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# The Maine Agricultural Experiment Station

ORONO, MAINE

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## Breakfasts of Maine Teen-Agers

Mary M. Clayton

A nutritious breakfast gives the day a good start.



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## BREAKFASTS OF MAINE TEEN-AGERS

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Nutritionist

### INTRODUCTION

"Start the day with a good breakfast" has long been a familiar slogan. In recent years much research has been done on the physiological effects of no breakfast, coffee only, light breakfasts, and heavy breakfasts (14, 12, 13, 5). The general conclusion to be made from these studies seems to be that people feel better and work better after a breakfast containing one-fourth to one-third of their total day's food. A recent study (8, 9) has also shown that it is desirable to have some high quality protein food such as meat, milk, or eggs in the breakfast as well as in the other two meals:

The kind of breakfasts which teen-agers eat depends to some extent on whether or not there is someone in the home who takes the responsibility for preparing the meal. The child who prepares his own breakfast is very apt to have an inadequate meal.

The time available for the meal is also important. It is useless for the mother to prepare a good breakfast if the family does not have time to eat it. Many good breakfasts have been left on the table because the children were afraid of being late to school.

The foods included in a particular child's breakfast are usually a matter of family custom. For example, in many Maine homes any day's breakfast without doughnuts on the table would be very unusual.

The present study was undertaken to determine the nutritive value of the breakfasts of Maine teen-agers and the contribution of the breakfasts to their day's food intake.

### METHOD OF STUDY

The subjects for this study were 27 girls and 30 boys of junior high school age from Bucksport, Newport, and Skowhegan. They were chosen at random from the group of 780 Maine children who took part in the Cooperative Regional Research Project on Nutritional Status in the Northeast which was begun in 1947.†

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\* With the technical assistance of Dorothy U. Turner, Ruth Goff, Elaine Fogler, and Rae West.

† The State Experiment Stations taking part in this study included Maine, Massachusetts, New York, New Jersey, Rhode Island, and West Virginia. The study was financed in part by funds provided under the Research and Marketing Act of 1946.

In the spring of 1949 the children kept records of everything they ate for seven days. The nutritive value of the foods eaten in each meal and between meals was calculated, using Babcock's shortened long method of calculation (1) and the Food Value Tables of the U. S. Public Health Service (16). The average daily total food consumption of each child was compared with the National Research Council's recommended daily allowances for each of nine nutrients (Table 1). Then the percentage contribution of the average breakfast to the average total day's food intake and to the National Research Council's recommended daily allowances was calculated.

TABLE 1

*National Research Council's Recommended Daily Dietary Allowances\* for Children 13-15 Years of Age*

Nutrients	Girls	Boys
Calories, number	2600	3200
Protein, grams	80	85
Calcium, grams	1.3	1.4
Iron, mg.	15	15
Vitamin A, I.U.	5000	5000
Thiamine, mg.	1.3	1.5
Riboflavin, mg.	2.0	2.0
Niacin (Nicotinic Acid), mg.	13	15
Vitamin C (Ascorbic Acid), mg.	80	90
Vitamin D, I.U.	400	400

\* National Research Council Reprint and Circular Series No. 129. October, 1948. National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

The frequency with which various foods were served in the breakfasts of both girls and boys was also studied in relation to the nutritive value of the day's meals. A special study was made of the comparative nutritive value of the breakfast cereals which seemed to be most popular with girls and boys.

Statistical studies were done in order to find out the relationship between the amounts of various nutrients in the breakfast and those in the total day's food. That is, an attempt was made to learn whether children tend to make up during the day any deficiencies in their breakfasts. For example, previous work has shown that the diets of Maine people are apt to be low in vitamin C. Therefore, it was of special interest to find out whether the day's intake of vitamin C was apt to be low if the child's breakfast was low in this vitamin.

Menus for four adequate breakfasts for girls and boys, 13-15 years of age, are included. These supply one-fourth or more of the National Research Council's recommended daily allowances for nine nutrients, as given in Table 1.

FOODS INCLUDED IN THE BREAKFASTS

The foods included in the breakfasts and the relative frequency of their consumption are given in Table 2. The foods which were used most are discussed separately in order to show their influence on the nutritive value of the diets as a whole.

