TRENDS IN SCHOOL BREAKFAST AND LUNCH PARTICIPATION: 1979 AND 1983

by

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INTRODUCTION

An original intent of the United States Congress, in passage of the National School Lunch Act of 1946, was the safeguarding of the health and well-being of the nation's children (1). The School Breakfast Program was initiated on a pilot basis in 1966 to extend, expand, and strengthen efforts to meet more effectively the nutritional needs of children (2). Legislation was enacted in 1975 to establish the breakfast program permanently (3). The school breakfast, lunch, and other child nutrition programs are administered, at the national level, by the Food and Nutrition Service of the United States Department of Agriculture (USDA/FNS).

Numerous studies have been published that establish the positive contribution made by school feeding programs to the nutrient intake of participants (4-18). Federal support of child nutrition programs, thus, has been viewed as a long-term investment in public health (19).

In the early 1980s, a faltering economy and growing national debt prompted enactment of Omnibus Reconciliation legislation. As part of the efforts to curb federal spending, child nutrition programs were included in budget cutbacks. A large decrease in program participation was expected due to reduced federal reimbursements, tightening of eligibility status for free and reduced-price lunches, and increases in meal prices (20, 21).

Although not as large a decline as anticipated occurred, Hiemstra (21) reported a drop in participation of 11% for the National School Lunch Program and 13% for the School Breakfast Program between 1981 and 1982. Reduction of federal subsidization of the paying child has had the effect

of targeting benefits to the economically neediest children. Research indicates, however, that nutritional need is not synonymous with economic need (22).

The National Evaluation of School Nutrition Programs (NESNP) report (16), published in 1983, concurred that alteration of major policies to control costs can have different and not immediately apparent effects on distribution of benefits to various subpopulations of participants. Hiemstra (23) emphasized that difficulties in projecting costs and participation may be related to non-economic variables affecting program participation, changes in program design, or lack of sufficient historical data. He advocated further research to determine participation frequency, which in turn will aid clarification of factors affecting participation.

Vaden (24) contended that the future success of child nutrition programs lies in the ability to demonstrate efficient, effective use of public funds and to respond to the needs and desires of participants. Grant and Minnick (25) also stated that new attitudes toward government responsibility in the school lunch program necessitate research on the impact of abrupt subsidy reductions on individual school districts in order to react effectively in the best interests of quality nutrition and sound program management. Vaden (26) further commented that continued evaluation and analyses are necessary to determine the impact of current administrative proposals, which request decreased funding, deregulation, and transfer of programs from federal to state control.

In 1979, a study assessing factors affecting participation in child nutrition programs in the four most populous states in the USDA/FNS Mountain Plains Region, Colorado, Iowa, Kansas, and Missouri, was conducted by Keyser et al. (27). Because of the significant legislative changes

since 1980, and the resultant impact on program participation, this study was an extension of Keyser's research, providing an updated data base and longitudinal analysis of the effects of recent legislation.

Schools in the four-state region in the Keyser study were asked to participate in the 1983 study to permit examination of changes in the same sample of schools. In the previous study, the schools had been selected randomly from a stratified (elementary and secondary) listing of schools in the four states. Child nutrition program participation data were collected from school lunch and breakfast records for October 1983, since the Keyser study also used October data on the recommendation of USDA program officials (27). Specific objectives of the study were:

(a) to study 1983 participation rates in the school lunch and breakfast programs in selected schools in the four-state region in relation to a number of selected variables (price, extent of bussing, location and size of school, percentage of free and reduced-price meals served, and several variables that measure program quality);

(b) to determine the alternatives to the National School Lunch Program that are available to students in these schools;

(c) to examine data on school facilities and institutional arrangements being used in school foodservice programs;

(d) to study activities and functions identified as components of school foodservice program quality; and

(e) to compare data reported in 1979 with those collected in 1983 to permit examination of changes during this period.

REVIEW OF LITERATURE

Historical Background of School Feeding Programs

European Influence

Spanning almost two centuries, school feeding developed as an outgrowth of the Industrial Revolution and French social philosophy (28). Recognition of the lack of educational benefit received by children in malnourished states prompted initiation of school feeding efforts (29). School attendance itself necessitated provision of meals. The advent of the single-session school day prevented many students from returning home for the noon meal, and often employment of the mother resulted in absence of an adequate luncheon for those who could return (30).

The first recorded service of school meals occurred in Munich, Germany in 1790. As part of an international attack upon vagrancy, Benjamin Thompson opened municipal soup kitchens for both unemployed adults and hungry school children (30, 31). In France, a surplus in the National Guard treasury in Paris was utilized in 1849 to educate and feed impoverished children. Funding for these *Cantines Scolaires* was made mandatory throughout France by 1882 (30). Children who could afford to do so purchased meal tickets in amounts equal to food cost. Needy children were given identical tickets to protect their anonymity (32).

English involvement in school feeding began when a cobbler, John Pounds, provided both basic education and a meal of hot potatoes and roasted apples for local children in the early nineteenth century (33). Victor Hugo, exiled to Guernsey from his native France, offered hot meals

to neighborhood children in the 1860s. Hugo's example provided impetus for formation of The Destitute Children's Dinner Society in London, which by 1869 had established 58 dining rooms (30, 33). Other charitable groups organized programs, such as the London School Dinner Association in 1889 (33). Lack of physical fitness among 60% of the recruits during the 1902 Boer War effort aroused national concern, resulting in passage of the Provision of Meals Act in 1906 (31). This legislation authorized public funding of school lunches and transferred school feeding from over 300 charitable societies to education authorities (30-32).

The first country to adopt specific national legislation for provision of school lunches was Holland in 1900. A Royal Decree mandated that food and clothing be provided to children needing both for school attendance. A similar program was adopted by Switzerland in 1903, with appropriation of state funds following in 1906 (32). School feeding programs had been established in Austria, Belgium, Denmark, Finland, Italy, Norway, Sweden, Spain, and Russia by the early 1900s (28, 30).

Beginnings of School Feeding in America

Long after the experimental period in Europe was over, school feeding still was considered a "startling innovation" in the United States (30). According to Bard (34), American attempts at school feeding still had not approached the success of several European nations as far as financial support, participation rate, and adequacy of facilities. Charitable associations supported pioneer efforts in several metropolitan areas, beginning with free lunches served to vocational school students by The Children's Aid Society in New York in 1853 (30, 35). Significant public school feeding did not begin in New York until 1908, however, when a trial

program comparing weight gains of children eating school lunch with a control group was conducted. Greater gains occurred in the lunch group, lending credibility to the benefit of school feeding (30, 32).

In Philadelphia in 1894, the Starr Center Association implemented low-cost meals called penny lunches. In 1909 Cheesman Herrick, principal of a newly founded high school for girls, succeeded in transferring responsibility for both operation and funding of school lunches from benevolent groups to Philadelphia's school board (32). Dr. Herrick required that lunch service be directed by a home economics graduate and meal planning be based on sound nutritional principles (30). By 1915, a Department of High School Lunches had been established to supervise both lower and upper grade lunch programs (31). Another pioneer city was Boston, where by 1910 2,000 elementary students were being served daily in a pilot program begun by home economists. Improved scholastic performance and increased attention span were noted by teachers (36).

Support for public school feeding mounted when malnutrition was identified in numerous World War I draftees (29). Throughout the 1920s, school lunch programs were continued by civic and school organizations, school boards, and philanthropists (32).

Following the stock market crash of 1929 and the ensuing economic depression of the 1930s, federal financial aid to school feeding programs was initiated (37). In 1932, federal loan assistance was first granted by the Reconstruction Finance Corporation to offset labor costs in several Missouri towns. Such assistance had expanded to 39 states by 1934, under the direction of the Civil Works Administration and Federal Emergency Relief Administration. In addition, formation of both the Works Progress

Administration (WPA) and National Youth Administration (NYA) in 1935 provided a labor source for school foodservices (32).

Huge agricultural surpluses led Congress to pass legislation in 1935 that authorized purchase and distribution of excess farm commodities to school lunch programs (37, 38). Participation increased steadily until the demands of World War II eradicated most farm surpluses. The WPA labor force was eliminated as defense industries grew as well. As a result, Congress amended the Agricultural Act of 1935 in July 1943, allowing interim cash subsidies for the purchase of food for school lunch programs (32).

Federally subsidized milk distribution programs were begun in selected Chicago and New York schools in 1940. Milk was provided for one cent per half-pint for pupils who could afford it, and was given free to those who could not. The program enjoyed continued expansion as a separate entity until 1943, when it was made part of the school lunch program, and thus became eligible for cash reimbursements (32). These cash payments continued until the enactment of permanent legislation in 1946 (35).

Child Nutrition Legislation

National School Lunch Act

In 1941, United States Surgeon General Thomas Parran contended America was "wasting money trying to educate children with half-starved bodies" (34). His remark, coupled with rejection of one-third of World War II draftees due to nutritional deficiencies (35), focused national attention upon the relationship between health and proper diet. Congressional testimony by Selective Service Director Lewis Hershey

revealed an estimated 155,000 United States casualties related to malnutrition, and further spurred legislative action (37). The National School Lunch Program (NSLP) thus was permanently authorized by passage of the National School Lunch Act, PL 79-396, in 1946 (16).

Envisioned as a national security measure, the National School Lunch Act had as dual objectives safeguarding the health and well-being of the nation's children and encouraging domestic consumption of nutritious agricultural commodities (1). The Act provided for a nutrition program for all children, recognizing that socioeconomic status is not the sole determinant of nutriture. Furthermore, tested nutritional research was to be the foundation of the school lunch program; meals offered were planned to meet one-third of the elementary school child's Recommended Dietary Allowances (RDAs) (39). Nutrition education also had been recognized as an important element in promoting health (29). Jurisdictional controversy over responsibility for such instruction, however, delayed Congressional appropriations for nutrition education and training until the late 1970s (39).

Participating schools were required to operate nonprofit programs, meet established nutritional guidelines, and offer free or reduced-price lunches for economically deprived students (40) to qualify for federal cash and/or commodity assistance. According to Congressional intent, this assistance was to be supplemental only, encouraging the states to assume increased financial and administrative responsibility for school lunch program operation (41). The NSLP thus was established as a joint venture of the federal government, state government, local communities, schools, children, and their parents (42).

The Interim Years: 1946-1966

Although school feeding remained structurally static for the next 20 years (39), broadening and expansion of the NSLP did occur (42). In 1954, the Special Milk Program (SMP) was established to promote increased milk consumption by children in nonprofit schools (43). Milk purchased by students was subsidized in excess of the number of pints served as a part of the school lunch (44). A 1956 Agricultural Marketing Service survey of St. Louis schools indicated an average daily milk consumption increase of 50% in elementary schools after initiation of the Special Milk Program. Milk consumption among high school students doubled. Findings from a survey of Los Angeles schools concurred with those in the St. Louis study (31), pointing to the early success of the program.

A major amendment to the National School Lunch Act in 1962, PL 87-823 (45), sought to correct funding inequities by basing apportionments on the participation and assistance need rates of each state. In addition, special assistance was authorized via cash reimbursements for free or reduced-price meals. Actual appropriation of funds did not occur, however, until fiscal year 1966 (32). National School Lunch Week, to be observed annually each October and accompanied by presidental proclamation, also was established in 1962 by a joint Congressional resolution (46).

Under Title 1 of the Elementary and Secondary Education Act (ESEA) of 1965, PL 89-10, funds were provided to equalize educational opportunities in areas with concentration of children from low-income families (34, 47, 48). Many school districts utilized portions of Title 1 funds to provide meals for needy children and to establish school lunchrooms where none existed (20, 34). The U.S. Department of Health, Education and Welfare (now, the Department of Health and Human Services) later ruled that ESEA

monies could not be used for school nutrition programs, and requested that additional appropriations be legislated to provide meals for needy children (20).

Child Nutrition Act of 1966

Public awareness of the nutritional needs of children increased in the early 1960s, leading to the development of a more comprehensive school feeding program with passage of the Child Nutrition Act of 1966 (39). This statute initiated pilot breakfast programs, with first consideration given to schools drawing attendance from areas of economic need and to which children traveled long distances (47, 49). The Child Nutrition Act also authorized grants-in-aid for foodservice equipment in economically depressed areas, extended child nutrition programs to preschoolers, and established a special supplemental food program for pregnant women, infants, and young children at nutritional risk. Another provision of the Act was the centralization of administration of federal child nutrition programs within the United States Department of Agriculture (2).

Hunger: A National Concern

Mounting national concern over the existence of hunger in the United States peaked in the late 1960s, leading to a series of amendments to the National School Lunch and Child Nutrition Acts (24). Findings from a NSLP study conducted by the Committee on School Lunch Participation were reported in the 1968 publication Their Daily Bread (47). Major problems identified were:

(a) inadequate financing of the NSLP on the federal level;

(b) absence of an appropriate formula for state and local financing of the school lunch program;

(c) lack of uniformity in determining eligibility for free or reduced-price meals;

(d) nonparticipation of older schools in the NSLP due to absence of kitchen or cafeteria facilities; and

(e) identification of students receiving free or reduced-price lunches by paying students, resulting in embarrassment and decreased participation of needy children.

Other groups succeeded in focusing national attention on poverty in 1968. In Hunger USA, a report by the Citizens' Board of Inquiry into Hunger and Malnutrition in the United States, 280 counties were identified as requiring emergency aid due to hunger. A television documentary aired by CBS, entitled "Hunger in America," brought awareness of the existence of poverty to the average American (44). Bard's critical essay (34) of the school lunch program, published that same year, stated that America's school cafeterias were "starved for facilities, and starved for funds to serve the proper food in the right amount to children who need it, sometimes desperately." As a result of public reaction to hunger issues, the Senate Select Committee on Nutrition and Human Needs was created to investigate further nutritional problems of national scope (24).

Major Legislative Amendments: 1968-1978

1968. In 1968, Congress enacted PL 90-302, which amended the National School Lunch Act to continue the School Breakfast Program (SBP) through fiscal year 1971. Participation eligibility was extended to include children in private nonprofit or public institutions providing non-residential child care (50). Funds also were authorized for qualifying summer feeding programs (44).

1969. Under a 1969 presidential directive, the Food and Nutrition Service (FNS) was created as an agency in the USDA to administrate federal

food programs (32). Additional stimulus for program expansion was provided by both the Poor People's March on Washington, and recommendations of the 1969 White House Conference on Food, Nutrition, and Health (32, 39).

1970. Landmark legislation passed in May, 1970 expanded and improved child nutrition programs (51). PL 91-248 standardized eligibility requirements for free and reduced-price lunches (52). Poverty guidelines, used by the Census Bureau and adjusted for household size, comprised the basis for determining family income eligibility. First priority for free meals was given to children with greatest need (51, 53). Accordingly, schools were required to protect the anonymity of children receiving free or reduced-price meals (54). The National Advisory Council on Child Nutrition was formed and given authority to conduct a continuing study of child nutrition programs for the purpose of program improvement (55). Nutritional training for school foodservice workers and nutrition education for participants was encouraged and funds appropriated (54).

1971. Permanent funding for the SMP was legislated in 1971 by PL 91-295 (56). Congressional effort to assure that every needy child received lunch resulted in enactment of PL 92-153 (57), which guaranteed levels of reimbursement for free and reduced-price lunches.

1972. The States were given the option of extending free lunch eligibility up to 125% of the poverty guidelines under legislation passed in 1972. Reduced-prices could not be granted above 150% of the guidelines (53). PL 92-433 (58) also expanded the SBP to encompass all public and nonprofit private schools.

1973. Under the Agriculture and Consumer Protection Act, the USDA was authorized to purchase, without constraint of surplus or price-support levels, sufficient amounts of commodities for domestic food assistance programs (53, 59). PL 93-150 (60) increased federal reimbursement rates from eight to ten cents per lunch. Special assistance reimbursement rates were set at 45 cents for free lunches and 35 cents for reduced-price. This amendment also required that reimbursement rates be adjusted semi-annually to reflect changes in the Food Away from Home series of the Consumer Price Index (53). In addition, the ceiling on reduced-price lunch eligibility was increased from 125 to 150% of the poverty guidelines. Eligibility to receive free milk also was extended to children eligible for free lunches.

In 1973, the USDA approved lunch service of skim, lowfat, cultured buttermilk, and flavored milk, in addition to unflavored whole milk. Rationale for these changes included concern over the effect of increased intake of saturated fat, a desire for greater foodservice flexibility, and the potential of increasing program participation by offering a variety of milk products (61, 62).

1974. Commodity assistance was set at 10 cents per lunch. This level was subject to annual adjustment, based upon changes in the Consumer Price Index (53, 63).

1975. Program changes after 1974 were directed at increasing participation, especially of needy children (64). With enactment of PL 94-105 (3), offering of reduced-priced lunches was no longer optional, and the eligibility upper limit was raised to 195% of income poverty guidelines. The definition of school was broadened to encompass licensed public or nonprofit private residential child care institutions, thus

permitting NSLP participation by such facilities as orphanages and homes for the mentally retarded.

Permanent authorization for the SBP was granted and information campaigns designed to increase awareness of the availability of the program were required (65). As part of an effort to reduce plate waste, the "offer versus serve" option was mandated for senior high schools. Students, now allowed to select as few as three of the five Type A lunch components, could refuse items they did not intend to eat. Pricing remained the same, regardless of whether a complete or partial meal was selected (65, 66).

1977. Citing lack of understanding of the relationship between good nutrition and health as reason for refusal of nutritious foods and resultant plate waste, Congress authorized the Secretary of Agriculture to provide nutrition information and education as part of foodservice programs for children (24, 67). The offer versus serve option was expanded to include junior high students, where approved by local authorities, and the maximum reimbursement for free and reduced-price breakfasts was increased for schools categorized as in "severe need" (67). In addition, the Secretary of Agriculture was given authority to regulate the sale of competitive foods. Competitive foods were defined as those of minimal nutritional value, i.e., containing less than 5% of the U.S. RDAs for protein, vitamin A, ascorbic acid, niacin, riboflavin, thiamin, calcium, and iron per 100 calories and per serving. The USDA prohibited sale of carbonated beverages, water ices not made with fruit or fruit juice, chewing gum, and certain candies during meal service. Later the sale of these foods was restricted from midnight to the last lunch period of the day (68).

PL 95-166 also gave the USDA authority to conduct a pilot program testing cash in lieu of commodities. Eight school districts, including both urban and rural areas, were to be selected. One state receiving commodity assistance was to be compared to Kansas, which had been operating with cash assistance since 1975. The only state receiving cash in lieu of commodities, Kansas had dismantled its commodity distribution facilities in 1973 when the USDA announced plans to discontinue commodity support (69-71).

1978. PL 95-627 (72) expanded nonprofit foodservice programs in institutions providing childcare. Also authorized was a study to determine the cost and feasibility of mandating offering menu item choices within the required meal pattern. Data from this study were to form the basis for regulations to diminish waste.

1979. Following field testing of meal pattern changes originally proposed in 1977, the USDA introduced interim regulations in 1979 (44, 73). The "Type A" terminology, a term from the days when the NSLP included three meal patterns, was eliminated. Meal requirements were retitled "school lunch meal pattern." School foodservices were encouraged to offer portion sizes tailored to meet the nutritional needs of five age groups. Guidelines specifying minimum quantities appropriate for each group were provided (73). Federal reimbursement required provision of four components in school lunches: meat or meat alternate, fruit and/or vegetable, bread or bread alternate, and milk. Meal pattern changes demonstrated efforts to combat hunger and malnutrition, increase program participation, reduce food waste, cut costs, increase flexibility, and promote the role of diet in maintaining health and preventing disease (64).

Service of unflavored lowfat or skim milk or buttermilk was no longer optional. Programs designed to promote parental and student involvement in school foodservice also were required (74). Final regulations, published in 1980, allowed service of two small meals to fulfill meal pattern requirements for children one to five years of age (75, 76).

The 1980s: Omnibus Reconciliation Legislation

A dramatic change in public sentiment occurred in the late 1970s as the growth of government and federal spending became major concerns. Commitment to the goals of tax reduction through program cuts and increased state controls has made the heavily funded child nutrition programs targets of Congressional action (26). Lachance (40) stated: "The child must be viewed as a human resource crucial to the nation, and the health of all citizens should be of utmost concern since the productivity of the nation is related to the productivity of its people." The burden has been placed upon the programs, however, to prove efficient and effective use of public funds in responding to the needs and desires of recipients (24).

Major reconciliation legislation of the 1980s forced Congress to approve appropriations within specified limits. Child nutrition programs, previously classified as educational, were designated as income maintenance programs as a result (77). A combination of legislative changes and reductions in funding thus curtailed further expansion of child feeding programs; appropriations were cut two billion dollars during 1981 and 1982 (78).

