

# Changing Adolescent Eating Patterns with Implications for Dietary Data Collection and Nutrient Database Selection

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Today I'm going to review some of the apparent changes in adolescent eating patterns that are emerging from our comparison of two nutritional studies that have been conducted at Berkeley over the past ten years. I will review two studies: the Berkeley Longitudinal Nutrition and Growth Study (BLNS) and the NHLBI Growth & Health Study (NGHS). I will discuss changing eating patterns, changing food consumption, and current practices/beliefs regarding food. I will summarize the above findings in terms of implications for database selection.

The first study that I'll be using as a basis for discussion is the Berkeley Longitudinal Nutrition Study, which began in 1969 with a cohort of 448 boys and girls aged 6 months.

## **BLNS (1969 - 1985)**

BLNS was a 16 year longitudinal study of 228 boys and 220 girls, aged 6 months at enrollment. The study objective was to identify the environmental factors associated with obesity and to assess obesity changes throughout childhood.

The study information included demographic and household information, medical history, health habits, clinical and anthropometric measurements, body composition data, dietary information, physical activity information, biochemical determinations, and psychosocial information. For today's discussion of adolescent eating patterns I will use a portion of the cohort (n = 175) at age 14.

## **NGHS (1987 - present)**

The second study is the NHLBI Growth and Health Study (NGHS), a multicenter study of 2,379 black and white, 9 and 10 year old girls begun in 1987 and presently being conducted at four centers: University of California at Berkeley; Children's Hospital Medical Center, Cincinnati; Westat, Washington, D.C., and Maryland Medical Research Institute, Baltimore (three clinical sites and one coordinating center, respectively).

The study objective is to determine whether black/white differences in the development of obesity and other cardiovascular disease risk factors can be explained by differences in dietary habits, patterns of physical activity, socioeconomic status, or psychosocial factors.

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The NGHS information obtained at six ages is very similar to the BLNS data: demographic and household information, medical history, health habits, clinical and anthropometric measurements, body composition, dietary information, physical activity information, biochemical determinations, and psychosocial information.

### **Comparative Sample and Method of Comparison**

From these two studies I selected 102 girls, with the following comparable values for sex, race, geographic area, and family income: Age: 14 years; Sex: female; Race: white; Geographic area: San Francisco Bay Area; Family income: middle to upper income. The samples selected from each study are not similar for number of years in study (BLNS, 14 years studied; NGHS, 5 years studied); or for study year (BLNS, 1983; NGHS, 1991).

I should emphasize here that this comparative sample is not representative of the larger cohort because it is based on a single strata from each study, which is neither random nor representative of the larger studies. The methodologies for assessing eating patterns within the two studies were the same. Two types of eating pattern data were used for this comparison:

- 1) Food intake data from a 3-day record, which includes time and place of eating occurrence, with a particular focus on pattern of eating and foods, rather than on nutrient intake.
- 2) Self-reported nutrition practices, attitudes, and beliefs; with answers to such questions as "Do you usually eat breakfast?"

One of the ways to examine shifts in eating pattern is to study eating occurrence. However, our traditional way of describing eating occurrence is in terms of meals and snacks. These terms are subjective, culture-bound, and dependent on many other variables including age and education of respondent. Meals and snacks are traditionally defined in terms of time of day; type of food; amount of food; and other more sociological variables such as number of persons, setting, etc.

Thus an objective meal/snack definition was developed as a communication tool for nutritionists in order to describe whether a given eating occurrence contributed nutritionally to the diet. One could reasonably argue the terms of any definition, but for this comparison, let us say that a "meal" is defined as an eating occurrence consisting of two or more of the four food groups for children, from either a combination dish or from multiple food items. In order for a food item to be counted for a meal, at least a half of a standard serving must have been consumed. Meals are also defined by time: "breakfast" if the meal was eaten before 11 a.m.; "lunch," if between 11 a.m. and 3:39 p.m.; and "dinner" if after 4 p.m. All other eating occurrences which do not meet the definition of foods from two food groups are considered "snacks."

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Now using this definition on all eating occurrences recorded on the three-day records from both the BLNS study and the NGHS study, one can begin to see differences.

### Findings

In the BLNS study, 31% of the participants had one of the three most common eating patterns for weekdays; while only 18% followed one of the three most common weekday patterns in the NGHS study. We found a much wider variety of eating patterns in the later study. We began to see a trend toward morning snacks replacing breakfast. Even though the subject might have reported having eaten breakfast, we saw a changing food composition of meals and a changing definition of meal and snack. We found that the number of eating occurrences per day has decreased in the last eight years, as has the average number of meals. Frequency of snacking occurrences stayed about the same, over the years, averaging about two a day.