TABLE 2

*Foods Eaten for Breakfast by Maine Teen-Agers*  
(Listed in order of frequency†)

Frequency* Index	Girls (27)	Frequency* Index	Boys (30)
480-489	Milk, fresh	500-509	Milk, fresh
400-409	Bread and toast, all kinds	400-409	Bread and toast, all kinds
370-379	Bread and toast, white	390-399	Cereals, all kinds
350-359	Butter	380-389	Sugar
320-329	Citrus fruit and juice and tomato juice	370-379	White bread and toast
310-319	Citrus fruit and juice	350-359	Butter
250-259	Cereals, all kinds	270-279	Citrus fruit and juice and tomato juice
220-229	Sugar	230-239	Citrus fruit and juice
180-189	Eggs	220-229	Eggs
160-169	Doughnuts	190-199	Doughnuts
150-159	Cocoa		
120-129	Orange juice	130-139	{Coffee {Orange juice
80-89	Grapefruit juice	120-129	Oatmeal
70-79	Oleomargarine	100-109	Cocoa
50-59	Bananas	90-99	Bacon
	Bacon	80-89	Bananas
40-49	Corn flakes	60-69	Shredded wheat
	Jam and jelly		
	Orange, fresh	50-59	{Biscuits {Oleomargarine
30-39	Bread and toast, dark	40-49	{Grapefruit, fresh {Pep
	Cream of Wheat		
	Grapefruit, fresh		
	Oatmeal		
20-29	Beans, baked	30-39	Bread and toast, dark
	Cream		Jam and jelly
	French toast		Maltex
	Pancakes		Postum
	Rice Krispies		Potato
	Rolls		Tomato juice
	Syrup, maple		
	Wheaties		
	Cheerios	20-29	Corn flakes
	Coffee		Grapefruit juice
	Cookies		Milk, evaporated
	Milk, chocolate		Rice Krispies
	Milk, evaporated		Rolls
	Orange and grapefruit juice		Syrup, all kinds
10-19	Pineapple juice		Wheat, puffed
	Prunes, stewed		
	Tangerine juice		Beans, baked
	Tomato juice		Bran, raisin
	Wheatena		Cheerios
	Wheat, puffed	10-19	Cookies
	Wheat, shredded		Cream
			French toast
			Muffins
			Orange, fresh
			Pancakes
			Pineapple juice
			Syrup
			Syrup, maple

\* Frequency Index: Percentage of children who had the food during the week x the number of days on which the food was eaten. An index of 700 would be the highest possible.  
† Foods with a frequency index below 10 are not listed.

### *Milk, Fresh*

Milk was the food mentioned most often in the breakfasts of both girls and boys. This is significant, since milk is the most important source of calcium in the diet and also an important source of high quality protein and vitamins, particularly vitamins A and riboflavin.

### *Bread*

Although a number of different kinds of bread were mentioned in the breakfasts, white bread was used by far the most frequently. Under the present Maine enrichment law all white bread and plain rolls are enriched with iron and vitamins B<sub>1</sub>, riboflavin, and niacin. Since white bread is so popular, the enrichment law has provided for improved nutrition.

### *Butter*

Butter was mentioned a great deal more often than oleomargarine, although it is possible that some of the children did not know which they were eating and put down butter in their food records in place of oleomargarine. Practically all of the children had either butter or oleomargarine on their bread or toast. From the standpoint of nutrition, oleomargarine is as nutritious as butter (6).

### *Cereals*

From Table 2 it will be seen that cereals were eaten more often by the boys than by the girls, but very frequently by both. Most of the children who ate cereal used liberal amounts of milk on it. At the time the food records were kept the favorite cereals for the girls were corn flakes, Cream of Wheat, oatmeal, Rice Krispies, and Wheaties; and for the boys oatmeal, shredded wheat, Pep, Maltex, corn flakes, Rice Krispies, and puffed wheat.

As shown in recent food tables (15) and on the cereal packages, most of the ready prepared cereals are now enriched with iron and vitamins B<sub>1</sub> and niacin. Also, a number of the cereals which require cooking are enriched. Five-minute Cream of Wheat has phosphates added to make it quick cooking. Even though many cereals are now enriched, there is considerable difference in the nutritive value of the various kinds on the market. For example, corn and rice cereals are lower in protein and iron than oats and wheat, and the protein of corn is of poor quality. Corn and oat cereals are comparatively low in niacin.\*

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\* Cream of Wheat is also low, as it is made from the endosperm of the grain.

The popularity of corn flakes with the girls in this study and the general popularity of all kinds of ready prepared cereals calls for a reminder that the protein of puffed and toasted flaked cereals is not as well utilized as that in cereals which are not subjected to such high heat treatment (11, 10, 4, 7). The use of more whole grain home cooked breakfast cereals by Maine school children would add considerably to the nutritive value of their diets. Before buying any breakfast cereal people should always read the label on the package and be sure they are buying a kind which is either whole grain or enriched or both.

