8.7	- 8.0	-14.7

Appendix Table 3 (continued)

Age-Sex Group	<u>Fat</u>				<u>Carbohydrates</u>			
	Actual Change		Relative Change		Actual Change		Relative Change	
	United States	South	United States	South	United States	South	United States	South
	Grams		Percent		Grams		Percent	
<i>Males and Females</i>								
Under 1	-11.2	- 8.7	-26.9	-20.4	- 8.6	-18.2	- 8.1	-17.6
1-2	-15.7	-16.6	-24.3	-26.6	-14.7	- 3.5	- 9.4	- 2.5
3-5	-17.6	-15.4	-22.4	-21.5	-18.2	-11.5	- 9.6	- 6.3
6-8	-21.1	-18.0	-22.6	-21.3	-20.9	-30.0	- 9.3	-13.6
<i>Males</i>								
9-11	-22.0	-23.8	-20.1	-23.1	-31.9	-46.6	-12.2	-18.2
12-14	-20.3	-17.2	-16.1	-14.6	-17.9	-25.1	- 6.2	- 9.1
15-18	-20.7	-15.2	-14.4	-11.6	-20.6	- 7.1	- 6.5	- 2.4
19-22	-30.6	-26.0	-20.5	-19.8	-55.1	-56.2	-17.7	-19.0
23-34	-31.3	-34.7	-21.4	-24.6	-30.0	-23.7	-11.0	- 8.9
35-50	-22.6	-23.7	-17.1	-18.2	-25.5	-25.5	-10.4	-10.1
51-64	-19.7	-17.9	-16.2	-15.6	-18.1	-10.7	- 8.0	- 4.8
65-74	- 7.8	-10.3	- 7.8	-10.1	2.1	- 5.0	1.0	- 2.5
75 and over	- 4.1	- 1.9	- 4.5	- 2.1	- 5.8	2.0	- 3.0	1.1
<i>Females</i>								
9-11	-13.1	-13.2	-14.2	-15.4	- 3.3	-14.1	- 1.5	- 6.4
12-14	-15.1	- 2.3	-15.0	- 2.5	-21.0	- 9.1	- 8.9	- 4.2
15-18	-13.4	- 4.0	-14.3	- 4.8	-16.0	- 8.0	- 7.5	- 3.8
19-22	-13.9	-19.8	-15.5	-22.3	-36.6	-37.7	-17.8	-18.4
23-34	-12.8	-20.3	-14.8	-23.0	-17.4	-39.0	- 9.5	-19.2
35-50	- 9.4	- 9.6	-11.7	-12.2	-10.3	-10.2	- 6.4	- 6.2
51-64	- 8.7	-14.7	-10.9	-18.4	- 3.7	-11.1	- 2.3	- 6.7
65-74	- 4.6	- 3.9	- 6.5	- 6.0	4.4	- 3.7	2.9	- 2.5
75 and over	- 9.3	- 9.9	-13.6	-14.8	2.9	-10.9	1.9	- 7.0

<sup>a</sup>Calculated from data in Table 1.

Appendix Table 4. Changes in average intakes of iron and calcium in the United States and South between 1965 and 1977 by age and sex<sup>a</sup>

Age-Sex Group	Iron				Calcium			
	Actual Change		Relative Change		Actual Change		Relative Change	
	United States	South	United States	South	United States	South	United States	South
	Milligrams		Percent		Milligrams		Percent	
<b>Males and Females</b>								
Under 1	11.5	10.5	294.9	264.1	-255	-349	-24.4	-31.4
1-2	1.0	1.0	14.5	15.4	-201	-265	-21.6	-30.7
3-5	1.0	.7	11.8	8.5	-170	-177	-19.3	-23.2
6-8	1.0	.3	9.9	3.0	-99	-136	-11.1	-15.9
<b>Males</b>								
9-11	1.3	1.0	10.8	8.5	-160	-138	-14.8	-14.3
12-14	1.5	1.1	10.9	7.7	-108	-86	-9.1	-8.4
15-18	1.2	1.1	7.5	7.7	-37	-9	-3.0	-.9
19-22	-.6	-.5	-3.6	-3.0	-200	-108	-16.9	-12.3
23-34	-2.0	-1.9	-11.2	-10.9	-63	-77	-7.1	-9.9
35-50	-.9	-.3	-5.4	-1.8	-14	-68	-1.8	-8.4
51-64	-.4	.5	-2.5	3.3	-13	-18	-1.8	-2.4
65-74	1.0	1.0	7.4	7.4	38	-61	5.5	-8.4
75 and over	1.9	1.3	16.5	10.8	72	11	11.9	1.8
<b>Females</b>								
9-11	1.7	2.3	16.7	22.3	-106	-62	-11.1	-7.5
12-14	.5	1.1	4.5	10.2	-83	-22	-8.8	-2.8
15-18	.1	.9	.9	8.4	-47	-4	-5.7	-.6
19-22	-.4	-1.3	-3.7	-11.4	-79	-56	-11.1	-9.5
23-34	-.6	-1.6	-5.3	-13.6	17	-88	2.9	-15.6
35-50	-.2	-.1	-1.8	-.9	-9	-18	-1.7	-3.5
51-64	.6	.4	5.6	3.7	6	-22	1.1	-4.0
65-74	.7	.9	7.1	9.9	64	16	12.7	3.1
75 and over	.9	.2	9.8	2.1	78	115	15.2	23.2

<sup>a</sup> Calculated from data in Table 4.