Omnibus Reconciliation Act of 1980. PL 96-499 required the first substantial reductions in federal assistance for child nutrition programs in U.S. history. Budget cuts of one-half billion dollars were approved

for fiscal year 1981 (79). The March update of poverty guidelines, adjusting for inflation, was eliminated for one year, thus reducing eligibility for free and reduced-price lunches. As a means of softening the impact of this mandate, a standard monthly deduction of $80 was provided (53). Basic meal subsidy was decreased by 2.5 cents in schools serving less than 60% of meals at free or reduced-price levels. Meal reimbursement adjustment was changed from a semi-annual to annual schedule until July, 1983. Commodity assistance also was reduced two cents per meal (80). Changes not limited to fiscal year 1981 included:

(a) prohibition of commodity assistance for the school breakfast program;

(b) reduction of school foodservice equipment assistance to $15 million annually;

(c) limitation of the reimbursement rate for milk to five cents per half pint, where other child feeding programs exist; and

(d) reduction of nutrition education funding to $15 million annually (80).

Omnibus Reconciliation Act of 1981. Federal spending reductions under PL 97-35 (81) contained reforms designed to aid economic recovery. Two measures that were to expire in 1981 were made permanent. The March update of the income poverty guidelines was dropped permanently, and meal reimbursement adjustment, scheduled to return to semi-annual status in 1983, was kept on an annual basis (53).

The 1981 legislation reduced both cash subsidies and commodity support for paid and reduced-price meals. Total meal reimbursement for paid lunches was set at 21.5 cents, cash and commodities combined, under the 1981 law. The combined total for meal reimbursement prior to the 1980 Omnibus legislation was 32.5 cents per meal. Paid breakfast

reimbursements dropped from 16.25 to 8.25 cents per meal. Special assistance reimbursement for reduced-price lunches was reduced by 12.75 cents per meal (82). Eligibility for schools participating in the SBP and designated as in severe need was tightened. Formerly determined at the state level, eligibility now was limited by federal mandate under PL 97-35. Only those schools serving at least 40% free or reduced-price lunches the most recent second preceding year, those required by state law to have breakfast programs, or those unable to cover program costs at the regular reimbursement rate were eligible for severe need assistance. Eligibility for schools in states requiring programs was scheduled for phase-out by fiscal year 1985 (21, 81).

Income eligibility was restricted further as well. Eligibility for free meals was raised to the same level as that required for food stamp assistance, 130% of the income poverty guidelines. Because the standard deduction allowed under the 1980 law was eliminated, however, the range for free lunch eligibility was narrowed. With the previous 125% of poverty guidelines ruling and application of the standard deduction, a range of 128 to 142% had been possible, thus allowing more needy children to qualify for free lunches (53, 82). Determination of eligibility was subjected to more stringent verification; social security numbers of all adult household members were required. Also, only the income eligibility levels for reduced-price meals were printed on the application forms for free and reduced-price meals to prevent purported tendencies to report lower than actual incomes (82).

The 1981 law eliminated federal support for the SMP in schools and institutions receiving any other federal subsidies for child nutrition programs (21, 82). Foodservice equipment assistance was eliminated

totally under the 1981 legislation, making upgrading of equipment the responsibility of state and local authorities. Nutrition education and training funds were reduced yet further, from the $15 million appropriated annually in 1980 to $5 million. Also, nonprofit schools charging over $1,500 tuition annually per student were eliminated from participation in federally subsidized food programs (21, 82). The 1981 law approved extension of the offer versus serve option to elementary schools, at the discretion of local authorities (81).

Current Program Status

Impact of Omnibus Reconciliation Legislation

Anticipated Impact on School Feeding Programs. According to Martin (77), support of reconciliation legislation became a vote for budget controls rather than for specific programs. Budgetary cutbacks in child nutrition programs under the Omnibus Reconciliation Act of 1981 were $1.5 billion. Decreased federal support of the school lunch accounted for $1 billion of that reduction, a cut of 30% (83, 84). As a result, it was predicted that reduction in federal subsidies for the paying child would reduce program size significantly. Reduced reimbursements and rising food costs were expected to cause an increase in lunch prices, forcing paying children from the NSLP (20, 85). Participation frequency is known to be responsive to the price level charged for school lunch (86-88). Evidence indicates a 3 to 6% drop in participation for a 10% increase in price (85). Decreased participation resulting in decreased production volume also has a negative effect on price (89).

Concern was voiced by foodservice professionals that school districts, unable to cover program costs due to decreased participation,

would drop the NSLP altogether (89). Others feared the creation of a welfare program in which the vision of safeguarding the health and well-being of all children would be lost (20, 78, 90).

Impact on School Lunch Participation. An estimated 1,500 to 2,000 schools dropped out of the program between 1980 and 1981 (21, 91, 92). Approximately two-thirds of these schools were nonpublic and may have left the program due to ineligibility based upon annual tuition levels specified in PL 97-35 (21, 91). Hiemstra (21) reported that comparison of data is difficult due to such factors as school closings, openings, consolidations, and declining enrollments. An overall drop of 8% in school enrollments, precipitated by maturation of post World War II children, occurred between 1977 and 1980. Nonetheless, school administrators anticipate increases in elementary school enrollments throughout the 1980s, as the result of a new "baby boomlet" emerges. Secondary school enrollments, however, are expected to continue a downward trend through the early 1990s (93, 94). According to Hiemstra (85), total program participation should stabilize in this decade.

Almost three million students left the NSLP between 1979 and 1983. Two million of these children paid full price for their meals, and presumably dropped out of school lunch lines because of increased prices. The remaining one-third, 300,000 reduced-price and 700,000 free lunch students, were affected by stricter eligibility guidelines (91, 92). Participation decreased by 15, 20, and 7% in the paid, reduced-price, and free lunch categories, respectively (85). Budget cutbacks, thus, have had the greatest impact on less needy and middle-income families (85, 95). Changes in maximum income eligibility guidelines for 1979 to 1983 are summarized in Table 1.

Table 1: Income eligibility guidelines for a family of four

year	poverty guidelines (PG)	free guidelines		reduced-price guidelines	
	$	$	% PG	$	% PG
July 1979-June 1980	$ 7,150	$0- 8,940	125	$ 8,941-13,940	195
July 1980-December 1980	8,200	0-10,250	125	10,251-15,990	195
January 1981-August 1981	7,450	0-10,270	125	10,271-15,490	195
September 1981-June 1982	8,450	0-10,990	130	10,991-15,630	185
July 1982-June 1983	9,300	0-12,090	130	12,091-17,210	185
July 1983-June 1984	9,900	0-12,870	130	12,871-18,315	185
July 1984-June 1985	10,200	0-13,260	130	13,261-18,870	185

Source: (53, 85, 96, 97)

In 1974, approximately 25 million students participated daily in the NSLP. Of this number, 63% paid for their lunch, 1% purchased reduced-price lunches, and 38% received free meals. Participation peaked in 1979 at the 27 million mark, representing 60% of students enrolled in schools offering the school lunch program. Increased school lunch participation during the 1970s was influenced by the rising numbers of free and reduced-price lunches served. A corresponding drop in percentage of paid meals served occurred as eligibility guidelines were relaxed and paying students entered free or reduced-price categories (85).

In 1982, participation declined to 23.1 million, or 56.1% of NSLP enrollment. The percentage of students paying full-price for school

lunch decreased to 50% (85). Free lunch participation increased by approximately 2%, while paid participation decreased by about the same amount. Some of the paying students undoubtedly shifted to special assistance categories as increasing unemployment enabled their families to meet eligibility requirements (98). Overall participation in 1983 increased to 23.2 million, and an increase of 2.7% in paid meal participation was seen in the first six months of fiscal year 1984 (85, 99).

Approximately 91% of students enrolled in U.S. schools had access to the NSLP as of 1982 (85), as compared to 98% in 1980 (100). In March 1981, 16,000 schools, 13,000 of which were private, did not provide lunch service. Estimated enrollment of these schools is 2.9 million (85). Participation trends for the years 1974 to 1984 are summarized in Table 2.

Table 2: NSLP participation in millions, 1974 to 1984

	paid		reduced-price		free		
fiscal year	number	%	number	%	number	%	total
1974	15.5	63.0	0.3	1.2	8.8	35.8	24.6
1975	14.9	59.8	0.6	2.4	9.4	37.8	24.9
1976	14.6	57.0	0.8	3.1	10.2	39.9	25.6
1977	14.5	55.3	1.3	5.0	10.4	39.7	26.2
1978	14.9	55.8	1.5	5.6	10.3	38.6	26.7
1979	15.3	56.7	1.7	6.3	10.0	37.0	27.0
1980	14.7	55.3	1.9	7.1	10.0	37.6	26.6
1981	13.3	51.6	1.9	7.4	10.6	41.0	25.8
1982	11.6	50.2	1.6	6.9	9.9	42.9	23.1
1983	11.2	48.3	1.6	6.9	10.4	44.8	23.2
1984[1]	11.5	48.7	1.6	6.8	10.5	44.5	23.6

[1]Obtained by averaging data from October 1983 to March 1984.

Source: (85, 99)

Impact on School Breakfast Participation. The NESNP report (16) indicated that breakfast was offered to only 39% of the nation's school children in 1980. Participating schools generally were located in poor, urban districts in the southern section of the United States. Approximately 10% of the total public school population participated in the SBP in 1980.

According to USDA statistics, nearly 50% of SBP schools were classified in the "severe need" category in 1980. New restrictions on this category under PL 97-35 caused a drop of 1,825 schools, which comprised 11% of the total number of participating schools. The decline in severe need schools is expected to continue as the eligibility of state-ordered breakfast programs is phased out through 1985. An increase of 11% in the overall SBP is indicative of a movement of schools losing severe need status into the regular program (21). Slight increases in participation occurred in fiscal year 1984 (99). Breakfast program participation data are presented in Table 3.

Table 3: SBP participation in millions, 1977 to 1984

	paid		reduced-price		free		
fiscal year	number	%	number	%	number	%	total
1977	0.40	16.0	0.10	4.0	2.00	80.0	2.50
1978	0.40	14.3	0.20	7.1	2.20	78.6	2.80
1979	0.54	16.3	0.21	6.3	2.56	77.1	3.32
1980	0.56	15.6	0.25	7.0	2.79	77.7	3.59
1981	0.51	13.4	0.25	6.5	3.05	80.1	3.81
1982	0.36	10.9	0.16	4.8	2.80	84.3	3.32
1983	0.34	10.1	0.15	4.4	2.88	85.5	3.37
1984[1]	0.37	10.7	0.16	4.6	2.93	84.7	3.46

[1]Obtained by averaging data from October 1983 to March 1984.

Source: (99, 101)

Impact on Special Milk Program Participation. Under PL 97-35 (81), the SMP was eliminated in schools operating other federally supported meal service. A 92% drop in schools offering the SMP occurred between October 1980 and October 1981 (21). Hiemstra (101) suggested that declines in the SMP may contribute to increases in the school lunch program, since schools no longer have the option of providing both programs.

Impact on Program Funding. Development of strategies for funding the educational mission of schools during a period of decline is a primary concern (94). Because child nutrition programs are considered part of an equal opportunity education, funding cutbacks have been contested continually (20). Financing of the child nutrition programs remains an intricate system involving inter- and intrafund transfers, matching requirements on the state and local level, and individual reimbursement rates (19).

Federal costs of all school foodservice programs totaled approximately $3.3 billion in fiscal year 1982, representing a decrease of 12% from the previous year, but an almost three-fold increase from 1972 (85). Total federal costs increased in 1983 to $3.6 billion (101). Special assistance funds have increased steadily, ranging from $41.8 million in 1969 to over $1.95 billion in 1983.

Federal contributions to the NSLP more than doubled since 1969, when federal cash reimbursements and commodities totaled 23.9% of program costs (85). Income from paid participation increased an estimated 12% from 1981 to 1982. State and local support has shown a slight increase since 1982, following a steady decline over the past several years. Summaries of NSLP funding for fiscal years 1974 to 1982 are provided in Table 4.

Table 4: Funding sources for the NSLP, 1974 to 1982

fiscal year	source		
	federal[1]	state and local	paying children
	← % of funding →		
1974	41.5	34.9	23.6
1975	44.1	33.9	22.0
1976	46.2	31.5	22.3
1977	49.8	28.8	21.4
1978	50.8	30.0[2]	21.2[2]
1979	53.0	26.9[2]	20.1[2]
1980	56.8	24.8	18.4
1981	55.9	24.8	19.3
1982	51.4	28.4[2]	20.2[2]

[1]Commodities for both the NSLP and SBP are included with reimbursement data.

[2]Estimates.

Source: (85)

Impact on Federal Reimbursement of School Meals. Budget reductions mandated by PL 97-35 decreased cash reimbursements in paid and reduced-price categories. Paid breakfast and lunch reimbursements were cut almost 50%. Reduced-price lunches were reimbursed at a 25% lower level, while breakfast reimbursements were approximately 40% less (21). Adjustments based on the Food Away from Home series of the Consumer Price Index were made annually, rather than semi-annually, beginning July 1, 1982. Payment levels for the SMP were not affected. Free meal reimbursement rates increased by approximately 10% during this same period (53, 85). Changes in cash and commodity assistance are summarized in Table 5.

Table 5: Cash and commodity assistance, 1979 to 1984

National School Lunch Program				
period	paid	reduced-price	free	commodity
	← cents per lunch →			
January-June 1979	15.75	77.25	87.25	13.75
July-December 1979	17.00	83.25	93.25	15.75
January-June 1980	17.75	87.25	97.25	15.75
July-December 1980	18.50	92.00	102.00	15.50
January-June 1981	16.00	79.50	99.50	13.50
July-August 1981	17.75	89.25	109.25	11.00
September 1981-June 1982	10.50	69.25	109.25	11.00
July 1982-June 1983	11.00	75.00	115.00	11.50
July 1983-June 1984	11.50	80.25	120.25	11.50

School Breakfast Program						
		reduced-price		free		
period	paid	regular	severe need	regular	severe need	commodity
	← cents per breakfast →					
July 1980	14.75	42.50	57.75	52.00	62.75	3.0
January 1981	14.75	42.50	57.75	52.00	62.75	-
July 1981	8.25	28.50	38.50	57.00	68.50	-
July 1982	8.75	30.00	42.25	60.00	72.25	-
July 1983	9.00	32.75	45.50	62.75	75.50	-

Source: (53, 85, 101)

Reform Strategies

Child nutrition programs have been described as "fragmented, overlapping and administratively complex" in a 1980 Congressional Budget Office report (19). Approximately 40 different reimbursement schemes are utilized in funding 10 nutrition programs, which are influenced by the legislative direction of five Congressional committees. Numerous proposals thus have been made to promote program reform. Such proposals

may be classified as either comprehensive reform strategies or incremental reform options (19).

Comprehensive Reform Strategies. Comprehensive reforms include suggestions for implementation of block grants, establishment of a universal free lunch program, reduction of program overlap, and elimination of federal subsidies for non-needy children (19). Block grants, designed to transfer the bulk of control to state and local authorities, have met with frequent opposition. Wynn (78) cautioned that federal responsibility for child nutrition programs might be abdicated under the system of "New Federalism," threatening even the continued existence of the programs themselves. The Reagan administration has suggested use of a block grant trust fund to assist states in paying program costs until the early 1990s, at which time operation of programs would become the responsibility of the states (102). Moseley (103) stated block grants would place child nutrition programs in a welfare contest, fail to protect middle-income children, not ensure balance between programs, eliminate performance funding, and potentially cause internal disruption in state agencies. A primary concern is possible reduction of uniform nutritional standards if control is relinquished to the states. The ability of each state to assess the nutritional needs of its school children accurately would be a major factor in program success (19).

A universal free lunch program in which all children receive free meals predates the inception of child nutrition legislation (77). Matz (104) has proposed a self-financing program for school lunches be implemented. Counting the value of school lunches as income on federal income tax returns would be the principal form of revenue, supplemented by decreasing the tax deduction from business meals and entertainment

from 100 to 83%, if necessary. Matz explained that such a program would direct emphasis to the original goal of child nutrition legislation, i.e., provision of nutritious meals for all children.

Reduction of program overlap also has been advocated as a means of promoting fiscal responsibility. One plan suggested decreasing food stamp benefits for those families with school-aged children receiving free or reduced-price lunches (19). The NESNP researchers (16, 100), however, found that low-income families did not utilize federal school meal subsidies to substitute for family food income, but rather to supplement food expenditures. Both the NSLP and SBP were found to be efficient methods of increasing the value of available food for needy families.

The proposal to eliminate federal subsidies for paying children has met with bitter controversy. The American Dietetic Association expressed support of such reform, but questioned the future of programs unable to fund their existence if paid participation decreased (105). Although the bulk of federal support goes to low-income families, reduction of participation by paying children would create a situation in which the needy child is identified overtly (20).

Incremental Reform Options. Incremental reforms provide stepwise changes as opposed to comprehensive reforms, which require resolution of major policy issues (19). The Omnibus Reconciliation Acts of 1980 and 1981, emphasizing direction of federal child nutrition subsidies to low-income families, are examples of incremental reform. Reimbursements for paid meals, while not eliminated, were substantially decreased. Reduced-price subsidies were decreased to a lesser degree. Eligibility guidelines for free and reduced-price meals were tightened to lessen program abuse and promote targeting of funds to the neediest school children (80, 81).

Hart (84), in addressing the American School Food Service Association's Eleventh Annual Legislative Action Conference, stated:

> . . . We have to remind our colleagues in the Congress that these programs are not poverty programs. They are broad-based, broadly defined programs to benefit all the people of this country.

The difference of opinion continues to cloud the future of child nutrition programs. Demand for cost-effectiveness and administrative efficiency will necessitate reformation of school feeding programs, which enjoyed rapid expansion during the 1970s. Incremental program changes may be the reform choice of legislators throughout this decade. According to the report of The Congressional Budget Office (19), however, such reform necessitates careful consistent, long-range planning.

Recent Legislative Action

Final Rule: Assessment, Improvement and Monitoring System. Since the passage of PL 97-35, several regulations have been published by the USDA. Specific performance standards for the Assessment, Improvement and Monitoring System (AIMS), implemented in 1980 by a USDA interim ruling, were finalized in 1983. AIMS standards are used by state agencies to measure compliance with NSLP requirements involving free and reduced-price meal application approval, reimbursement claims, meal recordkeeping procedures, and adherence to nutritional standards established for meals (106).

Proposed Rule: Sale of Competitive Foods. Under a proposed USDA rule published in March 1984, the sale of foods of minimal nutritional value is restricted during breakfast and lunch meal service and in foodservice areas only (107). Under 95-166 (67) the Secretary of Agriculture was granted authority to restrict competitive foods. The change in ruling

followed a U.S. Court of Appeals decision charging the USDA with exceeding its authority in a 1980 prohibition of sale of competitive foods throughout the school from the beginning of the school day until after the last lunch period. A period of public comment was extended until May 14, 1984 (108).

Final Rule: Child Nutrition Labeling Program. In May 1984, the USDA formally established a voluntary technical assistance program for child nutrition labeling. A child nutrition logo was designed, product eligibility determined, and program regulations and operation defined. Usage of the new child nutrition labels, which are limited to food products that make significant contribution to meat and meat alternate components of school meal patterns, will become effective January 2, 1986 (109).

Final Rule: Claim and Report Submission. Also in May 1984, the USDA published a final rule permanently establishing a 60-day deadline for submission of monthly reimbursement claims. Similarly, a 90-day deadline was mandated for receipt of monthly program reports prepared by state agencies (110).

Final Rule: Income Eligibility Verification. On June 26, 1984, the final rule establishing USDA requirements for eligibility verification for free and reduced-price meals was issued. Simplification of the application process was accomplished by allowing families eligible for food stamp benefits to use their Food Stamp Program cash number in place of required income information. An alternative verification method to the one specified in the interim rule was provided. Schools now may choose between verification of the lesser of 3% or 3,000 approved applications on file October 31 each year or a smaller, focused sample of applications

meeting criteria for greater potentiality of error (111-114). Initial reports of eligibility verification have not supported alleged misrepresentation of income on 18 to 22% of applications. Preliminary reports indicate the verification process has proven to be costly and time-consuming, particularly in large metropolitan districts (115).

Congressional Action. H.R. 4091, passed by the House of Representatives on October 25, 1983, sought to repeal many of the provisions affecting Child Nutrition Programs under the Omnibus Reconciliation Acts of 1980 and 1981 (116, 117). After passage by the House, the bill was tabled by the Senate Agricultural Committee (118).

H.R. 7, passed by House vote on May 1, 1984, extends child nutrition programs for four years. The bill, referred to the Senate Agriculture Committee on May 3, also requires the USDA to conduct a study on the feasibility of a universal school lunch program and report findings to the Congress by January 1, 1987. The House legislation prohibits USDA from changing calculation methods for determining eligibility for school meals without prior Congressional approval. Furthermore, the federal government must provide for the cost of income verification (119-121). Action is pending on S. 2722, which authorizes extension for five child nutrition programs scheduled to expire in 1984 for a two-year period only (120, 122).