### *Sugar*

As shown in Table 2 sugar was used very frequently by both girls and boys. In many cases the amounts added to cereals and drinks seemed excessive. The present tendency to add excessive amounts of sugar to bakery products and in the manufacture of certain ready prepared foods such as cereals, pudding mixes, and cake mixes, calls for a warning that sugar promotes decay of the teeth and decreases the appetite for other more nourishing foods. Parents should guard against the use by children of too much sugar in any form.

### *Citrus Fruit and Juice*

Oranges and grapefruit (including juice) were the fruits most often used by both girls and boys, but were used more frequently by the girls. When citrus fruit or juice was not used in the breakfast, the whole day's diet was very apt to be deficient in vitamin C. This will be discussed more fully later.

### *Eggs*

Eggs were used very frequently by both girls and boys, but somewhat oftener by the boys. Eggs are an important source of high quality protein, vitamin A, riboflavin, and iron, and should be used more often in the breakfasts of Maine school children.

### *Doughnuts*

In the breakfasts of both girls and boys, doughnuts were used almost as often as eggs. To the person who is not accustomed to eating doughnuts, they seem too much like cake to be eaten at breakfast. Moreover, the sweet sticky dough has a tendency to stick to the teeth and may promote decay. However, for many Maine people the morning cup of coffee seems to require a doughnut to go with it.

The present Maine enrichment law does not require that bakery-made doughnuts should be enriched. However, recent tests made by



E. O. Merrill, Assistant Chemist at the Maine Agricultural Experiment Station, show that doughnuts made with enriched flour are somewhat higher in vitamin B<sub>1</sub> and over twice as high in riboflavin and iron as those made with unenriched flour.

### *Cocoa and Coffee*

Cocoa was preferred as a hot drink by the girls, and coffee by the boys. However, many of the boys also drank cocoa. Coffee was used infrequently by the girls. The difference in the nutritive value of the two beverages is chiefly due to the added nutrients of the milk used in the cocoa. The average cup of beverage cocoa contains about one-half a level tablespoon of cocoa powder. This amount of powder contains 4 mg. of calcium, 25 mg. phosphorus, and 0.4 mg. iron, together with small amounts of protein, fat, carbohydrate, and B vitamins (15). These amounts would contribute only slightly to a day's diet. Within recent years considerable research has been done on the effect of cocoa on the utilization of the calcium and protein of milk (3). In the amounts ordinarily eaten, cocoa has not been found detrimental. One cup of cocoa beverage contains approximately 8 mg. caffeine and 125 mg. theobromine. One cup of coffee contains 68 to 101 mg. caffeine (2). Both caffeine and theobromine are stimulants, but theobromine is less stimulating than caffeine. For that reason, and because milk is used in making it, cocoa is a more desirable beverage for children.

### *Bacon*

Bacon was used more by the boys than by the girls, but was not recorded as often as eggs by either. Bacon has an appetizing flavor and the fat content gives staying power to the breakfast. However, the protein content is low considering the price. If food money is scarce, it would be better to buy milk and eggs rather than bacon.

### *Bananas*

Next to citrus fruits, bananas were the fruit used most often in the breakfasts. If 100 calorie servings of bananas and oranges are compared for amounts of various nutrients, the oranges are found to be considerably higher in calcium, phosphorus, vitamin B<sub>1</sub> and vitamin C than the bananas. In order to secure the amount of vitamin C contained in ½ cup of orange juice or 1 small orange it would be necessary to eat 5 medium sized bananas. Bananas are useful in the diet chiefly on account of their flavor, bulk, and energy value.

## NUTRITIVE VALUE OF BREAKFASTS

In order to classify the breakfasts according to their nutritive value, they were divided into groups, according to the percentage of the total day's food intake or the National Research Council's\* recommended daily allowances (Table 1) which they supplied. The results are shown in Tables 3 and 4 and Charts 1 and 2.

TABLE 3

*Percentage of Children Who Received Various Percentages of Their Total Day's Intake of Different Nutrients in Their Breakfasts*

Nutrients	Girls (27)				Boys (30)			
	33.3% or above	25% or above	15.0 to 24.9%	Below 15.0%	33.3% or above	25% or above	15.0 to 24.9%	Below 15.0%
Calories	3.7	14.8	77.8	7.4	0.0	33.3	66.6	0.0
Total protein	3.7	29.6	63.0	7.4	6.7	36.7	63.3	0.0
Calcium	33.3	85.2	7.4	7.4	36.7	70.0	26.7	3.3
Iron	3.7	14.8	59.3	25.9	6.7	20.0	66.7	13.3
Vitamin A	3.7	18.5	25.9	55.6	6.7	10.0	36.7	53.3
Vitamin B <sub>1</sub>	11.1	48.1	48.1	3.7	10.0	70.0	30.0	0.0
Riboflavin	18.5	70.4	25.9	3.7	23.3	66.7	33.3	0.0
Niacin	0.0	7.4	44.4	48.1	3.3	23.3	53.3	23.3
Vitamin C	51.9	63.0	22.2	14.8	46.7	56.7	13.3	30.0