Appendix Table 5. Changes in average intakes of selected vitamins in the United States and South between 1965 and 1977 by age and sex<sup>a</sup>

Age-Sex Group	Vitamin A				Vitamin C			
	Actual Change		Relative Change		Actual Change		Relative Change	
	United States	South	United States	South	United States	South	United States	South
	I.U.		Percent		Milligrams		Percent	
<b>Males and Females</b>								
Under 1	-1039	- 477	-22.8	-10.9	41	47	113.9	151.6
1-2	- 519	- 249	-13.7	- 7.3	23	16	51.1	44.4
3-5	- 266	- 17	- 6.7	- .5	21	28	42.9	66.7
6-8	53	211	1.2	5.4	29	26	51.8	53.1
<b>Males</b>								
9-11	- 700	- 170	-13.5	- 3.8	16	12	23.2	18.2
12-14	- 381	728	- 6.6	13.7	22	21	31.4	32.8
15-18	- 574	334	- 8.8	7.4	37	34	49.3	55.7
19-22	- 485	380	- 8.2	9.2	13	20	17.3	37.7
23-34	-1732	-1108	-24.7	-18.7	22	16	30.1	24.6
35-50	- 690	159	-10.8	2.7	13	17	17.8	25.4
51-64	-1955	342	-22.0	4.9	27	32	36.1	53.3
65-74	1034	1395	17.8	23.0	34	35	51.5	55.6
75 and over	2133	2274	46.8	54.4	41	23	74.5	40.4
<b>Females</b>								
9-11	- 855	- 313	-16.8	- 6.2	28	31	47.5	57.4
12-14	- 684	- 177	-14.4	- 4.2	15	18	22.7	31.6
15-18	- 955	-1153	-18.5	- 5.5	20	37	33.3	74.0
19-22	- 684	- 452	-15.3	-10.5	22	26	38.6	52.0
23-34	- 285	-1431	-22.9	-27.9	20	6	35.7	10.7
35-50	-1046	- 483	-19.7	-10.0	20	21	33.9	41.1
51-64	824	1597	15.8	35.3	30	28	47.6	51.9
65-74	1278	1240	25.9	31.2	35	31	61.4	59.6
75 and over	1631	1203	37.9	27.8	35	27	63.6	62.8

Appendix Table 5 (continued)

Age-Sex Group	Thiamin				Riboflavin			
	Actual Change		Relative Change		Actual Change		Relative Change	
	United States	South	United States	South	United States	South	United States	South
	Milligrams		Percent		Milligrams		Percent	
<b>Males and Females</b>								
Under 1	.21	.20	30.9	31.3	-.20	-.31	-11.6	-17.2
1-2	.09	.07	11.5	9.5	-.24	-.32	-14.4	-20.5
3-5	.14	.20	15.2	24.4	-.11	-.11	-6.5	-7.5
6-8	.23	.19	21.5	19.0	-.03	-.06	-1.6	-3.6
<b>Males</b>								
9-11	.28	.22	22.6	18.5	-.03	.01	-1.4	.5
12-14	.36	.34	26.7	25.2	.04	.06	1.7	2.8
15-18	.26	.19	16.7	12.4	.01	.10	.4	4.7
19-22	-.09	-.04	-5.5	-2.5	-.30	-.17	-12.0	-8.1
23-34	-.04	-.03	-2.5	-1.9	-.27	-.25	-12.0	-12.3
35-50	.05	.12	3.6	8.5	-.10	-.09	-5.1	-4.5
51-64	.05	.02	3.5	1.4	-.17	-.02	-8.3	-1.0
65-74	.23	.25	19.7	21.4	.15	.17	8.8	9.8
75 and over	.32	.34	29.4	30.9	.31	.27	21.8	18.0
<b>Females</b>								
9-11	.33	.31	31.7	30.7	-.02	.06	-1.1	3.6
12-14	.18	.23	16.2	22.1	-.06	.09	-3.7	5.6
15-18	.12	.26	11.2	27.1	-.09	.04	-5.2	2.6
19-22	0	-.16	0	-14.2	-.18	-.18	-11.6	-12.9
23-34	.03	-.07	3.0	-6.8	-.12	-.15	-8.2	-17.5
35-50	.08	.07	8.6	7.4	-.07	-.07	-5.2	-5.3
51-64	.11	.08	11.7	8.2	.05	.08	3.7	5.9
65-74	.23	.24	27.4	28.9	.16	.08	12.8	6.5
75 and over	.17	.13	20.2	15.7	.22	.23	18.6	19.7

<sup>a</sup>Calculated from data in Table 6.

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