Participation in Child Nutrition Programs

Factors Affecting Participation

Because of the benefit of Child Nutrition Programs to the nutritional intakes of children, increased participation in both the school breakfast and school lunch programs is desirable (4). Despite efforts to expand

school feeding programs, low participation has been recognized as a major problem since the early 1970s (123, 124). The majority of research conducted on school feeding participation generally has involved analysis of participation rates for regions, districts, or schools. Limited research exists to assist in identification of participation determinants for individual students (125). Akin et al. (125) classified factors thought to influence participation into several broad categories:

(a) cost variables, including meal price, free and reduced-price meal eligibility, and average costs of NSLP alternatives;

(b) availability of food options, such as open versus closed campus, residential patterns of students, presence of vending machines, and a la carte service;

(c) meal acceptability, including menu selection choices, student input into menu planning, type of food production, and lunchroom environment; and

(d) individual child characteristics, such as age, sex, ethnicity, region of origin, nutrition knowledge and attitudes.

Other researchers have identified the following as variables involved in participation: food quality, competition from food sales from off-campus restaurants and/or student groups, speed of service, publication of menus in advance, scheduling of recess, and attitudes of faculty and staff toward child nutrition programs (126-128). Factors considered to be uncontrollable or independent include enrollment, average daily attendance, size of community, grade levels within schools, percentage of students bussed, weather, season, sex, race, and age (85, 129, 130).

Major Reports on Participation

A USDA study of over 83,000 schools in 1975 indicated participation rates were highest in schools with on-site food preparation. Base schools that prepared food on-site for off-site distribution had somewhat lower

participation rates than did schools receiving the food in satellite service centers. The reason for this observation was thought to be due to the fact that most base schools were secondary level schools, which generally have lower participation than elementary schools. A la carte availability was associated primarily with secondary schools and decreased participation. Open-campus policies, allowing students to leave school grounds for lunch, were most often found in elementary schools where children could walk home for lunch. Student participation was significantly higher in closed-campus schools. Participation also was higher in schools with lunch periods of 25 minutes or less. Researchers theorized that this relationship was not causal, but instead reflected a competitive effect to pursue alternative food choices when more time was allowed (128).

In 1977, the General Accounting Office (GAO) submitted a report to Congress identifying shortcomings in both evaluation and performance of the NSLP. Areas of investigation included impact of the NSLP on the health of participants, effect on demand for agricultural commodities, participation, and operating efficiency (126). Factors influencing participation, development of nonparticipant profiles, and the effect of nonparticipation on health were considered in assessing program coverage (40). Recommendations of the report included encouragement of higher levels of student participation and development of a "unified explanation" for the causes and impacts of changes in program participation rates. In commenting on the study, USDA stated that a need existed to prioritize factors affecting participation and to determine the extent to which they individually and collectively influence participation (126).

A FNS study in 1977 stated that participation in the NSLP was lower than it should or could be. The report also indicated that the SBP was

small in comparison to the NSLP, even though it had been characterized by rapid expansion. Statistics showed that SBP participation was greatest in the southeastern section of the nation (131).

The National Evaluation of School Nutrition Programs (NESNP) study, initiated in 1979, was conducted by the Systems Development Corporation with funding from a USDA contract (16). Primary objectives of the evaluation were:

(a) identification and synthesization of existing research and evaluation data on the school nutrition programs;

(b) identification of determinants of participation in the school nutrition programs and development of statistical models for use in forecasting participation rates;

(c) determination of the impact of the school nutrition programs upon students and their families; and

(d) determination of whether existing benefit levels are appropriate for participants' needs.

The study, surveying almost 7,000 families, indicated that while NSLP participation was higher among low-income students, substantial numbers of students from all income and ethnic groups participated. Frequent participants of the school lunch program generally were males under age 13 who lived in rural areas, were not able to go home for lunch, had parents who determined where lunch was to be eaten, and attended schools in which faculty and staff ate with students (95). School breakfast participants were most likely to be young black males who decided where to eat breakfast, and whose parents believed school breakfasts to be more convenient and nutritious than home breakfasts (16).

Another GAO report, released in 1981, discussed results of examination of seven school districts considered innovative in their approach to NSLP problem-solving. Although offering secondary school students a greater food selection had a beneficial effect upon participation, researchers

found that none of the lunch formats used met the program goal of providing one-third of the RDAs (127).

Related Research on Participation Factors

Price of Meals. The price charged for meals is considered to be a primary factor influencing participation in child nutrition programs (47, 87). Lower participation rates are associated with higher lunch prices. Because price decisions set by local school authorities affect the paying child, the benefits of school feeding programs on a national level impact on local prices (132). In the wake of Omnibus Reconciliation legislation, many school districts raised prices to compensate for reduced federal subsidies and increased food costs (85). December 1981 survey data reported by the USDA revealed an increase in average full-price lunches from 63 to 81 cents, an increase of 29%. Reduced-price lunches, increasing from 12 to 36 cents, rose 200 percent (85). A price increase of 10% generally is accompanied by a 3 to 6% drop in program participation, with a recovery of about half the loss over time (21, 85). Prices higher than average tend to have a greater initial impact when increased (86, 100). Breakfast programs are more sensitive to price changes than is school lunch. Participation in the SBP by paying students characteristically has been low; thus, increased prices are a deterrent to further participation (88).

Bachemin (133) investigated factors affecting participation of tenth grade students in selected Louisiana schools. Price did not appear to influence participation as only a two cent difference existed between lunch prices at schools classified as having low and high participation. In a study conducted by Hundrup (134), NSLP participation was significantly greater at Utah schools that offered lower lunch prices.

A team of Hawaiian researchers interviewing eleventh and twelfth graders in 1968 found that 79% of the respondents indicated that the then 25 cent lunch was a "bargain" (123). West and Hoppe (132) also noted an inverse relationship between prices charged for paying students in Washington state public schools and participation. The 1970 study showed low participation rates were related to higher prices, and were found more likely in larger districts. Where different prices were charged within a district, differences were small and elementary schools charged less than secondary schools. In 1973, Braley and Nelson (135) studied the effect of a substantial price increase on participation in Pittsburgh's school lunch program. A price increase of 26.67 cents (133%) accompanied a decrease in participation of almost 63%.

In the 1977 GAO report, the price-participation relationships reported by West and Hoppe (132) and Braley and Nelson (135) were substantiated (126). Based upon fiscal year 1973 data for NSLP participation of regular-price students, the GAO report stated that price alone accounted for 39% of the variation in participation levels. Because of the impact of other factors upon participation, however, price-participation relationships provide only a weak forecasting method (126). A USDA survey of the NSLP in 1978 (128) also indicated an inverse relationship between participation and prices charged for a full-price lunch at both elementary and secondary levels and by regional breaks.

Howe (136), surveying students in a Kansas high school, found 81% of the participants believed the price of school lunch was "about right," as did 75% of those who did not participate. Over 90% of both participants and nonparticipants believed they could save money by eating lunch at school.

In the NESNP study (16), meal price was found to be an important factor in the decision to participate in the school lunch program. The combination of meal price and meal price status of the student accounted for 52% of variation under the lunch participation model selected for use. Keyser (130) reported that the mean price for lunches in a 1979 study of four midwestern states ranged from 53 to 64 cents. Mean breakfast prices ranged from 25 to 31 cents. Price did not emerge as a significant positive predictor of average daily participation. In research conducted by Grant and Minick (25) in Pennsylvania, increases in lunch prices for elementary and secondary full and reduced-price lunches amounted to 40% for elementary schools, 33% for secondary, and 100% for the reduced-price category in both types of schools. All lunch prices were increased by 20 cents. Participation in full and reduced-price categories dropped by 5.6%.

Paying Status. Akin et al. (125) reported that family income in the bottom one-third of the low-income category and availability of free and reduced-price school lunches have significant positive effect on school lunch participation. Other researchers have found positive correlation between the ratio of free and reduced-price meals served and participation (126, 130, 137-139).

Demographic Variables. Many researchers have found that grade levels within a school are related to participation; secondary schools generally have lower participation rates than elementaries (85, 126, 130, 140). Students who live in rural areas tend to participate more often than students who live in suburban or urban regions (16). In a study of four midwestern states, Keyser et al. (27) reported that participation was lowest in urban high schools. Approximately half of breakfast programs

within the study region were located in urban elementary schools. Paid participation was noted to increase as percentage of bussed students increased. Others have reported that bussing was positively related to participation (31, 138).

Open Versus Closed Campuses. Hundrup (134) did not find open/closed campuses to be an indicator of participation in Utah high schools. Printiss (137) and Law et al. (141) reported that closed campus policies were a positive factor in influencing student participation. Results of a USDA study (142, 143) on high school participation indicated 70% of both high and low participation schools surveyed had closed campus policies. High participation schools with an open campus option, however, often were located in rural areas where no competitive foodservices existed.

Keyser (130) found that lunch alternatives such as an open campus policy were associated with lower participation rates. She reported that 61.7% of elementary, 52.6% of secondary, and 47.3% of combined elementary-secondary schools allowed students to leave campus for lunch.

Physical Facilities. Bachemin (133) found that cheerful furnishings were a highly significant factor in participation, while Printiss (137) noted that older dining facilities had a negative impact on participation. Doucette (123) reported that new, attractive lunchrooms were associated with better student attitudes toward school lunch. Lachance (40) stated that little is known about the eating environment in school foodservices, although cafeterias generally are present in high schools and multi-purpose rooms are used for elementary schools. Sixty-one percent of elementary and 67% of secondary schools in the Keyser study (130) used dual purpose

rooms for school feeding; only 49% of combined schools used dual purpose facilities, however.

Only limited research has been conducted on the effect of satellite versus on-site preparation of school meals and participation. Nettles (144) reported that labor cost was higher at satellite schools than at on-site schools, suggesting decreased labor efficiency in satellite operations. Data from Johnson's study (139) indicated a mean percentage participation of 60% in on-site schools and 44% in satellite schools. She also reported that 43% of students ate lunch every day at the on-site schools as opposed to 26% of students in satellite schools.

Length of Time Allowed for Lunch. George and Heckler (145) found 30 to 35 minute lunch periods were needed for first graders, whereas 20 to 22 minutes was adequate for secondary school students. Although Hundrup (134) found no effect on lunch participation by length of lunch period in Utah schools, seating capacity was an important factor. Use of staggered lunch periods to assure adequate seating and increase time available for eating has been suggested (31, 145). Multiple serving lines, dependent upon enrollment, number of lunch periods, and time allowed for lunch, were recommended by Cronan (31). Law et al. (141) reported that 39% of the tenth graders surveyed listed waiting in line as a major reason for not eating school lunch. Callahan (4) indicated that waiting in line and speed of service were greater problems for secondary students.

Robinson (128) found higher participation in schools that had a lunch period of 25 minutes or less. Keyser (130) reported that 89% of elementary schools had one lunch line, whereas 50% of secondary schools had two or more. Between 80 and 89% of all schools surveyed used split shift lunch periods. Although the length of the lunch period varied from less than 20

to 50 minutes or longer, the majority of schools had lunch periods within a 20 to 30 minute range.

Service Options. The need for variety in school lunches has long been recognized. Dukes (146), in a comment made before the turn of the century, stated:

> Even assuming that schools provided the most expensive foods, if there be too much sameness, and they be too frequently supplied, the stomach rebels, the system starves, and growth and development are, in consequence, imperfect.

Opportunity for choice has been shown to be a positive factor in participation (126, 134, 147, 148). Hundrup (134), however, found that students responded with higher percent participation when given menu choices occasionally, as opposed to daily. Guthrie (149), in a study of the effect of offering a flavored milk option to elementary school children, reported that participation was not increased significantly, but more milk was purchased.

A USDA survey found that use of the offer versus serve option with elementary students resulted in increased participation of approximately 3%, reduced plate waste, and lower food costs. At the time of the survey, 40% of elementary schools exercised this option (150). Quality of food offered also has been noted to be an important influence on student acceptance of school lunch (130, 141, 151, 152).

Robinson (128) indicated higher participation occurred in schools that did not offer a la carte service. A la carte options, which are not eligible for federal or state reimbursement, tend to increase revenues and compete with off-campus food establishments (113) rather than increase NSLP participation. Harper et al. (153) studied the effect of offering alternate lunch patterns in high schools. Results indicated a preference

for free choice lunches comprised of a la carte items. School managers believed that, although free choice service was more difficult to accomplish due to problems with reimbursement, pricing individual items, and cashiering, plate waste decreased and student response increased.

Brown and Dow (154) analyzed cost and calorie/nutrient content of lunches selected by high school students from the following school lunch alternatives: Type A, a la carte, home, brown bag, fast food, and vending machine. Type A lunches had the highest nutritive value and were the best nutritional buy. Fast food options were second in nutritional value, but were twice as costly as the Type A lunch. Vended meals provided the least nutritional value.

Numerous innovations have been employed in efforts to promote NSLP participation (155, 156). Self-service in elementary schools has met with success (157, 158). Introduction of the scramble system has been effective in offering choice and speeding service (34, 159, 160). "Bar" style service is popular currently and includes potato bars, in which various toppings are provided for baked potatoes, and ethnic/regional bars, offering such items as pasta, tacos, and southern foods (113). In a Colorado study (161), offering nutritious "brown bag" lunches has resulted in an almost 10% increase in elementary school participation. Family style dining is a service option designed to decrease plate waste, teach courtesy and manners, promote socialization and responsible behavior, and increase participation (155, 162-164).

Keyser's study (130) revealed alternative meal approaches were available to 8.3% of elementary, 68.4% of secondary, and 39.9% of the school cafeterias serving both elementary and secondary students. She stated that lower participation rates were associated with greater

availability of lunch program alternatives. Lind (165) studied the effect of family versus cafeteria style service on student attitude and plate waste. Participation was similar in the satellite school receiving family style service and an on-site cafeteria style school. Higher participation occurred in a satellite cafeteria style school also included in the study; however, the percentage of students with free and reduced-price applications was higher at this school. Plate waste tended to be lower in the family style service school.

Influence of Parents, Faculty and Staff, and Peers. Koskie (166) reported that parental wishes had a positive influence on participation. Similar findings were reported by others (16, 136, 167, 168). Printiss' study (137) indicated that positive opinions regarding school foodservice on the part of the manager and principal resulted in higher student participation. The USDA high school participation study (143) revealed that school lunch participation may be adversely affected by negative or indifferent attitudes of administrators and faculty. Perkins et al. (138) found that teachers' attitudes toward eating with their classes and toward food quality accounted for some variance in average daily participation. Peer influence, especially the desire to eat with friends, has been cited as a reason for eating school lunch (167-169).

Attitudes of Students. Doucette's report (123) of research conducted in Hawaiian schools indicated that highest participation was found in schools where students had the lowest attitude ratings. He theorized that while a closed campus policy may increase participation, students may develop negative attitudes.

The USDA high school participation study (142) surveyed student attitudes and found that students desired more appealing lunches with larger portions for less money. Greater menu choice and opportunity to become involved in menu planning were desired by more than 75% of the students in both low and high participation schools. More than 50% of the students interviewed believed that the time allotted for lunch periods was insufficient. Garrett and Vaden (170) found attitude scores of elementary children who were frequent participants to be higher than for those who infrequently participated. Howe (136) analyzed frequency of participation in the NSLP in relation to opinions of the program; secondary student participants generally had a good opinion of the school program as opposed to nonparticipants.

Head et al. (171, 172) compared attitudes of elementary and secondary students toward school lunch. Elementary students revealed more positive attitudes in all areas than did high school students. Black students were found to be more positive than white students, particularly at the secondary level. Children who received free lunches exhibited more positive attitudes than children paying full-price for their lunches on both school levels.

Student Involvement. Koskie (166) found that 83% of students surveyed in Wisconsin Catholic schools believed participation would increase if their ideas were accepted. Garrett (168) used food and menu preferences of sixth grade students to construct a menu cycle and found average daily participation increased significantly when the student-selected menus were implemented.

Evans and Vaden (173) studied the influence of involving secondary students in the school foodservice program on student participation in the

NSLP. Student advisory councils were implemented in two experimental schools. Participation data did not indicate changes associated with initiation of the council, but students who were members of the councils were enthusiastic about activities. In the study conducted by Howe (136), both participating and nonparticipating secondary students expressed interest in joining a student advisory council. Keyser (130) found that student involvement in menu planning was regularly utilized by only 6% of secondary and combined schools. In more than 60% of the schools surveyed, students were involved infrequently in taste testing new foods. Between 24 and 35% of the schools conducted student tours of foodservice facilities on an occasional or regular basis. Student advisory councils were reported in approximately 10% of the elementary and combined schools, whereas 24% of the secondary schools had councils. Almost 70% of elementaries reported occasional or regular scheduling of special events, as opposed to 65% of secondary and 59% of combined schools.

METHODOLOGY

Overview of the Study

The objective of this study was to extend research of Keyser et al. (27, 130) in 1979 on participation in school lunch and breakfast programs by compiling a 1983 data base and conducting a comparative analysis of changes from 1979 to 1983. In the original study, a questionnaire developed for a proposed national study of factors affecting participation in child nutrition programs was provided by the Economic Evaluation Staff of the USDA/FNS. The questionnaire was modified and pretested prior to being used to collect data from a selected sample of midwestern schools. The questionnaire was updated and minor revisions were made in content and format for the 1983 study. The revised instrument then was used to collect data from the same sample of schools.

The 1979 study sample was selected from public schools in four states within the ten state USDA/FNS Mountain Plains Region. Five states with the largest populations and the highest degree of urbanization selected initially were Colorado, Iowa, Kansas, Missouri, and Nebraska. Nebraska was later excluded because in comparison with the other states, it had a larger number of school districts (N = 1,115) and lacked consolidated districts. States in the Mountain Plains Region not included in the sample were Montana, North Dakota, South Dakota, Utah, and Wyoming. The sample for the 1983 study was the final 1979 sample of schools in the four-state region.

Project Approval Procedures

Approval for the Keyser project was obtained from the Director at the time of that study of the Economic Analysis and Program Evaluation Staff, USDA/FNS; the staff of the USDA/FNS Office of Policy, Planning and Evaluation (OPPE); the Regional Administrator in the USDA/FNS Mountain Plains Regional Office; and the state school foodservice directors in the four states. Officials of the OPPE provided assistance in drawing the sample and designing data analysis. In both the 1979 and 1983 projects, state school foodservice directors in each of the four states were contacted by telephone to explain the study and to request a letter of endorsement. The telephone contacts in the Keyser study were followed up with a confirmation letter; a copy of the study proposal and a copy of the preliminary instrument were enclosed with the mailing. Letters of endorsement were provided for the 1979 study by all states except Kansas, which elected to give verbal endorsement only. In Colorado, additional approval was required from the Colorado Data Acquisition Review and Utilization Committee.

In 1983, a confirmation letter (Appendix A) also was mailed to the state directors, along with the Keyser instrument, and a copy of the article on the 1979 study (27). Endorsement letters were received from all four states in 1983, and approval to repeat the study in the state of Colorado was granted by the Data Acquisition Review and Utilization Committee.

The Study Sample

The 1979 sample was drawn by members of the Economic Analysis Branch, Office of Policy, Planning and Evaluation at USDA/FNS from a national computer listing of public and private schools. Because of the relatively small number of private schools in the states chosen for the study, the

sample was limited to public schools. Schools involved in a USDA study within the past three years were excluded in accordance with a USDA policy stating a school is not asked to participate in a USDA affiliated study more than once every three years. Two hundred schools per state were drawn randomly from a sample stratified by elementary and secondary classifications. In each state, 140 elementary and 60 secondary schools were selected based on the distribution of levels of schools in the four states encompassed by the study. Elementary schools were defined as grades K-8, or any schools that included grades below grade 9. Secondary schools were defined as grades 9-12, or any school that included grade 9 or above.

Keyser requested educational directories from each of the state school foodservice directors. The names of school superintendents (or school principals, as requested by Colorado) were identified for each of the school districts because the sample list provided by USDA did not include this information. A higher response rate was expected if the questionnaires were personally addressed to the superintendent or principal. Schools were deleted from the sample if not listed in the directories, which were more current than the USDA listing.

Ninety-seven elementary schools in Kansas which were part of an ongoing Nutrition Education and Training Program, Needs Assessment Project (174, 175) at the time of the 1979 study also were included in the sample, due to ease of data collection. The sample for that project was obtained by selection of an approximate 10 percent stratified random sample of elementary schools throughout the state of Kansas.

The resultant 1979 sample (N = 846) included 191 schools in Colorado,

181 in Iowa, 282 in Kansas, and 192 in Missouri. In many cases, more than one school from a single district was selected.