TABLE 4

*Percentage of Children Who Received Various Percentages of the NRC's Recommended Daily Allowances of Different Nutrients in Their Breakfasts*

Nutrients	Girls (27)				Boys (30)			
	33.3% or above	25% or above	15.0 to 24.9%	Below 15.0%	33.3% or above	25% or above	15.0 to 24.9%	Below 15.0%
Calories	3.7	3.7	70.4	25.9	6.7	20.0	63.3	16.7
Total protein	0.0	25.9	51.9	22.2	16.7	33.3	56.7	10.0
Calcium	22.2	44.4	44.4	11.1	20.0	50.0	33.3	16.7
Iron	3.7	3.7	51.9	44.4	16.7	30.0	53.3	16.7
Vitamin A	0.0	11.1	48.1	40.7	6.7	30.0	40.0	30.0
Vitamin B <sub>1</sub>	18.5	44.4	48.1	7.4	26.7	63.3	33.3	3.3
Riboflavin	29.6	66.7	29.6	3.7	40.0	83.3	6.7	10.0
Niacin	0.0	3.7	59.3	37.0	3.3	23.3	46.6	30.0
Vitamin C	40.7	48.1	11.1	40.7	26.7	43.3	20.0	36.7

### *Breakfasts in Relation to the Total Day's Food Intake*

Table 3 shows that less than 10 per cent of the children received  $\frac{1}{3}$  or more of their day's intake of calories, total protein, iron, vitamin A, and niacin in their breakfasts. This indicates that most of the children do not eat heavy breakfasts. However, only one girl and one boy missed any breakfasts during the week. As shown in Table 3 and also in Chart

\* Abbreviated as NRC in the following pages.

1 less than 40 per cent received  $\frac{1}{4}$  or more of their day's intake of calories, total protein, iron, vitamin A, and niacin. The breakfasts of 40 per cent or more of the children did contain  $\frac{1}{4}$  or more of their day's intake of calcium, animal protein, and vitamin B<sub>1</sub>, riboflavin, and C. These nutrients are furnished by milk, enriched bread, cereals, and citrus fruits and juices. As shown in the 5th and 9th columns of Table 3, the breakfasts of the girls were more apt to supply less than 15 per cent of the day's intake of iron and niacin than those of the boys. The boys' breakfasts were more apt to supply less than 15 per cent of the day's intake of vitamin C.

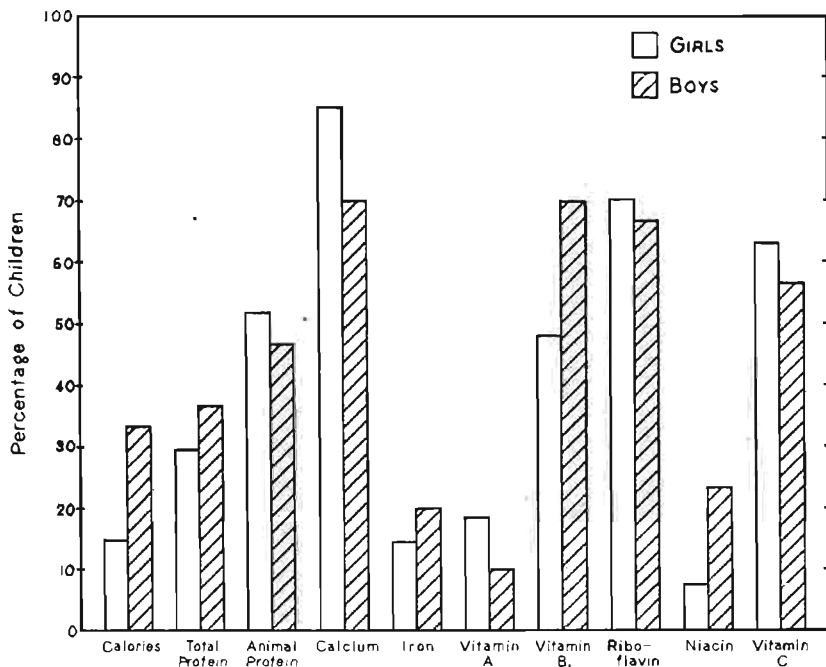


CHART 1  
Percentage of Children Who Received 25 Per Cent or More of Their Total Day's Intake of Different Nutrients in Their Breakfasts

Since it is possible for deficiencies in the breakfast to be made up later in the day, a deficient breakfast does not necessarily indicate that the whole day's diet will be deficient. However, deficiencies in some nutrients are seldom made up later in the day.