The area of greatest change is in the weekday eating pattern. Forty percent of the NGHS participants reported no weekday breakfast, as compared with only 16% of the BLNS participants. Twenty-seven percent of the NGHS girls did not routinely eat weekday dinner, while only 6% of the BLNS girls fell into this category. The differences in eating pattern were less dramatic on the weekend days, with an average of 2.2 meals for NGHS as compared with 2.5 for BLNS. With respect to total eating occurrences, average number of NGHS occurrences were lower as well.

Now looking more closely at foods within the diets of BLNS and NGHS girls, we can see two major differences. First, as HANES data have indicated, fruit and vegetable consumption is lower than expected for all age groups and considerably lower than the recommendation of five servings per day from the "Five a Day" campaign. In this comparative study the mean number of servings of fruits and vegetables decreased from 2.9 in 1983 (BLNS) to 1.6 in 1991 (NGHS). It must be noted that these figures are conservative and do not include french fries, or vegetable sauces such as tomato sauce.

Almost a decade ago, only 8% of the BLNS participants reported no servings of fruit and vegetables, as compared with the current figure of 20% of the NGHS participants. Among the BLNS participants, 11% had no fruit and 17% had no vegetables; among NGHS participants, 25% had no fruit and 29% had no vegetables. It is also of interest that 64% of the BLNS girls had three or more servings of fruit or vegetables, while only 20% of the NGHS girls had three or more servings per day.

Information on fruit and vegetable consumption obtained from food records is lower than that reported on a questionnaire of nutrition patterns. Sixty percent of NGHS girls reported usually or always eating vegetables. The conflicting information

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appears to be an issue of perception and serves to remind nutrition professionals of the importance of validating assessment tools.

The second area of notable change between the two studies is in the variety of entrees that were eaten for dinner. Seven kinds of entrees are eaten most frequently: Mexican food, chicken, hamburger, pasta dishes (including macaroni and cheese and spaghetti), pizza, beef (in any form other than hamburger), and hot dogs (including sausage). In 1983, 64% of the dinner entrees fell within one of these seven categories. In 1991, 84% of the entrees fell into one of these seven categories. Thus the variety of entrees being consumed has decreased. Almost all categories increased over the eight-year period.

In the earlier study girls were more likely to record dishes not belonging to one of the major categories such as lamb, sushi, fish sticks, salmon, ham, veal parmesan, shrimp salad, soup, chef salad, chow mein, or casseroles. Furthermore, in the later study more of the entrees were from fast food restaurants, or were pre-prepared, frozen, or canned, thus contributing to the decreased variety. Remembering that the NGHS girls represent only a portion of one strata from the total NGHS cohort, I would like to share with you some of their answers to nutrition pattern questions because I think the answers point to a changing adolescent life style.

Ninety-four percent of the NGHS girls in this sample said that they sometimes, usually, or always help choose the food purchased for the family. Twenty-one percent of the girls reported that they fix the food they eat most of the time. Twenty-nine percent of these girls reported that they never, or only sometimes, eat with their parent and that dinner is the meal most often eaten with family. Thus we are seeing greater individualization of eating patterns within the family.

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### Summary

In summary, a comparison of girls in two longitudinal nutrition studies eight years apart indicates changes in adolescent eating patterns. These changing adolescent eating patterns impact the way we collect dietary information and the basis upon which we select a default system and a database. The summary of changes and impacts follows.

### Summary of Changing Adolescent Eating Patterns

<u>Characteristic:</u>	<u>Impact</u>
Increased variability in eating patterns, including more non-traditional patterns.	Interview technique (Interviewer must be aware of the dietary data collection method.)
Individualization of eating pattern within family. Adolescents often buy and fix their own food and may not eat with parents.	Interview technique (Interviewer must be aware of the dietary data collection method)
Changing composition and definition of eating occurrences. Adolescent may say she ate a meal, but using nutritional criteria it would be called a snack.	Interview technique (Interviewer must be aware of meal/snack perceptions.)
Decreased knowledge of food measurement technique as a result of less cooking and more pre-measured foods.	Default system (Default system is critically important. Sometimes adolescents are unable to conceptualize measurement.)
Increased consumption of prepackaged foods leading to quantification reporting patterns.	Database (Coding ease is enhanced by having flexibility to enter portion size in terms of packages, bags, boxes, cartons, etc.)
Increased consumption of "commerciogenic" foods and fast foods	Database (Database updates must be current particularly for fast foods and snack food items.)
Decreased variety of foods in the diet coupled with increased number of varieties of each food (both in terms of ingredients and sizes, e.g., lite, low salt, low fat; as well as mini, small, and individual sizes)	Database (Database must have increased number of options per food item, but number of food items in adolescent diet is fewer.)