The sample for the 1983 study was based upon the final 1979 sample (N = 722). As in the original study, educational directories were obtained from each of the four states for the purpose of verifying school addresses and identifying the names of district superintendents and principals. Schools were removed from the sample if they had been closed or redistricted; as a result, two schools in Colorado, six in Iowa, eight in Kansas, and 13 in Missouri were deleted. In addition, two schools in Iowa and 10 in Kansas were omitted due to coding errors. The final 1983 sample (N = 682) included 138 schools in Colorado, 161 in Iowa, 248 in Kansas, and 135 in Missouri.

The Instrument

1979 Survey Instrument

The preliminary instrument was developed by the USDA/FNS Economic Evaluation Staff and reviewed by a USDA advisory council. USDA/FNS officials were consulted on interpretation and clarification of items in the survey instrument, as was a Washington State University researcher who was one of the developers of the proposed survey.

A selected group of school foodservice directors in Kansas were requested to assist with a pretest of the preliminary instrument. Several revisions were made based on feedback received.

The final research instrument in the Keyser study was printed in booklet form with the first page printed on official letterhead indicating the title of the study and identifying the sponsor (130). All data requested were from October 1979 records. According to USDA/FNS officials,

data from October or April are used customarily in school foodservice research since these months are the most uninterrupted by school holidays (27).

1983 Survey Instrument

Minor modifications were made in the 1979 instrument for the 1983 study; however, data requested basically were the same as those in 1979 to permit comparisons to be made. The instrument (Appendix B) was revised in format somewhat to facilitate data entry by respondents. Dates, where they appeared, were changed. Additional questions were included, or items were modified, as needed, to accommodate changes in school foodservice programs since the time of the prior study. For example, because "Type A" is no longer terminology used in the NSLP, "school lunch" was substituted wherever "Type A" occurred. Data were requested for October 1983 to correspond to those collected in October 1979 in the original study. The 1983 instrument also was printed in booklet form with the first page printed on official letterhead indicating the title of the study and identifying the sponsor. The final instrument consisted of four sections.

Section I. The first section consisted of 14 items that provided a description of school characteristics and program information. Data on grades taught at the school, number of students enrolled, and an estimate of average daily attendance were requested. Information also was elicited on types of child nutrition programs available; number and cost of lunches and breakfasts; number of days meals were served in October; number of students with free and reduced price meal applications on file; and a la carte information.

Section II. The 12 items in the second section provided information on the alternatives to school lunch and breakfast that were available in the school. The type of information requested included: availability and proximity of snack bars, fast food outlets, and vending machines; percentages of sack lunches brought to school; and students leaving the campus at noon.

Section III. The 25 items in the third part of the instrument concerned type of school meal facilities available and the promotion of school feeding programs. Frequency of activities and functions identified as components of a successful school foodservice program were requested. Several of the latter items were adapted from the instrument used by Hallett (176) in her research concerning school foodservice directors' program evaluations and related factors. Three additional questions in the 1983 instrument requested information regarding receipt of cash in lieu of commodities, and availability of family style and offer versus serve serving options on both elementary and secondary school levels.

Section IV. The fourth section of the instrument included two items providing characteristics of the geographic area. Information requested included the population of the area and the method of transportation used by students to and from school.

Distribution of the Research Instrument

The procedures for the 1983 study for distribution of the research instrument were patterned after those used by Keyser in 1979. In Iowa, Kansas, and Missouri, a packet was mailed to superintendents of the districts of selected schools and in Colorado, to the school principals. Each packet contained a cover letter (Appendix C) explaining the study,

the state school foodservice director's letter of endorsement (Appendix D), the research instrument, and a self-addressed, postage paid envelope for return of the questionnaire. Multiple questionnaires were sent, as needed, where more than one school was surveyed in a district, in the three states in which mailings were sent to district superintendents.

Identifying code numbers corresponding to codes in the original study were assigned to each questionnaire to permit matching of data. A four digit code was used to designate state and school surveyed. Each questionnaire was labeled with the name of the school and its address. A corresponding label was used in the district section and for mailing to the district superintendent in each state except Colorado.

The initial mailing occurred in late November 1983 to school districts in Iowa, Kansas, and Missouri. Due to the need for study approval by the Colorado Data Acquisition Review and Utilization Committee, mailing of the Colorado surveys was delayed until January 1984. A memorandum printed on brightly colored paper (Appendix C) was attached to the cover letter to explain the delay in receipt of the survey questionnaires.

In 1979, a telephone follow-up was conducted three to five weeks after mailing the questionnaires. Additional questionnaires were sent to districts or schools upon request. Two to three weeks after the telephone follow-up, a letter was mailed to schools that had been reached by phone but failed to respond. Additional questionnaires were mailed at the request of the school superintendent or principal.

In the 1983 study, a follow-up mailing was instituted in mid-January 1984, approximately six weeks after the initial mailing, for schools in Iowa, Kansas, and Missouri not returning the questionnaires. A similar

follow-up mailing was sent to Colorado schools in early February 1984 two to three weeks after the first mailing (Appendix E).

In mid-February 1984, a second follow-up mailing was sent to schools in each state not responding to the first follow-up (Appendix E). Additional questionnaires were provided. Two follow-up mailings were considered necessary to facilitate as high a return as possible to permit pairing of 1979 and 1983 data.

In Table 6, distribution and return of the survey questionnaires for both 1979 and 1983 are shown. The overall return was 85.3% (N = 722) for the Keyser study. The return rate ranged from 73.3% in Colorado to 94.3% in Kansas. Overall return rate for the 1983 study was 92.1% (N = 628). The return rate ranged from 76.3% in Colorado to 98.4% in Kansas. The excellent returns in 1983 were no doubt influenced by the fact that these schools had been involved in the previous study. Also, a summary had been

Table 6: Distribution and return of survey questionnaires

	1979 survey[1]			1983 survey[2]		
		returns			returns	
state	no. distributed	N	%	no. distributed	N	%
Colorado	191	140	73.3	138	106	76.3
Iowa	181	169	93.4	161	151	93.8
Kansas	282	266	94.3	248	244	98.4
Missouri	192	147	76.5	135	127	94.1
total	846	722	85.3	682	628	92.1

[1]Source: (130).

[2]Data collected in 1983 from schools responding to 1979 survey.

provided to them shortly after that study had been completed, which perhaps assisted in creating an interest among the administrators assisting with the 1983 study.

Data Analysis

Cross tabulations were compiled for most survey items by school type. Variables were computed on school characteristics and participation in the National School Lunch Program (NSLP) and School Breakfast Program (SBP), patterned on those used in 1979 (Table 7). Slight modification was made in calculation of average daily lunch participation and 1979 data were reanalyzed to ensure consistency of computations between the two data sets. In 1979, average daily participation based on attendance was calculated by dividing the total number of lunches served by the number of days of operation during the survey period and average daily attendance (ADA), with ADA adjusted by subtracting the number of students out of school at lunch. Because of frequency of incomplete data regarding students out of school at lunch in 1983, the formula was modified to use ADA without adjustment. In cases where data for ADA were unavailable, an estimated figure was obtained by using 95% of school enrollment. This level was selected based upon results in the final report of the Nutrition Education and Training Needs Assessment Project conducted in the state of Kansas (174), in which an average attendance in schools in that study was 95%. Three additional variables, alternatives to lunch, student acceptance and involvement, and food quality, were computed according to Keyser's procedure (Table 8).

State, school type (elementary, secondary, and combined elementary and secondary), and area population were key independent variables for

Table 7: Computation of variables for analysis of data on participation in the NSLP and SBP[1]

variable	variable label	computation
general variables:		
school enrollment	SIZE	Σ of students enrolled at each grade level
% of students bussed to school	BUSS	Σ of TRANS1* + TRANS2** * % bussed >30 min. ** % bussed <30 min.
% of students enrolled qualifying for free meals	STU-QF	$\frac{\text{no. of approved free applications (FREE-APP)}}{\text{no. of students enrolled}}$
% of students enrolled qualifying for reduced price meals	STU-QR	$\frac{\text{no. of approved reduced price applications (RED-APP)}}{\text{no. of students enrolled}}$
breakfast participation variables:		
average daily participation	ADP-BRFT	$\frac{\text{total no. brft. served (TOT-BRFT)}}{\text{days of operation (DAYS)} \times \text{average daily attendance}^2 \text{ (AV-ATTND)}}$
% meals served, free	BRFT-FSV	$\frac{\text{total no. of free brft. served (TOT-FB)}}{\text{TOT-BRFT}}$
% meals served, reduced price	BRFT-RSV	$\frac{\text{total no. of reduced price brft. served (TOT-RB)}}{\text{TOT-BRFT}}$
% meals served, paid	BRFT-PD	1 - BRFT-FSV - BRFT-RSV

[1]Computation based on Keyser's method (130).

[2]If average attendance figure not provided, attendance was recorded as 95% of enrollment, based on mean attendance data from a related study (174).

Table 7: (cont.)

variable	variable label	computation
% ADP, free		ADP-BRFT × BRFT-FSV
% ADP, reduced price		ADP-BRFT × BRFT-RSV
% ADP, paid		(1 - BRFT-FSV - BRFT-RSV) × ADP-BRFT
lunch participation variables:		
average daily participation	ADP-LUNCH[3]	$\frac{\text{TOT-LUN}}{\text{DAYS} \times \text{(AV-ATTND)}}$
% meals served, free	LUN-FSV	$\frac{\text{total no. of free lunches served (TOT-FL)}}{\text{TOT-LUN}}$
% meals served, reduced price	LUN-RSV	$\frac{\text{total no. of reduced price lunches served (TOT-RL)}}{\text{TOT-LUN}}$
% meals served, paid	LUN-PD	1 - LUN-FSV - LUN-RSV
% ADP, free		ADP-LUN × LUN-FSV
% ADP, reduced price		ADP-LUN × LUN-RSV
% ADP, paid		(1 - LUN-FSV - LUN-RSV) × ADP-LUN

[3]Computation modified from Keyser (130), because data on number of students out of school at lunch often were not provided; analysis on 1979 data was repeated to ensure consistency of computations between the two data sets.

Table 8: Computation of lunch quality variables[1]

variable/label	computation			
alternatives to lunch (ALT-LUN)	Σ of variable weights listed below:			
	section[2]	item	label	weight[3]
	I	13	ALACARTE 2	
	II	1	SNACK BAR	
		2	SNCK-LOC	
		4	VENDING	yes = 3
		5	VEND-LOC	no = 1
		6	SACK-LCH	
		8	LEAVE	
		10	FAST-FD	
		7	PERCENT	score as coded
		9	ESTLEAVE	
		12	FF-LOC	reverse score (i.e., 4=1, 1=4)
student acceptance and involvement (STU-ACCP)	Σ of variable weights listed below:			
	section	item	label	weight
	III	3	MEALS	yes = 3
		16	PANELS	no = 1
		25	ADVISORY	
		17	MENU-PLN	score as coded: 1=rarely 2=occasionally 3=regularly
		18	STU-EVAL	
		19	INVOLVED	
		20	EVENTS	
		21	TOURS	
		4	LUNCHRM	response 1 and 3 = 1; 2 = 3
		5	PERIOD	response 1 = 1; 2 = 3

[1]Computations based on Keyser's method (130).

[2]Refers to section and item number in survey instrument.

[3]Weight = score for item response.

Table 8: (cont.)

variable/label	computation			
food quality (FOOD)	Σ of variable weights listed below:			
	section	item	label	weight
	III	11a	ALTERNAT	
		11b(1)	TYPEA1	
		(2)	2	
		(3)	3	
		(4)	4	yes = 3
		(5)	5	no = 1
		12	CHOICE	
		13a	CHOICE1	
		b	2	
		c	3	
		22	WASTE	score as coded
		23	RECIPES	1=rarely
		24	SERVING	2=occasionally
				3=regularly
		1	PREPAR5	on site = 5;
				other = 1

analysis. Because all but one of the 1979 combined schools were located in communities of less than 10,000, Keyser et al. (27) developed a new variable that combined school type and population size as follows:

State	School type by area population	
	population	school type
Colorado Iowa Kansas Missouri	≥ 500,000	elementary secondary
	50,000-499,999	elementary secondary
	10,000-49,999	elementary secondary
	< 10,000	elementary secondary combined

In 1983, a small number (N = 5) of combined schools were located in population categories other than less than 10,000. These schools were dropped from the analysis and the combined school type and population variable was used, again, to permit comparisons in 1979 and 1983 data sets.

General linear model analysis of variance was used to analyze the following variables from data in both the 1979 and 1983 studies (refer to Tables 7 and 8 for computations):

School characteristics:

- school enrollment (SIZE)
- average daily attendance (AV-ATTND)
- percentage of bussed students (BUSS)

Program operating characteristics:

- breakfast price (BRFT-PRICE)
- lunch price (LUN-PRICE)
- percentage of students enrolled qualifying for free meals (STU-QF)
- percentage of students enrolled qualifying for reduced meals (STU-QR)

NSLP participation variables:
average daily participation (ADP-LUN)
% meals served, free (LUN-FSV)
% meals served, reduced (LUN-RSV)
% meals served, paid (LUN-PD)

Other variables:

lunch alternatives (ALT-LUN)
student acceptance and involvement (STU-ACCP)
food quality (FOOD)

Independent variables in the analyses were state and school type by area population. Data from 1979 were reanalyzed to ensure consistency of computations. Also, differences between the two survey periods were computed for the variables listed above, which were obtained by subtracting 1979 statistics from those in 1983.

For additional analysis of 1983 NSLP participation data, general linear model analysis of covariance was used with the two classification variables (state and school type by area population) and the following continuous variables or covariates (Tables 7 and 8):

school enrollment (SIZE)
percentage of students bussed to school (BUSS)
percentage of students enrolled qualifying for free meals (STU-QF)
percentage of students enrolled qualifying for reduced price meals (STU-QR)
lunch price (LUN-PRICE)
alternative to lunch (ALT-LUN)
student acceptance and involvement (STU-ACCP)
food quality (FOOD)

NSLP participation variables (Table 7) analyzed were the following:

average daily participation (ADP-LUN)
% ADP, free
% ADP, reduced price
% ADP, paid
% meals served, free (LUN-FSV)
% meals served, reduced price (LUN-RSV)
% meals served, paid (LUN-PD)

A similar analysis was used in 1979 to examine effects of the various covariates on participation.

General linear model analysis of variance and covariance also were used to analyze SBP participation data. State and school type by area population were classification variables for analyzing data from both 1979 and 1983 studies. The following SBP participation variables were analyzed and differences between 1979 and 1983 were determined using analysis of variance:

average daily participation (ADP-BRFT)
% meals served, free (BRFT-FSV)
% meals served, reduced price (BRFT-RSV)
% meals served, paid (BRFT-PD)

The same continuous variables were used in analysis of covariance of 1983 SBP participation data as for NSLP data with three exceptions; alternatives to lunch, student acceptance, and food quality scores were excluded because the items used to compute them were related primarily to school lunch production and service. In addition to the breakfast participation variables listed above, the following three variables were analyzed:

% ADP, free
% ADP, reduced price
% ADP, paid

RESULTS AND DISCUSSION

General Information on Schools

In both the 1979 and 1983 studies, the sample of schools surveyed were stratified by elementary and secondary classifications. Because survey returns indicated many school foodservices provided meals to students in both elementary and secondary schools, foodservices often could not be defined by school type; therefore, a combined school category was developed for these schools. In Table 9 the distribution of school types by state are summarized. In 1979, Keyser et al. (27) reported that 21% of the questionnaires were returned from combined schools, i.e., those serving both elementary and secondary grades by the same school foodservices. The number of combined schools reported in 1983 was higher, almost 28%, which may have been partially due to school consolidations resulting from declining enrollments. Iowa and Missouri had the highest percentage of combined schools in both survey periods, although Kansas experienced an increase from 14 to 25%. All three categories of schools were found in each state. The number of combined schools is characteristic of the predominantly rural economy of the midwest in which many small school districts exist.

The distribution of school types by city, town, or area population showed that the majority of schools were located in communities of less than 10,000 in 1983 (Table 10). Similar findings were reported by Keyser (130). Five combined schools were found in more populous communities (those with populations greater than 10,000) in 1983, as opposed to only one in 1979. Because of this small number, which was insufficient for

Table 9: Distribution of school types by state, 1983 data

state	N	type of school[1]		
		elem. (N = 345)	sec. (N = 75)	combined (N = 161)
		← % of schools →		
Colorado	95	58.9	17.9	23.2
Iowa	145	51.7	15.2	33.1
Kansas	225	65.3	10.2	24.5
Missouri	116	57.8	11.2	31.0

[1]Elem. = schools which include grades below grade 9 only.
Sec. = schools which include grade 9 or above.
Combined = schools which include elementary and secondary grades.

Table 10: Distribution of school types by city/town/area population, 1983 data

type of school	population of city/town/area			
	≥500,000	50,000-499,999	10,000-49,999	<10,000
	← % of schools →			
elementary (N = 340)	5.6	28.8	24.4	41.2
secondary (N = 75)	6.7	21.3	25.3	46.7
combined (both elem. and sec.) (N = 161)	0.6	1.2	1.2	97.0

analysis, combined schools in population areas of over 10,000 were excluded in data analysis. The distribution of school type by area population and state is provided in Table 11. Colorado had the greatest number of schools in the large cities (i.e., $\geq$500,000). In Iowa and Kansas, the largest percentage of elementary and secondary schools surveyed were in the less than 10,000 population area.

As in the Keyser study (130), differences were found in selected school characteristics based on state and school type by area population (Table 12). Analysis of variance of number of students enrolled, average daily attendance, and percentage of students bussed varied significantly in relation to both variables.

Mean school size ranged from 581 in Kansas to 784 in Missouri in 1983 (Table 13). Average daily attendance reflected mean school enrollment. As anticipated, larger schools were found in the larger metropolitan areas and secondary school enrollments were much larger than elementaries, except in the small rural areas. Secondary school enrollments varied from 339 to 1601 in 1983.

The results of the Keyser study (130) were confirmed in 1983 in regard to percentage of students bussed; Missouri schools again bussed the highest percentage of students and Kansas, the lowest. Interestingly, these two states, in addition to Iowa, experienced increases in percent of students bussed in 1983. The percentage increased in Missouri from 53% in 1979 to 59% in 1983. Kansas students bussed increased from 35 to 44%. In both studies, the percentage of students bussed was greatest in the smaller communities, which was not surprising in view of the rural nature of these towns. Approximately 70% of elementary, 56% of secondary,

Table 11: Distribution of school types by area population and state, 1983 data

area population	school type	N	state CO (N = 91)	IA (N = 144)	KS (N = 244)	MO (N = 112)
			← % of schools →			
≥ 500,000	elem.	19	15.4	0.7	--	3.6
	sec.	5	5.5	--	--	--
50,000-499,999	elem.	98	19.8	14.6	16.5	19.6
	sec.	16	4.4	0.7	2.2	5.3
10,000-49,999	elem.	83	8.8	11.1	18.8	15.2
	sec.	19	4.4	2.8	3.1	3.6
< 10,000	elem.	140	14.3	25.7	30.3	19.6
	sec.	35	4.4	11.8	5.0	2.7
	combined	156	23.0	32.6	24.1	30.4

Table 12: Analysis of variance of selected school characteristics, 1983 data

dependent variable	overall F ratio	df error	mean square error	F ratios for independent variables[1] state df=3	school type by area population df=8
no. of students enrolled	62.60	559	57500.82	17.97	71.97
average daily attendance	62.52	559	52277.08	17.96	71.90
percentage of students bussed	11.14	481	657.93	9.31	12.12

[1]All values significant, $P \leq .001$.

Table 13: Least squares means for selected school characteristics data, 1983

independent variables		no. students enrolled	average daily attendance	% of students bussed
		← mean and std. error →		
state:				
Colorado		689.3± 26.9	657.9± 25.6	43.9± 3.3
Iowa		647.4± 26.3	620.2± 25.1	44.0± 3.1
Kansas		580.8± 23.4	554.1± 22.3	43.7± 2.7
Missouri		784.4± 27.5	748.2± 26.2	58.9± 3.1
school type by area population:				
population	school type			
≥ 500,000	elem.	335.2± 56.9	318.6± 54.3	40.6± 7.0
	sec.	1601.1±109.5	1538.8±104.4	33.7±13.1
50,000-499,999	elem.	346.8± 24.4	331.2± 23.3	40.8± 2.7
	sec.	1363.7± 60.1	1300.1± 57.3	34.8± 7.2
10,000-49,999	elem.	319.9± 27.0	306.2± 25.8	46.9± 3.5
	sec.	1036.6± 55.1	983.7± 52.5	43.3± 6.0
< 10,000	elem.	262.1± 21.2	250.9± 20.2	67.5± 2.4
	sec.	338.7± 41.2	322.9± 39.3	56.3± 4.6
	combined	475.0± 19.6	453.5± 18.7	64.9± 2.2
overall		398.1	380.1	55.5

and 65% of combined students were bussed in both 1979 and 1983. Mean overall percent of students bussed was 54% in 1979 and 56% in 1983.