By statistical methods the relationship between the amounts of various nutrients in the breakfasts and in the total day's food was studied for both girls and boys. For both girls and boys a close relationship

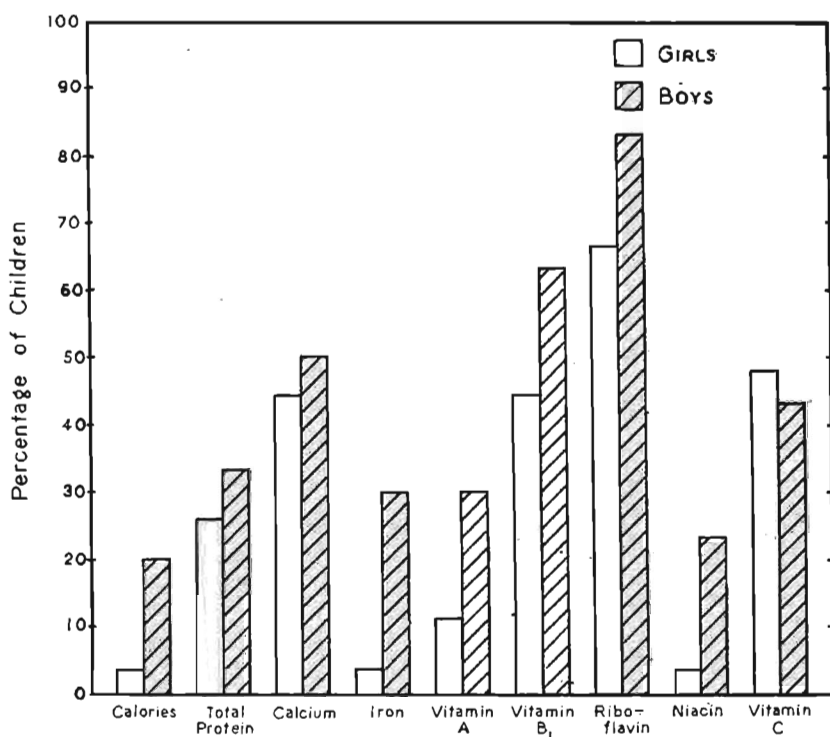


CHART 2

Percentage of Children Who Received 25 Per Cent or More of the NRC's Recommended Daily Allowances of Different Nutrients in Their Breakfasts

was shown for calcium, iron, and vitamins B<sub>1</sub>, riboflavin, and C. For boys a close relationship was also shown for calories and total protein. Apparently, girls tend to make up for breakfast deficiencies in calories and protein later in the day, but boys do not. Both girls and boys tend to make up deficiencies of vitamin A and niacin. That is because foods high in these nutrients are more apt to be eaten at noon or night than in the morning.

#### *Breakfasts in Relation to the NRC Recommended Daily Allowances*

It has generally been assumed that the breakfasts of teen-agers should contain at least 25 per cent of their total food for the day. A comparison of Charts 1 and 2 shows that, on this basis, the breakfasts tended to be more deficient in relation to the NRC recommended daily allowances than they were in relation to the total day's food intake. That is because the recommended allowances provide for a considerable margin

of safety and the daily food intake of many of the children provided less than the recommended amounts of a number of nutrients.

When the individual nutrients supplied in the breakfasts are studied in relation to the recommended daily allowances, statements similar to those in the preceding section can be made.

As shown in Table 4, few of the children ate breakfasts which supplied  $\frac{1}{3}$  or more of the recommended daily allowances of the different nutrients. Less than 40 per cent of the breakfasts supplied  $\frac{1}{4}$  or more of the recommended allowances for calories, total protein, iron, vitamin A, and niacin. One-fourth or more of the recommended amounts of calcium and vitamins B<sub>1</sub>, riboflavin, and C were more apt to be supplied. The breakfasts of the girls were more apt to supply less than 15 per cent of the recommended daily allowances of calories, total protein, iron, vitamin A, and niacin than those of the boys. The percentages of girls and boys whose breakfasts supplied less than 15 per cent of the recommended allowances of vitamin C were about the same. However, in general, the girls' breakfasts tended to be slightly better in respect to vitamin C than those of the boys.