Child Nutrition Program Operating Characteristics

All but one school surveyed in 1983 participated in the NSLP and that school was removed from the data set. Percentages of schools operating the SBP in both 1979 and 1983 are given in Table 14. Breakfast participation overall remained low, with 12.5% (N = 90) of survey schools providing the breakfast programs in 1979 as opposed to 11.8% (N = 67) in 1983. Schools providing the SBP decreased slightly in comparing 1979 and 1983 data, from 14.4 to 13.4% in elementary schools and from 9.5% to 8.2% in combined schools. A small increase was seen in the percentage of secondary schools offering the breakfast program, however; 9.7% participated in 1979 as opposed to 12.5% in 1983. Kansas reported the largest decline in breakfast programs, from 12.4% to 6.9%, whereas Missouri had a gain from 11.7% to 16.5% (Table 15). Compared to data from the recent national study (16), fewer schools provide the breakfast in the four states studied than is the pattern nationally.

Analysis of variance was used to compare various NSLP and SBP operating characteristics based on state and school type by area population for 1979 and 1983 data (Table 16). Also, the difference between the two years was examined on each variable. Breakfast and lunch prices and percentage of students qualifying for free or reduced price meals were the dependent variables in the analysis. F values are shown in Table 16, with significance levels indicated.

In Table 17, mean breakfast and lunch prices for 1979 and 1983 by state and school type are presented. In all instances, differences

Table 14: Percentages of survey schools operating school breakfast programs in 1979 and 1983

type of school[1]	1979 survey			1983 survey		
	schools in study	breakfast programs		schools in study	breakfast programs	
		N	%		N	%
elementary	460	65	14.4	336	45	13.4
secondary	114	11	9.7	72	9	12.5
combined	148	14	9.5	159	13	8.2
total	722	90	12.5	567	67	11.8

[1]Elementary = schools which include grades below grade 9 only.
Secondary = schools which include grade 9 or above.
Combined = schools which include elementary and secondary grades.

Table 15: Schools with breakfast programs by state, 1979 and 1983

state	1979 survey			1983 survey		
	schools in study	breakfast programs		schools in study	breakfast programs	
		N	%		N	%
Colorado	135	30	22.2	92	22	23.9
Iowa	159	12	7.5	142	11	7.8
Kansas	251	31	12.4	218	15	6.9
Missouri	145	17	11.7	115	19	16.5
total	690[1]	90	13.0	567	67	11.8

[1]In reanalysis of 1979 data during analysis of 1983 data, several schools were excluded from the 1979 data set because of coding errors or incomplete data.

Table 16: F values from general linear model analysis of variance of breakfast and lunch prices and percentage of students qualifying for free and reduced price meals, 1979 and 1983

dependent variable	F values for independent variables: overall F value	state df=3	school type by area population df=8
breakfast price			
1979	0.95	1.11	0.70
1983	5.89***	13.02***	2.84*[1]
difference	4.37**	5.22**	2.68*[2]
lunch price			
1979	25.90***	64.14***	10.77***
1983	28.90***	59.96***	16.21***
difference	10.52***	11.78***	9.75***
% students qualifying, free			
1979	13.78***	10.55***	13.91***
1983	5.86***	9.30***	4.76***
difference	2.35**	3.92**	1.68
% students qualifying, reduced			
1979	5.99***	5.89***	5.68***
1983	2.75**	2.26	2.94**
difference	1.25	2.40	0.72

[1] df=7, because breakfast not served in some school types by area population.

[2] df=5.

* $P \leq .05$
** $P \leq .01$
*** $P \leq .001$

Table 17: Comparison of breakfast and lunch prices in 1979 and 1983 (paid)

		breakfast price			lunch price		
		1979	1983	diff.[1]	1979	1983	diff.[1]
		← mean and std. error (¢) →					
state:							
Colorado		32.7±3.0	38.2±2.7	11.4±2.4	61.4±0.9	99.6±1.5	38.0±1.4
Iowa		26.3±3.2	31.1±3.2	14.2±3.5	55.0±0.9	87.5±1.5	31.9±1.3
Kansas		30.5±2.3	45.0±2.1	18.5±1.6	66.5±0.8	105.3±1.4	39.1±1.2
Missouri		28.8±3.1	49.7±2.4	21.7±2.0	56.0±0.9	93.3±1.6	36.6±1.4
school type by area population:							
population	school type						
≥ 500,000	elem.	28.4±2.3	45.8±2.6	15.0±2.4	55.5±1.6	79.9±3.0	22.9±2.8
	sec.	31.9±5.9	--	--	68.2±3.0	151.8±7.5	78.3±6.5
50,000-499,999	elem.	31.2±2.5	43.2±2.0	16.5±1.7	59.7±0.9	89.5±1.3	30.2±1.1
	sec.	36.2±6.9	42.3±3.6	--	67.1±2.1	94.4±3.2	30.5±2.8
10,000-49,999	elem.	30.2±3.5	43.5±4.5	19.2±3.4	55.8±0.9	88.5±1.4	33.1±1.3
	sec.	32.4±6.0	53.5±5.9	22.9±4.3	63.8±2.1	101.0±2.9	37.1±2.6
< 10,000	elem.	24.9±3.0	38.4±2.3	16.2±2.3	54.1±0.7	84.3±1.1	30.6±1.0
	sec.	24.1±9.8	26.0±8.1	--	59.1±1.2	93.1±2.3	34.8±2.1
	combined	27.1±2.9	35.4±2.6	8.9±2.2	54.6±0.8	85.1±1.1	29.9±0.9
all schools		29.4	43.2	15.9	57.3	88.8	31.4

[1]Mean differences all significantly different than zero, $P \leq .001$.

between the two years were significantly different than zero ($P \leq .001$). Increases in breakfast price ranged from 11.4¢ in Colorado to 21.7¢ in Missouri. Mean breakfast price increases were lowest for combined schools (8.9¢) and highest for elementary and secondary schools (19.2 and 22.9¢, respectively) in the 10,000 to 49,999 population category. In 1983, data indicated a range in breakfast price of 31.1¢ in Iowa to 49.7¢ in Missouri. Secondary school breakfast prices were higher than elementary prices in the 10,000 to 49,999 population category only, with a reported difference of 10¢.

Lunch price increases varied from 31.9¢ in Iowa to 39.1¢ in Kansas. Prices in combined schools increased by about 30¢; elementary prices increased from 22.9¢ in the most heavily populated area to 33.1¢ in the 10,000 to 49,999 population category. A large price increase of 78.3¢ was noted for secondary schools in the $\geq$ 500,000 population area. Increases in breakfast and lunch prices are not surprising, as Hiemstra (85) reported that many school districts had been forced to raise prices to offset both reductions in federal subsidies following Omnibus Reconciliation legislation and increases in food cost.

Mean lunch prices ranged from 87.5¢ in Iowa to 105.3¢ in Kansas in 1983. Kansas schools receive cash in lieu of commodities, while the other three states participate in the USDA commodity distribution program; this factor may have some impact on findings. In 1983, data indicate that more than 90% of the schools in Colorado and Missouri used commodities, while more than 90% of the Kansas schools participated in the cash program. A few schools in the three states other than Iowa were involved in the USDA studies on cash in lieu of commodities. In Colorado, 11% of its schools participated in the cash program at the

elementary level; whereas Missouri participation in that program ranged from 8 to 10% for all school types.

Mean lunch prices for secondary schools were from 5 to 72¢ higher than elementary school prices in 1983; this differential was greatest in the larger cities. The overall mean lunch price for 1983 was 89¢, compared to 57¢ in 1979, representing an increase of approximately 36%. Hiemstra (85) reported that national average lunch price was 81¢ in 1981-1982. Grant and Minnick (25) reported increases of 40% in elementary lunch prices and 33% for high schools in a Pennsylvania study in 1981.

Percentages of students qualifying for free and reduced price meals in 1979 and 1983 are compared in Table 18. The percentage qualifying for free meals increased significantly in each state during this four year period except in Colorado. Significant increases also were noted for elementary schools in all population areas and for the combined schools. Secondary school increases were significant only in the small rural areas (< 10,000). Increases in the percentage of students qualifying for reduced price meals were significant only in Iowa and Missouri schools, and in secondary schools in areas of less than 10,000 people.

In 1983, Colorado schools reported the lowest mean percentage of students qualifying for free meals (17%), while Missouri schools reported the highest (23%). Increases were noted in all states and ranged from 3.2 to more than 8.0%. The percentage of students eligible for free and reduced price meals was higher in elementary than in secondary schools in three of the four population areas. Secondary schools in the smaller rural communities surpassed elementary school percentages in 1983, however. Both the 1979 and 1983 studies reflected a greater differential in the large cities (500,000 or more population). In these cities, over 40%

Table 18: Comparison of the percentages of students qualifying for free and reduced price meals[1] in 1979 and 1983

		% students qualifying, free			% students qualifying, reduced		
		1979	1983	diff.[2]	1979	1983	diff.[2]
		← mean % and std. error →					
state:							
Colorado		14.7±1.5	17.3±2.0	3.2±1.6	5.8±0.5	5.1±0.8	-0.3±0.9
Iowa		14.5±1.5	19.8±2.0	9.3±1.6***	4.4±0.5	6.8±0.7	2.7±0.9**
Kansas		18.7±1.4	23.0±1.7	5.9±1.4***	6.1±0.4	7.4±0.7	1.3±0.8
Missouri		23.2±1.5	29.6±2.0	8.7±1.6***	4.3±0.5	6.4±0.8	2.0±0.9*
school type by area population:							
population	school type						
≥ 500,000	elem.	41.9±2.6	40.2±4.3	9.4±3.4**	8.6±0.8	11.8±1.6	2.0±1.9
	sec.	15.7±5.8	11.5±8.1	5.8±6.3	2.1±1.7	2.8±3.1	2.0±3.5
50,000-499,999	elem.	20.8±1.6	28.3±1.8	8.7±1.4***	6.1±0.5	6.1±0.6	0.5±0.8
	sec.	15.3±3.7	20.8±4.4	4.9±3.6	2.6±1.1	3.3±1.7	0.6±2.0
10,000-49,999	elem.	14.1±1.5	21.2±2.0	6.3±1.6***	5.4±0.5	6.9±0.8	0.7±0.9
	sec.	8.7±3.6	13.5±4.1	3.1±3.2	2.4±1.1	4.1±1.6	0.9±1.8
< 10,000	elem.	15.8±1.2	20.1±1.6	4.3±1.3***	6.8±0.4	7.7±0.6	1.3±0.7
	sec.	13.3±2.0	25.0±3.1	12.6±2.6***	5.5±0.7	8.3±1.2	4.0±1.4**
	combined	14.4±1.3	21.3±1.5	5.9±1.2***	5.6±0.4	6.9±0.6	0.8±0.7
overall		17.1	22.8	6.5	6.1	7.2	1.2

[1] % of students with approved applications in relation to school enrollment.

[2] Mean differences that are significantly different than zero are indicated: * $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

of elementary school students enrolled had approved applications on file for free meals in both 1979 and 1983.

The increase in percentage of students eligible for free meals is likely to be related to changes made in the income poverty guidelines, raising eligibility from 125 to 130% (53). Modest increases observed in reduced price meal eligibility, along with an actual decrease in Colorado, reflect the more stringent reduced price qualifying categories, lowered from 195% of the income poverty guidelines to 185% (53).

Days of program operation also were reported for survey schools. The number of days of operation in October 1979 varied slightly, with an overall mean of 22 days. In 1983, operating days for October varied between 19 and 22, with an overall mean of 20 days.

Alternatives to Lunch

The extent of availability of alternatives to the NSLP in 1983 were analyzed by school type (Table 19). Data collected included information on a la carte service, snack bars, vending machines, sack lunches, fast food outlets, and open versus closed campus policies. Comparisons are drawn in the discussion with the findings Keyser (130) reported in 1979.

According to both 1979 and 1983 results, secondary schools were more likely to offer a la carte items than were elementary or combined schools. Availability of a la carte service in all three school types was noted, however; elementaries rose from 3.3 to 7.3%, secondaries from 47.4 to 65.3%, and combined schools from 10.1 to 19.9%. A possible reason for the large increase in secondary and combined schools is the effort to maintain or increase high school participation. Items offered in 1983 included sandwiches, desserts, beverages, entrees, and various

Table 19: Extent of availability of alternatives to USDA lunch program by type of school, 1983 data

alternatives to USDA lunch	type of school		
	elem. (N = 345)	sec. (N = 75)	combined (N = 161)
	← % of schools →		
a la carte items offered to students	7.3	65.3	19.9
snack bar available at noon	<1.0	30.7	8.7
snack bar located in lunchroom	<1.0	30.7	6.8
vending machines available during meal time	<1.0	13.3	4.4
vending machines located in lunchroom	<1.0	12.0	4.4
students bring sack lunches	95.7	86.7	95.7
percentage of students usually bringing sack lunch			
less than 25%	76.8	94.7	96.3
more than 25%	23.2	5.3	3.7
students allowed to leave campus for lunch	47.5	42.7	46.0
percentage of students leaving campus for lunch			
less than 25%	97.7	73.3	93.8
more than 25%	2.3	26.7	6.2
fast food outlets available	6.4	36.0	13.7
proximity of fast food outlets			
< 1 block	93.9	70.7	88.2
2-3 blocks	1.7	5.3	4.4
3-6 blocks	2.0	10.7	3.1
> 6 blocks	2.3	13.3	4.4

meal accompaniments. Snack bars were available in more than 30% of secondary schools, a slight increase from 26.3% in 1979. Presence of snack bars in combined schools increased from 4.1 to almost 9% in combined schools, while elementary snack bars remained at 1% in both studies.

Vending machines were provided in 11.4% of secondary schools in 1979 compared to more than 13% in 1983. Very few elementary or combined schools reported use of vending machines. Periods allowable for sale of competitive foods are currently under debate (108).

Although a large percentage of the survey schools reported students brought sack lunches, less than 25% routinely did so in all three school types. Interestingly, more schools in all categories indicated students brought their lunch in 1983, and the estimated percentage of students doing so also increased, particularly in elementaries. More students might elect to bring lunch from home either to have money available for other purposes, or because parents believe a home-packed lunch to be more economical than the NSLP.

Little difference was found in closed campus policy in regard to school type in 1983; almost half of the schools allowed students to leave the campus at noon. In both 1979 and 1983 studies, elementary schools had open campus policies most frequently, presumably because some lower-grade schools are located in close proximity to children's homes. The number of schools permitting an open campus decreased in 1983 for all three school types. A larger percentage of secondary than elementary or combined schools indicated that more than 25% of students left the campus for lunch in both 1979 and 1983. Although both studies agreed that fast food outlets were more available to secondary students,

the proximity of these establishments were closer to elementary and combined schools in 1983.

School Meal Facilities and Promotion

Facilities and Operations

In both 1979 and 1983 studies, operational characteristics of school foodservice programs (i.e., place of food preparation, length of lunch period, number of serving lines used for lunch meal service and method of collecting meal receipts) were analyzed by school type. Of those schools participating in the SBP, more secondary than elementary or combined schools had on-site preparation (Table 20). The percentage of secondary and combined schools with on-site breakfast production increased in 1983. Similarly, more secondary schools prepared lunch on-site and both secondary and combined schools reported on-site preparation more frequently than in 1979. Approximately 40% of the elementary schools in 1979 and 1983 reported off-site preparation, compared to less than 20% of the secondary schools. The percentage of combined schools that had lunches prepared at another site and transported dropped from 26% in 1979 to almost 17% in 1983.

The length of lunch periods in 1983 ranged from less than 20 minutes to 45 minutes or longer (Table 21). Little difference was found between data reported for 1979 and 1983. Approximately 89% of elementary schools reported lunch periods of 30 minutes or less, compared to 74% of the secondary schools, and 94% of the combined schools.

More than 80% of the elementary and combined schools used one cafeteria line for lunch service (Table 22), which was true also in 1979.

Table 20: Place of food preparation by type of school, 1983 data

type of school	breakfast		lunch	
	no. of schools serving breakfast	% of schools with on-site preparation	no. of schools serving lunch	% of schools with on-site preparation
elementary	45	64.4	345	57.7
secondary	9	100.0	75	86.7
combined	13	69.2	161	82.6

Table 21: Length of lunch period by type of school, 1983 data

length of lunch period	type of school		
	elem. (N = 329)	sec. (N = 70)	combined (N = 154)
	← % of schools →		
≤ 20 minutes	34.7	17.1	30.5
21 to 25 minutes	24.9	22.9	31.2
26 to 30 minutes	28.9	34.3	32.5
31 to 35 minutes	2.4	4.3	2.0
36 to 45 minutes	7.6	14.3	3.3
≥ 46 minutes	1.5	7.1	<1.0

Table 22: Number of serving lines used for lunch by type of school, 1983 data

number of serving lines	type of school		
	elem. (N = 342)	sec. (N = 75)	combined (N = 160)
	← % of schools →		
one	88.3	42.7	83.8
two	5.6	33.3	12.5
three or more	6.1	24.0	3.7

Approximately one-third of secondary schools used two serving lines, while between 20 and 25% had three or more.

The method used for collecting meal receipts in 1983 is summarized in Table 23. In both studies, teachers and other school officials were involved in collecting meal receipts in elementary and combined schools more frequently than in secondary schools. Other methods of collection included monthly billing and use of teacher aides.

Table 23: Method of collecting meal receipts by type of school, 1983 data

method of collecting meal receipts	type of school		
	elem. (N = 345)	sec. (N = 75)	combined (N = 160)
	← % of schools →		
school foodservice cashier	31.0	68.0	25.0
teacher or other school official	65.2	28.0	74.4
other	3.8	4.0	<1.0

Student Involvement and Acceptance

Several variables were examined in regard to practices related to student involvement and acceptance of the school lunch program (Table 24). The room where meals are served was used as a lunchroom only more frequently in combined than in elementary and secondary schools, a finding similar to that in 1979. In 1983, data indicated, however, that fewer schools in all three school types were using dual purpose rooms for meal service. This practice was more characteristic of the secondary schools; 61% reported use of dual purpose rooms in 1979, compared to 52% in 1983. More than three-fourths of all schools reported the size of the lunchroom to be adequate in both 1979 and 1983 survey periods, although the percentage increased slightly in elementary and secondary schools reporting lunchrooms of inappropriate size in 1983. Split shift scheduling was the predominate method used to accommodate students in all schools, although a slightly higher percentage of secondary as compared to elementary schools used a single shift.

The use of taste panels in menu development increased in 1983 by 15% in elementary, 12% in secondary, and 6% in combined schools. Slightly more than 30% of elementary and secondary schools reported use of taste panels. Occasional student involvement in menu planning increased by 16% in elementary, 14% in secondary, and 10% in combined schools, while regular involvement was practiced in only a small percentage of all types of schools (< 10%). More than 50% of the elementary and secondary schools reported occasional student involvement in 1983.

Student evaluations of school foodservice followed a similar pattern. Somewhat higher percentages of schools in both studies indicated that student evaluations were used regularly as compared to use of

Table 24: Practices related to student involvement and acceptance of school lunch program, 1983 data

practices	type of school		
	elem. (N = 345)	sec. (N = 75)	combined (N = 161)
	← % of schools →		
use of room where meals are served:			
only a lunchroom	36.2	48.0	54.0
dual purpose	63.8	52.0	46.0
adequacy of lunchroom size:			
crowded/too large	22.0	24.0	11.2
about right size	78.0	76.0	88.8
type of lunch period:			
single shift	17.1	17.3	6.2
split shift	82.9	82.7	93.8
taste panels used in menu development	32.2	32.0	16.2
students involved in menu planning			
rarely	39.7	34.7	51.0
occasionally	53.6	58.7	45.3
regularly	6.7	6.6	3.7
student evaluations obtained			
rarely	27.5	21.3	39.1
occasionally	54.5	58.7	51.6
regularly	18.0	20.0	9.3
students involved in testing new foods			
rarely	49.6	50.7	62.7
occasionally	46.1	40.0	31.7
regularly	4.3	9.3	5.6

Table 24: (cont.)

practices	type of school		
	elem. (N = 345)	sec. (N = 75)	combined (N = 161)
	← % of schools →		
sponsor special events or feature days at lunch			
rarely	22.0	32.0	37.9
occasionally	50.4	40.0	46.6
regularly	27.6	28.0	15.5
conduct class tours of foodservice facilities			
rarely	51.6	57.4	69.6
occasionally	38.3	37.3	29.2
regularly	10.1	5.3	1.2
have student advisory council	12.2	14.9	11.2

student input in menu planning. Regular use of student evaluations ranged from about 9% in combined schools to 20% in secondary schools. Gains in occasional use of student evaluations were seen for all school types. Involvement of students in testing new foods was an infrequent practice in more than 60% of the schools in each category in Keyser's 1979 study. In 1983, about 50% of the elementary and secondary schools indicated that food testing by students rarely was allowed, a decrease of 10 to 20%. More than 40% of those schools reported occasional use of students in testing new products, as opposed to about one-third of the combined schools.

Increases in occasional or regular use of special events and feature days were seen for all school types, with almost 80% of elementary schools responding affirmatively. Between 24 and 35% of the schools in 1979 conducted class tours of foodservice facilities on either an occasional or regular basis, as compared to about 30 to 48% in 1983. Hallett (176) stated that approximately 50% of surveyed school foodservice directors reported occasional involvement of students in taste panels and menu planning, obtaining student evaluations, sponsoring of special events, and arranging class tours of foodservice facilities.

Student advisory councils were implemented in between 11 and 15% of schools in 1983, as opposed to 10 to 24% in 1979. While there was a decrease in the percentage of secondary school advisory councils of almost 9%, slight increases of councils in elementary and combined schools were found.

Keyser expressed concern about findings in her study regarding the limited extent of student involvement in the surveyed schools in light of federal regulations published in 1979 requiring school food authorities

to devise a program of student involvement. A trend toward increased student involvement in school foodservice is indicated from analysis of 1983 data, however, perhaps reflecting a response to the regulatory directive.

Menu Alternatives and Food Production Controls

From the 1983 survey, data on practices related to food quality and service are shown in Table 25. Increases were reported for all school types in percentage of schools reporting provision of alternate meal approaches in comparing 1979 and 1983 results. Elementary schools increased from 8 to almost 13%, secondaries from 68 to more than 73%, and combined schools from 40 to about 49%. Alternate meal approaches were most common, however, in schools serving high school students. All school types indicated an increase in service of an additional regular lunch or a salad lunch, with more than 60% of the secondary schools providing both alternatives.

Snack-type lunches were available in less than 5% of elementary and combined schools and approximately 16% of high schools in both studies. Soup and sandwich meals were offered in 20% of the secondary schools in 1983, compared to 11% in 1979.

Choices within the regular lunch menu pattern were offered in about 32% of the elementary, 81% of the secondary, and 54% of the combined schools, an increase of 18, 17, and 8% respectively, from 1979. Increases in percentage of schools offering a choice of main entree, vegetable, fruit, or dessert were found for all school types. In both 1979 and 1983, secondary schools most frequently provided choices on the

Table 25: Practices related to food quality and service in school lunch program, 1983 data

practice	type of school		
	elem. (N = 345)	sec. (N = 75)	combined (N = 161)
	← % of schools →		
provide alternate meal approaches	12.5	73.3	49.1
types of alternatives available:			
regular lunch	8.4	60.0	29.8
salad lunch	8.7	62.7	42.9
"snack" lunch	1.0	16.0	2.5
soup and sandwich	1.7	20.0	3.1
provide choice of items on regular lunch menu	32.2	81.3	54.0
type of choices:			
main entree	20.0	65.3	21.1
vegetable, fruit or dessert	24.1	72.0	46.6
check plate waste			
rarely	6.7	12.0	7.5
occasionally	28.1	28.0	30.4
regularly	65.2	60.0	62.1
use standardized recipes			
rarely	5.5	1.3	7.4
occasionally	6.1	4.0	11.8
regularly	88.4	94.7	80.8
check serving temperatures			
rarely	6.9	9.3	7.5
occasionally	17.4	14.7	24.2
regularly	75.7	76.0	68.3

regular lunch menu. In 1983, about 65% of the secondary schools offered a choice of main entree, while 72% allowed choices of vegetable, fruit, or dessert. Other choices offered to students in 1983 included milk, bread, salad, sandwiches, desserts, and juice.

Data from 1983 on the frequency of checking plate waste and serving temperatures and use of standardized recipes also are summarized in Table 25. More than 60% of all three types of schools checked plate waste on a regular basis. Small increases in the percentage of schools using standardized recipes was noted, with about 88% of the elementary, 95% of the secondary, and 81% of the combined schools responding positively. Serving temperatures were checked regularly in about three-fourths of the elementary and secondary schools and more than 68% of the combined schools in the 1983 study, which compared favorably with data reported by Keyser. In each study, both use of standardized recipes and checking of food temperatures were more common in elementary and secondary than in combined schools.

Questions requesting data on percentage of survey schools offering family style service and the offer versus serve option were added to the 1983 research instrument. Less than 5% of the schools surveyed offered family style service (Table 26), whereas almost 54% of the elementary, 88% of the secondary, and more than 82% of the combined schools had implemented the offer versus serve option. This option was mandated by federal legislation for senior high students in 1975 (65, 66); thus, a report of 88% of secondary schools and 82% of combined schools providing this option seems surprising. According to federal law (67, 81), the offer versus serve option may be extended to include both junior high and elementary schools at the discretion of local school authorities. A USDA

Table 26: Percentages of survey schools offering family style service and offer versus serve option, 1983 data

type service	type of school		
	elem. (N = 340)	sec. (N = 75)	combined (N = 158)
	← % of schools →		
family style	3.5	2.7	3.8
offer versus serve	53.5	88.0	82.3

survey in 1982 indicated that nationally, 40% of the elementary schools exercised the offer versus serve option (150); data in this study indicate more schools provide the option in the four states than is true nationally.

Analysis of Lunch Quality Variables, 1979 and 1983

Three indices were computed, as described in the methodology section (Table 8), to study lunch alternatives, student involvement and acceptance, and food quality data. Indices for both 1979 and 1983 and the differences between the two periods were analyzed by analysis of variance to determine differences among states and school type by area population. F values are shown in Table 27 and least square means in Table 28.

As in the Keyser study, the mean lunch alternatives index was highest in Colorado and lowest in Missouri (Table 28). A higher index is indicative of greater availability of school lunch alternatives. The index from secondary school data was higher in both studies than from elementary and combined school data in all population areas. Although

Table 27: F values from general linear model analysis of variance of indices related to program quality and practices, 1979 and 1983

dependent variable	F values for independent variables: overall F value	state df=3	school type by area population df=8
alternatives to lunch index			
1979	28.66***	14.25***	32.05***
1983	21.90***	4.76**	27.00***
difference	2.61**	2.03	2.92**
student acceptance index			
1979	3.02***	0.63	3.12**
1983	5.58***	7.32***	4.50***
difference	3.08***	5.55**	2.01*
food quality index			
1979	39.44***	3.16*	52.31***
1983	25.62***	1.88	33.45***
difference	3.62***	3.75*	3.31**

* $P \leq .05$
** $P \leq .01$
*** $P \leq .001$

Table 28: Comparison of 1979 and 1983 indices[1] related to program quality and practices

		alternatives to lunch index			student acceptance index		
		1979	1983	diff.[2]	1979	1983	diff.[2]
		← mean % and std. error →					
state:							
Colorado		18.3±0.2	17.6±0.3	-0.5±0.3	18.4±0.3	18.6±0.3	0.6±0.4
Iowa		17.4±0.2	16.5±0.3	-0.7±0.3*	18.1±0.3	17.4±0.3	-0.5±0.4
Kansas		17.8±0.2	16.9±0.2	-0.5±0.3*	18.0±0.3	18.8±0.3	1.1±0.3**
Missouri		16.4±0.2	16.3±0.3	0.1±0.3	18.0±0.3	18.9±0.4	0.7±0.4
school type by area population:							
population	school type						
≥ 500,000	elem.	15.3±0.4	13.4±0.6	-1.2±0.6*	18.9±0.5	18.2±0.7	-0.8±0.8
	sec.	22.9±0.9	22.8±1.1	1.3±1.2	18.6±1.1	16.1±1.4	-2.5±1.6
50,000-499,999	elem.	15.8±0.3	14.7±0.2	-1.0±0.3***	17.8±0.3	19.8±0.3	1.8±0.4***
	sec.	20.8±0.6	19.6±0.6	-0.8±0.7	18.6±0.7	19.3±0.8	0.8±0.9
10,000-49,999	elem.	15.3±0.3	15.1±0.3	-0.5±0.3	17.7±0.3	18.2±0.3	0.8±0.4*
	sec.	21.0±0.6	20.3±0.6	-1.2±0.6	19.8±0.7	20.1±0.7	1.3±0.8
< 10,000	elem.	14.8±0.2	14.3±0.2	-0.7±0.2**	17.0±0.2	17.9±0.3	0.9±0.3**
	sec.	16.2±0.3	16.0±0.4	0.1±0.5	17.2±0.4	18.4±0.5	1.2±0.6
	combined	15.2±0.2	15.3±0.2	0.2±0.2	17.6±0.3	18.1±0.3	0.7±0.3*

[1]Refer to Table 8 for computation of indices.

[2]Mean differences that are significantly different than zero are indicated: * $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

Table 28: (cont.)

	food quality index		
	1979	1983	diff.
	← mean % and std. error →		
state:			
Colorado	26.9±0.4	29.3±0.5	2.6±0.6***
Iowa	27.5±0.4	28.1±0.5	0.6±0.6
Kansas	27.4±0.4	28.7±0.5	1.8±0.5***
Missouri	28.5±0.4	29.4±0.5	0.8±0.6
school type by area population:			
population / school type			
≥ 500,000 elem.	22.7±0.7	26.1±1.1	3.1±1.2**
sec.	33.2±1.5	35.4±2.1	3.7±2.3
50,000-499,999 elem.	22.3±0.5	23.8±0.5	1.8±0.5***
sec.	34.6±1.0	33.4±1.2	-3.7±1.3**
10,000-49,999 elem.	21.7±0.4	23.4±0.5	2.1±0.6***
sec.	36.8±1.0	36.2±1.1	0.5±1.2
< 10,000 elem.	23.2±0.3	24.0±0.4	0.8±0.4
sec.	27.8±0.6	30.1±0.8	2.6±0.9**
combined	26.2±0.4	27.5±0.4	1.9±0.4***

the difference statistic was significant in some cases, these actual differences were small.

Student acceptance indices were similar for schools in all states and similar in both reporting periods. Also, schools in all population areas had similar indices.

Food quality indices also differed only slightly from state to state. Missouri schools had the highest food quality index in both the 1979 and 1983 studies. A higher index indicates menu choices are available more frequently in the school foodservice. The index increased significantly in Colorado and Kansas schools in 1983. Secondary schools in all population categories had higher indices than did elementary and combined schools. Increases were significant in data from elementary schools in all except those for communities of less than 10,000, indicating greater frequency of offering menu choices.

Participation in the National School Lunch Program (NSLP)

Comparison of 1979 and 1983 School Lunch Participation

General linear model analysis of variance was used to analyze percent average daily participation (ADP) for lunch, and percentage of meals served in three categories (free, reduced price, and paid) for 1979 and 1983 data and for analysis of differences in data from the two years. The independent variables in the analyses were state and school type by area population. F values were significant from the analysis of 1979 and 1983 data for all variables analyzed in relation to both state and school type by area population (Table 29). The F values for analysis of the differences data were significant in all instances except for average

Table 29: F values from general linear model analysis of variance of lunch participation variables, 1979 and 1983

dependent variable	F values for independent variables: overall F value	state df=3	school type by area population df=8
% ADP--lunch			
1979	8.69***	8.41***	6.92***
1983	15.49***	9.31***	14.47***
difference	0.79	0.43	0.94
% meals served			
free			
1979	19.94***	17.06***	17.60***
1983	12.67***	10.49***	11.70***
difference	2.40**	2.40	2.50*
reduced			
1979	12.18***	5.88***	13.98***
1983	5.45***	6.02***	4.41***
difference	4.20***	3.12*	4.24***
paid			
1979	21.92***	17.22***	20.13***
1983	11.52***	9.35***	10.93***
difference	2.30**	2.74*	2.23*

* $P \leq .05$
** $P \leq .01$
*** $P \leq .001$

daily participation (ADP) for lunch for both independent variables and percentage of free meals served by state.

Mean percent ADP ranged from almost 54% in Colorado to 71% in Iowa in 1983; 1979 data also showed Colorado to be lowest with 51% and Iowa highest with 75% (Table 30). Schools in all states except Colorado indicated a slight but nonsignificant drop in overall ADP from 1979 to 1983. Participation in elementary schools at all population levels and in combined schools was higher than in secondary schools in both study periods.

A significant increase from 1979 to 1983 in percent of meals served free in schools in each state and in all population areas was reflected in the comparative analysis. These findings were not surprising, in view of the previous data discussed on the percentage of students qualifying for free meals. In both the 1979 and 1983 studies, Iowa schools reported the lowest percentage of meals served free (27.1% in 1983), while Missouri had the highest percentage (39.1%), representing increases of 11.3% and 10.3%, respectively. In all population areas, except in cities of 50,000 to 499,999, elementary schools served more free meals than did secondary schools.

Changes in the percentage of students served reduced price meals were not significant except in Missouri, where a slight decrease was registered. Elementary schools in the largest cities and smallest communities had significant changes, with a sizeable (8.5%) decrease in the large city schools and a small increase (1.7%) in the small rural schools. In 1979, Iowa schools reported the lowest percentage of reduced price meals served (5.8%), which also was true in 1983 (5.7%). Missouri schools had the highest percentage (8.6%) in 1979, but had only 5.8% in 1983.

Table 30: Comparison of lunch participation variables for 1979 and 1983

		% meals served											
		ADP lunch[1]			free			reduced			paid		
		1979	1983	diff.[2]	1979	1983	diff.[2]	1979	1983	diff.[2]	1979	1983	diff.[2]
		mean % and std. error											
state:													
Colorado		50.6± 3.9	53.8± 2.7	2.0± 3.9	22.2±1.6	28.0±2.0	9.2±1.1*	6.0±0.7	6.2±0.5	0.4±0.9	71.9±1.8	65.9±2.1	-9.7±1.3*
Iowa		74.5± 3.8	70.5± 2.6	-3.1± 3.6	19.3±1.5	27.1±2.0	11.3±1.1*	5.8±0.6	5.7±0.5	0.2±0.8	75.8±1.7	67.1±2.1	-11.6±1.2*
Kansas		71.0± 3.4	67.9± 2.3	-1.7± 3.2	25.2±1.4	31.2±1.7	8.6±0.9*	7.6±0.6	7.6±0.5	-0.2±0.7	68.3±1.6	60.7±1.8	-8.6±1.1*
Missouri		67.0± 3.8	61.8± 2.7	-3.2± 3.7	32.1±1.6	39.1±2.0	10.3±1.1*	8.6±0.7	5.8±0.5	-2.3±0.9*	61.1±1.8	55.4±2.2	-8.0±1.3*
school type by area population:													
population	school type												
≥ 500,000	elem.	85.0± 6.6	82.1± 5.9	1.2± 8.2	46.7±2.7	55.6±4.3	11.4±2.3*	17.8±1.2	7.7±1.1	-8.5±1.8*	38.6±3.1	36.5±4.6	-2.9±2.7
	sec.	37.5±13.7	25.1±10.6	-10.2±14.4	40.7±5.3	35.1±8.1	18.3±4.2*	3.1±2.3	2.8±2.1	-1.1±3.2	62.2±6.3	61.9±8.5	-17.3±4.9*
50,000-499,999	elem.	62.9± 4.0	62.8± 2.4	-1.1± 3.3	26.5±1.7	36.3±1.8	10.7±1.0*	8.4±0.7	6.9±0.5	-0.4±0.7	64.6±1.9	56.5±1.9	-10.6±1.1*
	sec.	48.8± 9.4	41.7± 5.8	-8.8± 8.1	29.0±3.9	39.2±4.4	11.0±2.5*	4.2±1.6	4.0±1.2	2.0±2.0	66.9±4.3	56.8±4.7	-13.3±3.0*
10,000-49,999	elem.	66.5± 4.0	69.7± 2.7	7.0± 3.8	18.1±1.6	27.7±2.0	8.8±1.1*	8.4±0.7	8.5±0.5	-1.1±0.8	73.2±1.8	63.5±2.1	-7.9±1.3*
	sec.	57.1± 9.4	54.1± 5.3	-2.1± 7.4	13.2±3.9	22.2±4.1	7.8±2.2*	2.9±1.6	5.3±1.1	1.9±1.7	83.9±4.3	72.6±4.3	-9.6±2.5*
< 10,000	elem.	87.6± 3.1	81.0± 2.1	-1.5± 3.0	17.5±1.3	24.0±1.6	7.8±0.9*	7.1±0.5	8.6±0.4	1.7±0.7*	75.9±1.5	67.4±1.7	-9.5±1.0*
	sec.	69.0± 5.0	74.2± 4.0	5.0± 5.7	14.1±2.1	19.4±3.0	6.1±1.7*	4.9±0.9	6.0±0.8	0.5±1.3	80.9±2.3	74.8±3.2	-6.6±1.9*
	combined	77.9± 3.4	81.0± 1.9	-2.7± 2.7	16.7±1.4	22.6±1.4	6.8±0.8*	6.2±0.6	7.2±0.4	0.9±0.6	77.2±1.5	70.7±1.5	-7.4±0.9*
overall		76.0	74.8	-0.7	20.5	27.3	8.3	7.5	7.6	0.3	72.5	65.0	-8.6

[1]Average daily participation in relation to student attendance.

[2]Mean differences that are significantly different than zero are indicated: * $P \leq .05$.

In all population areas, elementary schools served more reduced price meals than secondary schools in both study periods.

The percentage of paid meals served dropped in schools in all four states and in all population areas between 1979 and 1983. The decline ranged from 2.9% in the large city elementary schools to 17.3% in the large city secondary schools. Percentages in 1979 varied from about 61% in Missouri to about 76% in Iowa, compared to 55.4% and 67.1% in those states, respectively, in 1983. Secondary schools had the highest percentage of paid meals served in all population areas, even though the decline was greater in those schools in all but those in small rural areas.

Effects of Selected Variables on 1983 Lunch Participation

General linear model analysis of covariance was used to analyze school lunch participation data, patterning the procedures after those of Keyser (130). Results of 1983 data are presented in Tables 31 to 33. The two discrete variables in the analysis were state and school type by area population. School size, percentage of students bussed, percentages of students qualifying for free and reduced price meals, price, and three indices computed to assess effects of availability of lunch alternatives, student involvement, and food quality practices were covariates in the model. Average daily participation (ADP) in the NSLP was computed as a percentage of average daily attendance. Average attendance was adjusted for number of students out of school at lunch in 1979; a similar adjustment was not made in the 1983 computation, however, as this information frequently was not provided. Participation rates in free, reduced price, and paid meal categories also were analyzed.

F values are shown in Table 31 for the analysis, and beta estimates are presented in Table 32 for the covariates. Least square means and standard errors are shown in Table 33; i.e., means adjusted for the effects of the two independent variables and the seven covariates. Since the previous discussion focused on state and school type by area population participation data and the comparison of those data in 1979 and 1983, this section will be concerned, primarily, with the effects of the covariates on school lunch participation in 1983.

In 1983, size was a significant determinant of ADP and % ADP, reduced price and paid; whereas percentage of students bussed was not a significant predictor. Percentage of students qualifying for free meals in 1983 had a significant effect on all variables except % ADP, reduced and percent of meals served in the reduced price category. Percentage of students qualifying for reduced price meals had a significant effect on all participation variables. Lunch price, while not significant for any variables in the 1979 study, was significant for ADP and % ADP, paid in 1983. The F value for the 1983 lunch alternatives score was significant for ADP and % ADP, paid, as was that for the student acceptance score. In addition, the student acceptance score was significant for % meals served, reduced and paid. The food quality score had a significant effect on % meals served, free and paid in 1983.

The percentage of variance accounted for by the model ranged from 25 to 68%. As shown in Table 31, the model accounted for over 60% of the variance for two dependent variables, % meals served free, and % meals served paid.

Beta estimates for 1983 data indicate that smaller schools had both higher ADP and % ADP served in the reduced price and paid categories (Table 32).