The fact that the NRC recommended daily allowances for iron and vitamin A are the same for the girls as for the boys partly explains why the breakfasts of the girls tend to be more deficient in these nutrients. Since the girls require breakfasts of lower calorie value than the boys, their breakfasts need special planning in order to supply  $\frac{1}{4}$  of the recommended daily amounts of iron and vitamin A. See page 17 for breakfast menus.

### *Importance of Amount and Type of Protein in the Breakfasts*

In recent years considerable research has been done on the physiological effects of breakfasts containing different amounts of protein (14, 12, 13, 5). Also, studies have been made on the utilization of high quality protein, such as milk, when it is served at only two meals or at all three meals (8, 9). The conclusions from this work are that when people eat breakfasts which contain a liberal amount of protein they work better and usually do not get as hungry as when low protein breakfasts are eaten. Also, high quality protein is used better by the body when it is divided into three meals instead of two.

As shown in Table 3 and Chart 1, only 29.6 per cent of the girls and 36.7 per cent of the boys received  $\frac{1}{4}$  or more of their day's intake of total protein in their breakfasts. For both girls and boys the percentage who received  $\frac{1}{4}$  or more of their day's intake of animal protein in their breakfasts was considerably higher (Chart 1). The liberal amounts of

milk used in many of the breakfasts account for the higher percentages of animal protein.

TABLE 5  
*Chief Sources of Protein in Breakfasts*  
*Average Amounts of Protein Supplied by Different Foods*

Approximate Percentages of NRC Recommended Allowances	Protein in Breakfasts gms.	No. of Breakfasts Studied	Girls, Age 13-15									
			Milk gms. pro.	Eggs gms. pro.	Meat gms. pro.	Bacon gms. pro.	Cereals gms. pro.	Breads* gms. pro.	Doughnuts gms. pro.	Pancakes gms. pro.		
20	14.0-17.9	88	8.0	1.4	0.0	.2	1.7	2.7	1.1	.3		
25	18.0-21.9	15	7.0	5.3	.4	.3	1.6	3.3	.5	1.4		
30	22.0-26.9	11	8.4	3.8	1.6	1.2	2.0	3.5	.4	2.0		
Boys, Age 13-15												
20	15.0-18.9	46	7.2	2.0	.2	.5	3.0	2.4	.7	0.0		
25	19.0-22.9	39	8.0	3.1	0.0	.5	3.1	4.4	1.0	0.0		
30	23.0-26.9	10	11.7	4.6	.8	.3	2.2	4.0	.6	0.0		

\* Including French Toast.

### *Chief Sources of Protein in the Breakfasts*

A study was made of the chief sources of protein in three groups of girls' and boys' breakfasts. These groups of breakfasts supplied approximately 20, 25, and 30 per cent of the NRC recommended daily allowances of protein. The results are shown in Table 5. It will be seen that in all breakfasts milk, eggs, breads, and cereals were the chief sources of protein, but doughnuts, pancakes, and meats furnished considerable amounts. Small amounts were also supplied by bacon.

In all three groups of breakfasts, milk supplied the largest amounts of protein. In the girls' 20 per cent group, bread held second place as a source of protein, cereals held third place, and eggs fourth. In the girls' higher percentage groups, eggs held second place, breads third, and cereals fourth. In the boys' 20 per cent group, cereals held second place, breads third, and eggs fourth. In the boys' 25 per cent group, breads held second place and cereals and eggs tied for third place. In the 30 per cent group, eggs held second place, breads third, and cereals fourth. These results show the importance of eggs as a means of increasing protein in the breakfasts.

The breakfasts which contained the lower amounts of protein were more apt to be low in other nutrients (except vitamin C) than those which contained more liberal amounts. The reason for this is that milk and eggs, which are excellent sources of high quality protein, are also good sources of a number of other nutrients.

### MIDMORNING EATING

Differences in the caloric content of the breakfasts caused no noticeable differences in the tendency to eat during the morning. In fact, there was not a great deal of midmorning eating on school days, but more on Saturdays and Sundays. In one school, where candy was sold during the morning, midmorning eating was more frequent. Most of the eating between meals was done after lunch, on the way home from school in the afternoons, and in the evenings at social gatherings. No relationship could be shown between the kind of breakfasts which the children ate and the amount of between meal eating which they did.

### NUTRITIVE VALUE OF DIETS FOR THE WHOLE DAY

In order to classify the diets for the whole day they were divided into groups according to the percentage of the NRC recommended daily allowances which they supplied. The results are shown in Table 6 and Chart 3. In the girls' diets vitamin C, calcium, and iron were the nutrients most apt to be deficient. In the boys' diets vitamin C, calcium, and

calories were especially apt to be low. Considering all nutrients, the girls' diets showed a definite tendency to be lower than the boys' in protein, iron, and vitamin B<sub>1</sub>.