Table 31: General linear model analysis of covariance for effects of selected variables on school lunch participation, 1983 data

source of variation	df	F ratios						
		ADP lunch	% ADP			% meals served		
			free	reduced	paid	free	reduced	paid
state	3	6.55***	0.25	1.46	11.09***	3.18*	2.53	3.47*
school type by area population	8	6.50***	2.13*	2.55*	13.25***	9.53***	1.58	8.68***
school size	1	6.15*	0.74	5.11*	5.22*	0.51	2.87	0.03
% of students bussed	1	1.11	0.05	0.07	2.21	1.34	0.34	1.25
% students qualifying, free	1	31.05***	326.40***	0.38	45.36***	513.33***	3.52	387.45***
% students qualifying, reduced price	1	3.90*	22.62***	97.24***	16.24***	58.47***	73.44***	15.98***
lunch price	1	7.95**	1.48	0.00	8.78**	0.04	0.35	0.29
lunch alternatives score	1	19.21***	0.74	1.70	23.66***	3.74	0.97	4.35*
student acceptance score	1	5.01*	1.40	1.57	6.50*	1.81	7.45**	5.46*
food quality score	1	0.04	3.40	0.20	2.89	12.07***	0.15	9.73***
df error		443	442	438	437	445	441	440
mean square error		452.0	157.8	12.8	253.8	129.8	17.9	157.0
R^2		.41	.53	.36	.51	.68	.25	.63

* $P \leq .05$ ** $P \leq .01$ *** $P \leq .001$

Table 32: Partial regression coefficients and standard error from analysis of effects of selected variables on school lunch participation, 1983 data

variables	ADP lunch	% ADP			% meals served		
		free	reduced	paid	free	reduced	paid
	$\hat{\beta}_i$ and std. error						
school size	-.010*	-.002	-.002*	-.007*	.002	-.001	-.004
	±.004	±.002	±.000	±.003	±.002	±.000	±.002
% students bussed	.041	-.005	.002	.044	-.024	-.005	.026
	±.039	±.023	±.006	±.030	±.021	±.007	±.023
% students qualifying, free	.367***	.705***	.007	-.335***	.796***	-.025	-.765***
	±.065	±.039	±.011	±.050	±.035	±.013	±.039
% students qualifying, reduced	.309*	-.440***	.261***	.476***	-.641***	.268***	.371***
	±.157	±.093	±.027	±.118	±.084	±.031	±.093
lunch price	-.229**	-.058	.005	-.182**	.009	.010	-.026
	±.081	±.048	±.013	±.061	±.043	±.016	±.048
lunch alternatives score	-1.904***	-.220	-.095	-1.591***	.448	.085	-.534*
	±.434	±.256	±.073	±.327	±.231	±.086	±.256
student acceptance score	.761*	.237	-.072	.654*	-.243	-.184**	.467*
	±.340	±.201	±.057	±.256	±.180	±.067	±.200
food quality score	.046	-.248	-.017	.294	-.424***	-.017	.424**
	±.228	±.134	±.038	±.173	±.122	±.045	±.136

* $P \leq .05$ ** $P \leq .01$ *** $P < .001$

Table 33: Least squares means and standard error for lunch participation variables, 1983 data

independent variable		ADP lunch	% ADP free	% ADP reduced	% ADP paid	% meals served free	% meals served reduced	% meals served paid
		← mean % and std. error →						
state:								
Colorado		66.0± 3.5	21.1± 2.0	5.0± 0.6	40.6± 2.6	29.7± 1.8	6.7± 0.7	64.0± 2.0
Iowa		77.0± 3.1	20.9± 1.9	4.9± 0.5	51.1± 2.3	27.2± 1.7	5.6± 0.6	67.2± 1.8
Kansas		75.6± 3.0	21.8± 1.8	5.8± 0.5	48.1± 2.3	29.1± 1.6	7.3± 0.6	63.5± 1.8
Missouri		65.6± 3.4	22.5± 2.0	4.8± 0.6	38.7± 2.5	32.6± 1.8	6.7± 0.7	61.0± 2.0
school type by area population:								
population	school type							
≥ 500,000	elem.	62.0± 6.5	32.2± 3.8	3.5± 1.1	25.8± 4.9	47.0± 3.4	6.7± 1.2	46.0± 3.7
	sec.	70.5±16.5	24.1± 9.8	4.5± 2.8	43.2±12.4	24.2± 8.8	2.8± 3.3	73.8± 9.7
50,000-499,999	elem.	59.4± 2.5	20.1± 1.5	4.6± 0.4	34.5± 1.9	31.2± 1.4	7.4± 0.5	61.1± 1.5
	sec.	62.4± 7.3	19.9± 4.3	4.8± 1.2	38.3± 5.5	40.4± 3.9	6.3± 1.5	53.6± 4.3
10,000-49,999	elem.	73.0± 3.1	20.4± 1.8	6.4± 0.5	46.1± 2.3	26.1± 1.7	8.3± 0.6	65.4± 1.8
	sec.	76.4± 6.1	22.1± 3.6	5.7± 1.0	49.3± 4.6	28.5± 3.3	6.6± 1.2	65.3± 3.6
< 10,000	elem.	78.0± 2.3	21.4± 1.3	6.4± 0.4	50.1± 1.7	26.5± 1.2	8.3± 0.5	65.1± 1.3
	sec.	76.1± 4.2	15.0± 2.5	4.4± 0.7	57.0± 3.2	18.9± 2.2	5.5± 0.8	75.8± 2.5
	combined	82.0± 2.0	18.9± 1.2	6.0± 0.3	57.2± 1.5	23.9± 1.1	7.3± 0.4	69.1± 1.2
overall		75.4	20.2	5.8	49.4	26.9	7.5	65.5

As expected, ADP and % ADP free, and % meals served, free were higher in schools with a greater percentage of qualifying for free meals, while this covariate was a negative predictor of the two paid lunch participation variables. Again, this latter finding was expected, since fewer paid lunches usually are served in schools with a large percentage of students in the free meal category. Higher percentages of students with approved reduced price applications on file also were predictors of ADP and also, the two reduced price participation variables.

A negative beta estimate for the lunch alternatives index indicated that ADP, % ADP, paid, and % meals served, paid were higher if the index was lower; in other words, if fewer alternatives were available, more students participated in the school lunch program. The reverse pattern was true for the student acceptance score; higher scores were predictive of higher participation. This score measures the extent to which student involvement and related activities are practiced regularly. The food quality score was a significant negative predictor of % meals served, free and a positive predictor of % meals served, paid.

Lower lunch prices were predictive of a higher overall ADP rate and % ADP, paid. These results were hypothesized in planning the study, because of the sizeable increase in paid lunch prices during the last four years. Other researchers have reported that price, menu variety, choice of menu items, closed versus open campus policy, type of transportation, and availability of alternatives to the school lunch were factors affecting participation (126, 132, 134, 136, 137, 142, 147, 170).

Data reported by Hiemstra (101) indicated that on a national level, 45% of total meals served in 1983 were in the free category, 7% in reduced price, and 48% in paid. Keyser reported that for the overall

sample of schools, approximately 20% of the total meals served were free, 7% reduced price, and 73% paid. In 1983, data indicated that almost 27% of the total meals served were free, 7.5% reduced price, and 65.5% paid (Table 33). In both studies, the highest percentage of free meals was reported by elementary schools in the largest cities and secondary schools in the 50,000 to 499,999 population areas. The percentage of meals served free in those elementaries increased from 28 to 47%; this percentage in secondary schools increased from 33 to 40%. The highest percentage of reduced price meals was in the elementary schools in the large metropolitan areas in 1979; whereas in 1983, the elementaries in the two lowest population categories served the greatest percentage of reduced price meals. The highest percentage of paid meals in 1983 was served in secondary schools in both the largest and the smallest population areas.

Participation in the School Breakfast Program (SBP)

Comparison of 1979 and 1983 School Breakfast Participation

General linear model analysis of variance also was used to analyze the percentage of average daily participation for breakfast and percentage of meals served in three categories (free, reduced price, and paid) for 1979 and 1983 data and for analysis of the differences in statistics from the two periods. The independent variables in the analyses were state and school type by area population. F values for % ADP breakfast were significant for both independent variables in each study period, except by state in 1983 (Table 34). F values also were significant for percentage of meals served free and paid in 1979 and 1983, whereas those for percentage of meals served at reduced price were both nonsignificant.

Table 34: F values from general linear model analysis of variance of breakfast participation variables, 1979 and 1983

dependent variable	overall F value	F values for independent variables: state df=3	school type by area population	
% ADP--breakfast				
1979	5.62***	13.59***	3.54**	(df=8)[1]
1983	2.51*	2.30	2.37*	(df=7)
difference	1.19	0.56	1.10	(df=6)
% meals served				
free				
1979	5.78***	7.98***	5.17***	(df=7)
1983	6.02***	8.96***	4.93***	(df=7)
difference	0.98	0.37	1.18	(df=6)
reduced				
1979	0.96	1.54	0.80	(df=7)
1983	0.29	0.26	0.30	(df=7)
difference	0.58	0.15	0.82	(df=6)
paid				
1979	3.61***	5.11**	3.36**	(df=7)
1983	10.23***	12.96***	8.21***	(df=7)
difference	0.87	0.13	1.04	(df=6)

[1]Degrees of freedom vary because breakfast not served in some school types by area population.

* $P \leq .05$
** $P \leq .01$
*** $P \leq .001$

None of the F values were significant in analysis of the difference statistic.

In 1979, mean % ADP ranged from 4.4% in Colorado to almost 38% in Missouri (Table 35). In 1983, data indicated that Colorado again had the lowest % ADP (< 14%), but Iowa had the highest (< 29%). For schools in all population areas, participation was higher at the elementary than at the secondary level in both 1979 and 1983.

Increases in the percentage of breakfasts served free occurred in all states, ranging from an 11.2% rise in Missouri to about 23% in Colorado. Actual percent of meals served free varied from almost 60% in Iowa to more than 94% in Missouri. Differences between the two data sets were significant for schools in Colorado and Kansas. When analyzed for school type by area population, significant increases in % meals served, free were found for elementaries in the 50,000 to 499,999 size cities and the less than 10,000 size communities.

In 1983, percentage of reduced price breakfasts served decreased, although not significantly, in schools in each state surveyed. Means for the % meals served, reduced ranged from 3% in Iowa to 6.3% in Colorado. These declines may be explained by tightened eligibility requirements for reduced price meals, or a possible flux of students from the reduced price into free category due to economic conditions allowing them to meet criteria for free meals. Differences were not significant for school type by population areas, but elementary schools in communities of $\geq$ 500,000 did experience a slight increase.

As expected, percent of paid breakfasts served decreased in the schools in every state, although not significantly, ranging from 8.7% in Missouri to 15.2% in Colorado. In 1979, Missouri schools reported the

Table 35: Comparison of breakfast participation variables for 1979 and 1983

		ADP breakfast[1]			% meals served: free			reduced			paid		
		1979	1983	diff.[2]	1979	1983	diff.[2]	1979	1983	diff.[2]	1979	1983	diff.[2]
		mean % and std. error											
state:													
Colorado		4.4± 4.7	13.7± 4.9	4.8± 5.4	45.9± 5.7	76.3± 5.4	22.6± 8.7*	13.3± 2.2	6.3± 2.8	-5.9± 5.0	41.5± 5.7	17.9± 4.4	-15.2± 8.2
Iowa		22.6± 5.3	28.6± 5.4	6.1± 7.6	46.6± 7.2	59.8± 6.2	16.3±12.8	9.6± 3.0	3.0± 3.2	-1.8± 7.2	45.2± 7.9	36.6± 4.9	-11.7±11.7
Kansas		2[illegible].7± 3.7	18.4± 4.5	-1.6± 4.5	64.1± 5.1	81.0± 5.2	17.7± 7.7*	7.0± 2.1	3.5± 2.9	-7.5± 5.0	30.0± 5.5	14.1± 4.5	-10.0± 8.2
Missouri		37.7± 4.9	26.1± 4.3	-2.0± 5.1	77.7± 6.5	94.4± 5.0	11.2± 8.7	8.6± 2.7	4.5± 2.9	-6.1± 6.1	14.8± 7.0	2.6± 4.5	-8.7± 9.9
school type by area population:													
population	school type												
≥ 500,000	elem.	40.0± 3.6	32.0± 5.2	-6.6± 5.6	84.2± 5.0	83.9± 5.8	-3.1± 9.1	6.2± 1.9	5.5± 2.8	0.4± 4.9	10.6± 5.1	9.9± 4.4	2.0± 8.0
	sec.	18.1±11.0	12.0±10.7	1.0±10.1	41.8±15.4	83.1±12.2	27.7±17.0	13.0± 7.5	1.9± 8.0	-13.6±12.0	41.3±19.5	4.8±12.4	-5.6±19.5
50,000-499,999	elem.	29.3± 4.3	33.9± 3.9	7.1± 4.6	75.8± 6.1	90.0± 4.3	17.2± 7.4*	9.0± 2.4	4.7± 2.3	-8.0± 4.8	17.4± 6.4	4.3± 3.5	-14.1± 7.7
	sec.	20.9± 8.5	12.8± 7.1	--	47.0±12.0	66.6± 8.2	--	11.3± 5.2	1.8± 4.5	--	51.9±13.7	36.4± 7.0	--
10,000-49,999	elem.	19.3± 6.4	22.0± 9.1	2.0± 8.8	65.1± 7.9	90.9±10.5	12.0±15.0	9.2± 3.0	7.9± 8.1	-2.6±12.3	27.7± 7.8	8.7±12.5	-15.8±20.1
	sec.	6.4± 9.3	16.0±10.7	6.8±10.2	59.8±13.0	88.2±12.3	28.0±17.4	6.8± 4.6	4.4± 6.0	-0.0± 9.5	33.4±12.1	8.8± 9.3	-27.9±15.4
< 10,000	elem.	28.7± 4.7	28.1± 4.8	-5.1± 5.4	49.3± 6.6	65.2± 5.5	19.9± 9.3*	8.3± 2.5	4.9± 2.9	-0.2± 5.5	41.6± 6.5	29.3± 4.5	-19.1± 8.9*
	sec.	26.7±15.2	--	--	--	--	--	--	--	--	--	--	--
	combined	11.4± 4.8	16.7± 4.9	7.8± 5.9	45.6± 6.8	55.3± 5.6	17.2±10.0	13.1± 2.7	7.3± 2.8	-13.4± 6.6	39.0± 7.1	40.3± 4.4	0.8±10.8
overall		26.0	25.1	0.0	66.8	78.8	13.8	8.8	5.4	4.2	25.4	17.5	9.5

[1]Average daily participation in relation to student attendance.

[2]Mean differences that are significantly different than zero are indicated: * $P \leq .05$.

lowest percentage (< 15%) and Iowa the highest (> 45%); 1983 data indicated a low of < 3% in Missouri compared to a high of almost 37% in Iowa. Declines, significant only for elementaries in small rural areas, were seen at all population levels except for elementaries in the largest cities and for combined schools. The largest percentage of paid breakfasts served was in elementary schools in communities of less than 10,000, and in secondary schools in population areas of 50,000 to 499,999. Decreases in participation by the paying child were anticipated due to targeting of federal aid to neediest students.

Effects of Variables on 1983 Breakfast Participation

General linear model analysis of covariance was used to analyze 1983 school breakfast participation statistics using a model similar to that for lunch participation data (Tables 36 to 38). State and school type by area population were the two discrete variables in the model. Five continuous variables were included as covariates in the analysis of breakfast participation rates: school size, percentage of students bussed, percentages of students qualifying for free and reduced price meals, and price. The three indices related to lunch alternatives and food quality were excluded from the model for examining breakfast data because these variables were relevant to lunch production and service, but not to breakfast. The model accounted for 79% of the variance for ADP breakfast; R^2 ranged from 65% for % ADP, reduced, to 84% for % ADP, free (Table 36). The discussion will focus on the significant covariates, since participation rates were discussed in the foregoing section. F values were significant for all variables except school type by area population and school size for overall ADP breakfast. The only other significant F values were for % students bussed for % ADP, reduced, and

Table 36: General linear model analysis of covariance for effects of selected variables on school breakfast participation, 1983 data

source of variation	df	F ratios						
		ADP breakfast	% ADP			% meals served		
			free	reduced	paid	free	reduced	paid
state	3	8.18***	3.33*	2.12	2.51	1.66	1.99	1.84
school type by area population	6	2.12	1.28	0.90	1.12	1.53	0.53	0.96
school size	1	0.94	0.02	1.91	1.61	1.04	0.04	0.95
% students bussed	1	4.74*	4.19	5.88*	0.40	0.45	2.24	2.39
% students qualifying, free	1	33.14***	45.01***	0.26	0.58	3.03	0.76	2.15
% students qualifying, reduced-price	1	6.40*	6.15*	3.94	0.12	0.05	3.75	0.35
breakfast price	1	8.15**	7.43*	1.30	0.01	1.79	3.06	0.88
df error		23	23	17	17	24	18	18
mean square error		86.0	74.0	1.3	26.7	153.4	16.4	135.9
R^2		.79	.84	.65	.76	.80	.59	.84

* $P \leq .05$ ** $P \leq .01$ *** $P \leq .001$

state, % students qualifying, free and reduced, and breakfast price for % ADP free.

Percentage of students qualifying for free and reduced price meals and breakfast price were found to be significant positive predictors for both % ADP and % ADP, free, in 1983 (Table 37). Percentage of students bussed had significant negative beta weights for % ADP and % ADP, reduced. No other beta weights were significant. Perhaps in those schools with higher percentages of bussed students, these bussed students did not arrive at school in time to eat school breakfast.

Least squares means and standard errors for breakfast participation variables for state and for school types by area population are presented for 1983 data in Table 38. The means have been adjusted for effects of all seven variables in the analysis and, therefore, differ somewhat from those presented in Table 35. Overall participation rate in the breakfast program in those schools offering breakfast in relation to average daily attendance was almost 30%.

In 1983, Colorado schools reported the lowest percentage of ADP (20.7%), compared to Iowa which had the highest adjusted % ADP (50.5%). Overall % ADP, free, reduced, and paid varied little between the two studies. In both 1979 and 1983, approximately three-fourths of % ADP was in the free category. Where data existed, elementary schools in all population areas had higher adjusted mean % ADP, free, and percent meals served, free than did secondary schools. The percentage of meals served free was greatest in elementaries in the large urban areas and in communities of 10,000 to 49,999.

Table 37: Partial regression coefficients and standard error from analysis of effects of selected variables on school breakfast participation, 1983 data

variables	ADP breakfast	% ADP			% meals served		
		free	reduced	paid	free	reduced	paid
	$\hat{\beta}_i$ and std. error						
school size	-.004 ±.004	-.005 ±.004	-.008 ±.000	-.003 ±.002	.006 ±.005	-.004 ±.001	-.006 ±.005
% students bussed	-.137* ±.063	-.120 ±.058	-.020* ±.008	.024 ±.038	-.056 ±.084	-.044 ±.030	.133 ±.086
% students qualifying, free	.520*** ±.090	.562*** ±.084	-.007 ±.013	-.045 ±.059	.205 ±.118	-.040 ±.046	-.192 ±.131
% students qualifying, reduced	.618* ±.244	.562* ±.227	.068 ±.034	-.054 ±.152	-.075 ±.325	.230 ±.119	-.201 ±.341
breakfast price	.915** ±.320	.810* ±.297	-.054 ±.048	.024 ±.214	.573 ±.428	-.294 ±.168	.454 ±.485

* $P \leq .05$
** $P \leq .01$
*** $P \leq .001$

Table 38: Least squares means and standard error for breakfast participation variables, 1983 data

independent variable		ADP breakfast	% ADP free	% ADP reduced	% ADP paid	% meals served free	% meals served reduced	% meals served paid
		mean % and std. error						
state:								
Colorado		20.7± 5.7	18.3± 5.3	0.7± 0.7	2.2± 3.3	82.0± 7.4	6.2± 2.5	13.5± 7.2
Iowa		50.5± 5.2	36.3± 4.8	0.4± 0.7	12.6± 3.2	67.9± 6.9	0.1± 2.5	32.1± 7.1
Kansas		25.6± 3.4	22.3± 3.2	1.1± 0.5	4.1± 2.3	84.8± 4.6	4.1± 1.8	14.2± 5.2
Missouri		22.6± 4.6	18.7± 4.3	2.6± 0.6	2.3± 2.8	82.6± 6.2	8.4± 2.2	10.5± 6.3
school type by area population:								
population	school type							
≥ 500,000	elem.	32.0± 4.5	28.3± 4.2	0.6± 0.6	3.9± 2.6	88.9± 6.0	1.4± 2.0	11.4± 5.9
	sec.	--	--	--	--	--	--	--
50,000-499,999	elem.	21.5± 3.6	20.1± 3.3	0.7± 0.5	1.4± 2.1	86.6± 4.7	5.2± 1.6	9.2± 4.7
	sec.	12.6± 9.4	6.4± 8.8	0.9± 1.5	7.2± 6.6	75.2±12.6	3.6± 5.2	24.6±14.9
10,000-49,999	elem.	30.2± 7.5	26.9± 7.0	1.4± 1.3	3.3± 5.7	89.7±10.1	5.4± 4.5	11.1±12.9
	sec.	26.1±10.4	23.3± 9.6	0.9± 1.3	1.6± 5.9	82.2±13.9	6.2± 4.6	11.9±13.2
< 10,000	elem.	43.3± 5.0	30.6± 4.6	2.4± 0.6	10.9± 2.8	70.8± 6.6	5.9± 2.2	23.5± 6.5
	sec.	--	--	--	--	--	--	--
	combined	43.2± 5.7	31.8± 5.3	1.3± 0.8	8.7± 3.4	61.9± 7.6	5.3± 2.7	31.3± 7.6
overall		29.9	24.3	1.3	4.9	80.3	4.9	16.2

SUMMARY AND CONCLUSIONS

In 1979, a study assessing factors affecting participation in child nutrition programs in Colorado, Iowa, Kansas, and Missouri was conducted by Keyser and others (130). Because of the significant legislative changes since 1980 and the resultant impact on program participation, this study extended Keyser's research; a 1983 data base was compiled and analysis of changes from 1979 to 1983 was examined.