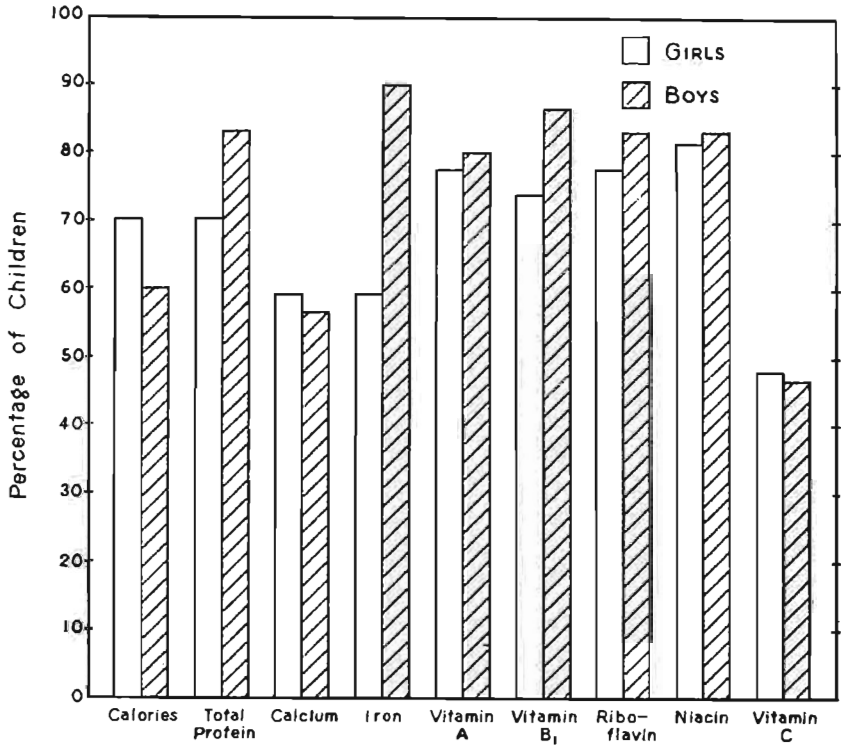


CHART 3

Percentage of Children Who Received 80 Per Cent or More of the NRC's Recommended Daily Allowances of Different Nutrients in Their Total Day's Food

The nutrients which were apt to be deficient in the day's meals are those which could be furnished by using more citrus fruits or juice, eggs, milk, and whole grain or enriched cereals (especially wheat) in the breakfasts. Extra iron could be supplied by cooking raisins with the cereal, and extra niacin by serving peanut butter with toast.



TABLE 6

*Percentage of Children Who Received Various Percentages of the NRC's Recommended Daily Allowances of Different Nutrients in Their Total Day's Food*

Nutrients	Girls (27)				Boys (30)			
	80.0% or more	60.0 to 79.9%	40.0 to 59.9%	Below 40.0%	80.0% or more	60.0 to 79.9%	40.0 to 59.9%	Below 40.0%
Calories	70.4	29.6	0.0	0.0	60.0	23.3	16.7	0.0
Total protein	70.4	29.6	0.0	0.0	83.3	6.7	6.7	3.3
Calcium	59.3	18.5	14.8	7.4	56.7	20.0	16.7	6.7
Iron	59.3	37.0	3.7	0.0	90.0	10.0	0.0	0.0
Vitamin A	77.8	14.8	3.7	3.7	80.0	13.3	3.3	3.3
Vitamin B <sub>1</sub>	74.1	25.9	0.0	0.0	86.7	3.3	10.0	0.0
Riboflavin	77.8	18.5	3.7	0.0	83.3	6.7	6.7	3.3
Niacin	81.5	14.8	3.7	0.0	83.3	6.7	10.0	0.0
Vitamin C	48.1	18.5	14.8	18.5	46.7	23.3	20.0	10.0

## BREAKFAST MENUS FOR TEEN-AGERS

The following breakfast menus for girls and boys, 13-15 years of age, will supply 25 per cent or more of the NRC recommended daily allowances for nine nutrients.

FOOD	AMOUNT PER SERVING	
	GIRL	BOY
1. Orange juice, fresh or frozen*	$\frac{3}{4}$ cup†	$\frac{7}{8}$ cup
Instant Ralston, enriched whole wheat cereal	1 cup after cooking	1 cup after cooking
Milk, whole, on cereal	$\frac{1}{2}$ cup	$\frac{1}{2}$ cup
Light cream, on cereal	3 tablespoons	3 tablespoons
Toast, enriched white bread	2 slices	3 slices
Butter	2 teaspoons	3 teaspoons
Cocoa (made with $\frac{3}{4}$ milk)‡	$\frac{2}{3}$ cup	$\frac{2}{3}$ cup
2. Orange juice, fresh or frozen*	$\frac{3}{4}$ cup	$\frac{7}{8}$ cup
Wheaties, enriched whole wheat flakes	$\frac{7}{8}$ cup	1 cup
Milk, whole, on cereal	$\frac{1}{2}$ cup	$\frac{3}{4}$ cup
Egg, boiled or poached	1 medium	1 medium
Toast, enriched white bread	2 slices	3 slices
Butter	2 teaspoons	3 teaspoons
Cocoa (made with $\frac{3}{4}$ milk)‡	$\frac{2}{3}$ cup	$\frac{2}{3}$ cup
3. Mixed orange and grapefruit juice, fresh or frozen*	$\frac{3}{4}$ cup	$\frac{7}{8}$ cup
Oatmeal	$\frac{1}{2}$ cup	1 cup
Milk, whole, on cereal	$\frac{1}{2}$ cup	$\frac{1}{2}$ cup
Egg, boiled or poached	1 medium	1 medium
Toast, enriched white bread	2 slices	3 slices
Butter	$\frac{1}{2}$ tablespoon	2 teaspoons
Peanut butter	2 teaspoons	$\frac{1}{2}$ tablespoon
Postum (made with $\frac{3}{4}$ milk)‡	$\frac{2}{3}$ cup	$\frac{2}{3}$ cup
4. Tomato juice*	$\frac{7}{8}$ cup	1 cup
Sausage	1 patty (2 in. diam.)	1 patty (2 in. diam.)
Pancakes, made with enriched white flour	2 (4 in. diam.)	4 (4 in. diam.)
Butter	$\frac{1}{2}$ tablespoon	$\frac{3}{4}$ tablespoon
Table syrup	$1\frac{1}{2}$ tablespoons	2 tablespoons
Milk	1 cup	1 cup

\* The amounts of citrus juices given in menus 1, 2, and 3 will supply approximately 90 per cent of the NRC recommended daily allowance of vitamin C. The amounts of tomato juice given in menu 4 will supply approximately 50 per cent.

† Standard measuring cup used for all measurements of cups.

‡ Cocoa or postum may be replaced by the same amounts of milk. This substitution would slightly increase several nutrients in the breakfasts.

In planning the above breakfast menus it was found to be difficult to supply 25 per cent of the recommended daily allowances of vitamin A and niacin without using butter or fortified oleomargarine, cream, eggs, or tomato juice for vitamin A, and meat or peanut butter for niacin. However, when breakfasts fail to furnish sufficient amounts of these nutrients they can be supplied later in the day.

### SUMMARY

A study of the breakfasts of 27 teen-age girls and 30 boys indicates the following:

1. The foods eaten most often for breakfast were: milk, bread and toast, butter, citrus fruits and juice, cereals, sugar, eggs, doughnuts, cocoa (girls), coffee (boys), bananas, and bacon.
2. In relation to the total day's food intake the breakfasts were more apt to be low in calories, protein, iron, vitamin A, and niacin than in calcium and vitamins B<sub>1</sub>, riboflavin, and C.

The nutrients most liberally supplied were those furnished by milk, enriched bread, cereals, and citrus fruits and juices.

The girls' breakfasts were more apt to be very low in iron and niacin than those of the boys. The boys' breakfasts were more apt to be very low in vitamin C.

3. In relation to the NRC recommended daily allowances the breakfasts were apt to be low in calories, protein, iron, vitamin A, and niacin. The breakfasts of the girls were more apt to be very low in these nutrients than the boys.

Approximately 40 per cent of both girls and boys had less than 15 per cent of the NRC recommended daily allowances for vitamin C in their breakfasts.

4. In relation to the NRC recommended daily allowances the girls' diets as a whole were especially apt to be low in vitamin C, calcium, and iron: the boys' diets were especially apt to be low in vitamin C, calcium, and calories. Considering all nutrients the girls' diets showed a tendency to be lower than the boys' in protein, iron, and vitamins B<sub>1</sub> and riboflavin.

### CONCLUSIONS

1. The eating of inadequate breakfasts by teen-agers tends to result in deficiencies in their food intake for the day.
2. Improvement of the breakfasts of low nutritive value by the use of more citrus fruits and juices, eggs, milk, and whole grain and enriched cereals would do a great deal to improve the diets as a whole.

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