Schools in the four-state midwestern region in the Keyser study were asked to participate in the 1983 study to permit examination of changes in the same sample of schools. Specific objectives of the study were to study participation rates in the school lunch and breakfast programs in relation to a number of selected variables, to determine availability of the NSLP to students, to examine data on school foodservice facilities and institutional arrangements being used, to study activities and functions identified as components of school foodservice program quality, and to compare data reported in 1979 with those collected in 1983 to permit examination of changes during this period.

The original research instrument was adapted from a questionnaire developed by the USDA/FNS Economic Evaluation Staff. Minor revisions were made for the 1983 study; however, data requested basically were the same as those in 1979 to permit comparisons. Project approval was obtained from the state school foodservice directors in each of the states and questionnaires were mailed to those schools randomly selected in the 1979 study in the four-state region, with participation data requested for the month of October. Data from October also were collected in 1979, at the suggestion

of USDA/FNS staff who indicated October and April are preferred months for child nutrition studies in schools. After two follow-up mailings, 92% (N = 628) of the schools in Keyser's study returned 1983 research instruments.

Schools were divided into three categories, elementary, secondary, and combined (i.e., those serving both levels of students), for analysis of selected questionnaire items. Independent variables used for analysis of child nutrition program operational characteristics and lunch and breakfast participation were state and school type by area population. Differences between 1979 and 1983 participation also were examined. In addition, selected other variables such as price, school size, percentage of students qualifying for free or reduced price meals, percentage of bussed students, and quality scores were used to analyze factors affecting program participation using analysis of covariance with 1983 lunch and breakfast participation data.

All schools in the 1983 study participated in the National School Lunch Program (NSLP); School Breakfast Program (SBP) participation was limited to 12.5% (N = 90) of the survey schools in 1979 and 11.8% (N = 67) in 1983. A small increase was seen in the percentage of secondary schools offering the SBP, however.

Breakfast and lunch prices increased significantly between 1979 and 1983. Mean 1983 breakfast prices ranged from 31¢ in Iowa schools to 50¢ in Missouri, and were lowest for combined schools. Secondary school breakfast prices were higher than elementary prices in one population area (10,000 to 49,999) only.

Mean lunch prices varied from 88¢ in Iowa to $1.05 in Kansas in 1983. Overall mean lunch price was 57¢ in 1979 and 89¢ in 1983, an increase of

approximately 36%. Secondary schools in 1979 charged from 4 to 13¢ more for lunch than elementaries, and in 1983, from 5 to 72¢ more. These differences were greatest in the larger cities.

In 1983, Colorado schools reported the lowest mean percentage of students qualifying for free meals (17.3%), while Missouri schools reported the highest (29.6%). Significant increases were found in all states except in Colorado, ranging from 3.2 to 9.3%. Significant increases also were noted for elementary schools in all population areas, for secondary schools in the smallest cities, and for combined schools. Modest increases were observed in reduced price meal eligibility, along with an actual decrease in Colorado schools.

The extent of availability of alternatives to the NSLP was analyzed by school type. Data collected included information on a la carte service, snack bars, vending machines, sack lunches, fast food outlets, and open versus closed campus policies. Secondary schools were more likely to offer a la carte items and provide snack bars than were elementary or combined schools. Availability of a la carte service increased in secondary schools between 1979 and 1983 from 47 to 65%, and in combined schools from 10 to 20%.

Vending machines were provided in 11% of secondary schools in 1979, and in 13% in 1983. Very few elementary or combined schools reported use of vending machines. Although a large percentage of the survey schools reported students brought sack lunches, less than 25% routinely did so in all three school types. Little difference was found in closed campus policy in regard to school type in 1983; almost half allowed students to leave the campus at noon. In both 1979 and 1983 studies, fewer elementary schools had closed campus policies than did secondary schools. The number

of schools permitting an open campus decreased in 1983 for all three school types. Although both studies agreed that fast food outlets were more available to secondary students, the proximity of these establishments were closer to elementary and combined schools.

In both 1979 and 1983 studies, operational characteristics of school foodservice programs were analyzed by school type. On-site meal preparation was more frequent in secondary than in elementary and combined schools for both lunch and breakfast. Increases in the percent of schools involving students in menu planning, obtaining student evaluations, using taste panels, sponsoring special events, and arranging class tours of foodservice facilities were found between 1979 and 1983. Less than 15% of the surveyed schools reported use of student advisory councils in 1983, however, as compared to approximately 25% in 1979.

Increases were reported for all school types in percentage of schools reporting provision of alternate meal approaches. The increase ranged in elementary schools from 8 to 13%; in secondaries, from 68 to 73%; and in combined schools from 40 to 49%. Alternate meal approaches were most common, therefore, in schools serving high school students. Choices within the regular lunch menu pattern increased for all school types and were offered in 32% of the elementary, 81% of the secondary, and 54% of the combined schools. In 1983, 65% of the secondary schools offered a choice of main entree, while 72% allowed choices of vegetable, fruit, or dessert. Plate waste and serving temperature checks and use of standardized recipes were common practices in most schools in both studies. Questions requesting data on percentage of survey schools offering family style service and the offer versus serve option were added to the 1983 research instrument. Less than 5% of schools surveyed offered family

style service (Table 26); 54% of the elementary, 88% of the secondary, and 82% of the combined schools had implemented the offer versus serve option.

Three scores were computed to study lunch alternatives, student acceptance, and food quality data. Indices for both 1979 and 1983 and the differences between the two periods were analyzed using general linear model analysis of variance to determine differences among states and school type by area population. As in the Keyser study, the mean lunch alternatives score, indicating availability of more alternatives to the school lunch, was highest in Colorado schools and lowest in Missouri. Secondary schools had higher scores in both studies than did elementary and combined schools in all population areas. Student acceptance scores were similar in both reporting periods, in schools in all states and in all population areas. Food quality scores differed only slightly from state to state in both 1979 and 1983; secondary schools in all population areas had higher scores than did elementary and combined schools.

Data from 1979 and 1983 for percentage of average daily participation (ADP) for breakfast and lunch and percentage of meals served in three categories (free, reduced price, and paid) were analyzed using state and school type by area population as independent variables. Mean % ADP, lunch ranged from 53.8% in Colorado schools to 71% in Iowa in 1983. Schools in all states, except Colorado, indicated a drop in ADP from 1979 to 1983. Participation in elementary schools in all population areas and in combined schools was higher than in secondary schools in both survey periods. Significant increases in the percentage of meals served free and significant decreases in paid meals were found in all states and in all school types by population area in 1983, compared to 1979, except in urban elementaries. Elementary schools generally served more free meals than

did secondary schools. Changes in the percentage of students served reduced price meals were not significant except in Missouri schools, where a slight decrease was registered. In all population areas, elementary schools served more reduced price meals than did secondary schools in both the 1979 and 1983 study periods. Secondary schools had the highest percentage of paid meals served in all population areas.

For breakfast data, no significant changes in % ADP were found in comparing data from the two study periods. Percentage of meals served in the free and paid categories changed significantly, however. Colorado had the lowest % ADP (14%) and Iowa the highest (29%). In all population areas, participation was higher at the elementary than the secondary level in both 1979 and 1983. Increases for the percentage of breakfasts served free occurred in schools in all states, ranging from 11% in Missouri to 23% in Colorado. Actual percentage of free breakfasts varied from 60% in Iowa to 94% in Missouri schools. In all population areas, elementaries served a greater percentage of free breakfasts than did secondary schools. In 1983, the percentage of reduced price breakfasts decreased for each state surveyed. Means ranged from 3% in Iowa to 6.3% in Colorado. The percentage of paid meals served decreased in all four states as well; a low of 2.6% in Missouri compared to a high of 36.6% in Iowa schools was reported.

General linear model analysis of covariance also was used to analyze 1983 school breakfast and lunch participation data, patterning the procedures after those of Keyser (130). The two discrete variables in the analysis were state and school type by area population. School size, percentage of students bussed, percentages of students qualifying for free and reduced price meals, lunch price, and three indices computed to

assess effects of availability of lunch alternatives, of student involvement, and of food quality practices were covariates in the model.

In 1983, data indicated that smaller schools had both higher ADP and the % ADP served in the reduced price and paid categories. As expected, ADP and % ADP, free, and % meals served, free were higher in schools with a greater percentage of students qualifying for free meals, while this covariate was a negative predictor of the two paid lunch participation variables. Higher percentages of students with approved reduced price applications on file also were predictors of ADP and also, as expected, the two reduced price participation variables.

Results indicated that lower % ADP, % ADP, paid, and % meals served, paid were associated with greater availability of alternatives to the lunch program. Conversely, higher student acceptance scores were predictive of higher participation. The food quality score was a significant positive predictor of % meals served, paid.

Lower lunch prices were predictive of a higher overall ADP rate and % ADP, paid. These results were hypothesized in planning the study, because of the sizeable increase in paid lunch prices during the last four years and the anticipated effect on participation.

Keyser reported that for the overall sample of schools, approximately 20% of the total meals served were free, 7.3% reduced price, and 73.2% paid. In 1983, data indicated that 26.9% of total meals served were free, 7.5% reduced price, and 65.5% paid.

General linear model analysis of covariance also was used to analyze school breakfast participation statistics using a model similar to that for lunch participation data. The three indices related to lunch alternatives and food quality were excluded from the model for examining

breakfast data because these variables were relevant to lunch production and service, but not to breakfast.

Percentage of students qualifying for free and reduced price meals and breakfast price were found to be significant positive predictors for both % ADP and % ADP, free, in 1983. Percentage of students bussed had significant negative predictors for % ADP and % ADP reduced. No other beta weights were significant. In those schools serving breakfast, overall participation rate in the breakfast program in relation to average daily attendance was about 30%.

In conclusion, meal prices were significantly higher in 1983, reflecting decreased federal subsidies for children paying full price for meals, increased numbers of students qualifying for free meals, and increased food costs. The resultant effect of these price increases has been a significant drop in paid participation. The higher number of students qualifying for free meals is likely to be related to slight relaxation of the income eligibility guidelines. More stringent eligibility criteria for reduced price qualification have resulted in only a very small increase in reduced price qualifying students, however. Increased student involvement in school foodservice and greater service options, combined with fewer schools with open campus policies may be indicative of efforts to increase participation, particularly of the paying child.

Because of the positive contribution of child nutrition programs to the nutrient intake of school children, studies should be conducted to assess legislative impact further. In addition, studies investigating school lunch and breakfast participation should be initiated in other USDA/FNS regions.

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APPENDICES

APPENDIX A

Initial Correspondence

(KSU Letterhead)

November 1, 1983

Mr. Daniel G. Wisotzkey
Executive Director
Child Nutrition/Traffic Safety
Colorado Department of Education
State Office Building, Room 318
201 East Colfax Avenue
Denver, Colorado 80203

Dear Mr. Wisotzkey:

This correspondence is to follow up our recent telephone conversation concerning participation of selected schools in Colorado in the school foodservice study being conducted here at Kansas State University. As we discussed, this study will be a replication of one conducted in 1979, which investigated factors affecting participation in child nutrition programs. We hope this study will reveal the impact of recent legislation on such participation.

We are pleased you are interested in the study and are willing to work with us. We are enclosing the original letter of endorsement sent by your office, a copy of the publication reporting results of the original study, and a copy of the original survey questionnaire, which is under revision. Also included is a list of schools which were originally surveyed, per your request. Thank you for your kind offer to identify the appropriate contact personnel for distribution of the survey questionnaire. As we understand, you prefer that the form be sent to school principals, rather than the district superintendents.

We appreciate your willingness to provide a letter of endorsement for the study. If you have questions after reviewing the enclosed materials, please do not hesitate to let us know. We will share a copy of the final study with you when it is available.

Sincerely,

Sharon Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

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Enclosures

(KSU Letterhead)

November 1, 1983

Dr. Lewis Smith
Director, Child Nutrition Programs
Department of Public Instruction
Grimes State Office Building
Des Moines, Iowa 50319

Dear Dr. Smith:

This correspondence is to follow up our recent telephone conversation concerning participation of selected schools in Iowa in the school foodservice study being conducted here at Kansas State University. As we discussed, this study will be a replication of one conducted in 1979, which investigated factors affecting participation in child nutrition programs. We hope this study will reveal the impact of recent legislation on such participation.

We are pleased you are interested in the study and are willing to work with us. We are enclosing the original letter of endorsement sent by your office, a copy of the publication reporting results of the original study, and a copy of the original survey questionnaire, which is under revision.

We appreciate your willingness to provide a letter of endorsement for the study. If you have questions after reviewing the enclosed materials, please do not hesitate to let us know. We will share a copy of the final study with you when it is available.

Sincerely,

Sharon Hearne, R.D.
Graduate Research Assistant

Allene Vaden, Ph.D., R.D.
Professor and Project Director

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Enclosures

(KSU Letterhead)

November 1, 1983

Ms. Rita Hamman
Director, State School Food Service
Kansas State Department of Education
120 East 10th Street
Topeka, Kansas 66612

Dear Ms. Hamman:

This correspondence is to follow up our recent telephone conversation concerning participation of selected schools in Kansas in the school foodservice study being conducted here at Kansas State University. As we discussed, this study will be a replication of one conducted in 1979, which investigated factors affecting participation in child nutrition programs. We hope this study will reveal the impact of recent legislation on such participation.

We are pleased you are interested in the study and are willing to work with us. We are enclosing original letters of endorsement written by state school foodservice directors in Colorado, Missouri, and Iowa, a copy of the publication reporting results of the original study, and a copy of the original survey questionnaire, which is under revision.

We appreciate your willingness to consider provision of a letter of endorsement for the study and believe it would be helpful in securing participation by school level personnel. If you have questions after reviewing the enclosed materials, please do not hesitate to let us know. We will share a copy of the final study with you when it is available.

Sincerely,

Sharon Hearne, R.D.
Graduate Research Assistant

Allene Vaden, Ph.D., R.D.
Professor and Project Director

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Enclosures

(KSU Letterhead)

November 1, 1983

Mr. Wilbert Grannemann
Director, School Food Service
Department of Elementary and Secondary Education
Post Office Box 480
Jefferson City, Missouri 65102

Dear Mr. Grannemann:

This correspondence is to follow up our recent telephone conversation concerning participation of selected schools in Missouri in the school foodservice study being conducted here at Kansas State University. As we discussed, this study will be a replication of one conducted in 1979, which investigated factors affecting participation in child nutrition programs. We hope this study will reveal the impact of recent legislation on such participation.

We are pleased you are interested in the study and are willing to work with us. We are enclosing the original letter of endorsement sent by your office, a copy of the publication reporting results of the original study, and a copy of the original survey questionnaire, which is under revision.

We appreciate your willingness to provide a letter of endorsement for the study. If you have questions after reviewing the enclosed materials, please do not hesitate to let us know. We will share a copy of the final study with you when it is available.

Sincerely,

Sharon Hearne, R.D.
Graduate Research Assistant

Allene Vaden, Ph.D., R.D.
Professor and Project Director

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Enclosures

APPENDIX B

Instrument

KANSAS STATE UNIVERSITY

Department of Dietetics, Restaurant and Institutional Management

Justin Hall
Manhattan, Kansas 66506
913-532-5521

SURVEY OF SCHOOL FOOD PROGRAMS

SCHOOL NAME _____

ADDRESS _____

CITY, STATE _____
city state zip

PHONE NUMBER (_____) _____
area code

SCHOOL DISTRICT _____

ADDRESS _____

CITY, STATE _____
city state zip

PHONE NUMBER (_____) _____
area code

Please complete all questions and return in the envelope provided to:

Department of Dietetics, Restaurant
and Institutional Management
Kansas State University
Manhattan, Kansas 66506

STUDY OF SCHOOL FOODSERVICE PROGRAMS

Directions: Please complete all items as completely as possible.

SECTION I: SCHOOL CHARACTERISTICS AND PROGRAM INFORMATION

1. Is this school:

_____ (1) Public
_____ (2) Private

2. Please check all grades served at this school foodservice:

_____ (1) Pre-K
_____ (2) K
_____ (3) 1
_____ (4) 2
_____ (5) 3
_____ (6) 4
_____ (7) 5
_____ (8) 6
_____ (9) 7
_____ (10) 8
_____ (11) 9
_____ (12) 10
_____ (13) 11
_____ (14) 12

3. Please indicate enrollment at each grade level on October 1, 1983 (or the closest official reporting date; if different than Oct. 1, please specify date: _____):
date

no. students

_____ (1) Pre-K
_____ (2) K
_____ (3) 1
_____ (4) 2
_____ (5) 3
_____ (6) 4
_____ (7) 5
_____ (8) 6
_____ (9) 7
_____ (10) 8
_____ (11) 9
_____ (12) 10
_____ (13) 11
_____ (14) 12

4. What was the average daily attendance in Oct. (all grades served; estimate if necessary)?

_____

5. Does this school provide:

a. Lunches under the USDA National School Lunch Program?

_____ (1) Yes
_____ (2) No

b. Breakfasts under the USDA School Breakfast Program?

_____ (1) Yes
_____ (2) No

c. Milk under the USDA Special Milk Program?

_____ (1) Yes
_____ (2) No

If yes, indicate price per carton for paid milk _____

NOTE: If the answer to any part of Question 5 is Yes, please continue with Question 7 on page 2. If the answer to all three parts of Question 5 is No, please respond to Question 6 and return the questionnaire in the enclosed envelope. Thank you.

6. If this school is not currently providing these USDA Programs but has participated previously, please indicate when Programs were discontinued:

date of discontinuation of Program

_____ Lunch
_____ Breakfast
_____ Special Milk

For Questions 7 and 8, elementary and secondary grades are defined as:

Elementary Grades: Grades K-8 in K-12 schools or any school which includes grades below grade 9 (for example, schools with grades K-6, K-8, 4-6, 6-8, 7-8, etc.).

Secondary Grades: Grades 9-12 in K-12 schools or any school which includes grades 9 or above (that is, schools with grades 7-9, 8-9, 9-12, 10-12, etc.).

7. During October, 1983, how many USDA lunches, breakfasts, and half-pints of special milk were served in this school to the categories of participants identified below? (Please fill in those blocks that pertain to this school.)

Category	Elementary Grades		
	no. of meals in Oct. 1983		Special Milk (no. of half pints served, Oct. 1983)
	Breakfast	Lunch	
Full price, student			
Reduced price, student			
Free, student			
Other (teacners, other school staff and other adults)			
TOTAL			

Category	Secondary Grades		
	no. of meals in Oct. 1983		Special Milk (no. of half pints served, Oct. 1983)
	Breakfast	Lunch	
Full price, student			
Reduced price, student			
Free, student			
Other (teachers, other school staff and other adults)			
TOTAL			

8. What were the full and reduced prices charged for the USDA meals during October 1983? (Fill in the blocks that pertain to this school.)

Category	Prices Charged--USDA Reimbursed Meals			
	Elementary Grades		Secondary Grades	
	Breakfast	Lunch	Breakfast	Lunch
Full price				
Reduced price				

9. How many days were USDA meals served during October 1983?

_____ days served in Oct. 1983.

10. How many students had approved applications for free meals on file, October 15, 1983 (or closest official reporting date; if different than Oct. 15, please specify date: _____)?

_____ no. free meal applications, Oct. 15, 1983.

11. How many students had approved applications for reduced price meals on file, October 15, 1983 (or closest official reporting date; if different than Oct. 15, please specify date: _____)?

_____ no. reduced price meal applications, Oct. 15, 1983.

12. Approximately how many students are not in school when lunch is served?

_____ no. students not in school at lunch.

13. Are a la carte items offered to students? (If No, skip to Section II.)

_____ (1) Yes
_____ (2) No

14. What are the five most common a la carte items offered and what are their prices?

ITEM	PRICE

SECTION II: ALTERNATIVES TO THE USDA LUNCH

1. Is a snack bar available for students to use at noon? (If No, skip to question 4.)

_____ (1) Yes
_____ (2) No

2. Is the snack bar located in the lunchroom?

_____ (1) Yes
_____ (2) No

If No, where is the snack bar?

_____

3. Who operates the snack bar?

_____ (1) School Foodservice
_____ (2) Student groups
_____ (3) Outside vendors
_____ (4) Other, please specify:
_____

4. Are food vending machines available to students during mealtimes? (If No, skip to question 6.)

_____ (1) Yes
_____ (2) No

5. Are the vending machines located in the lunchroom?

_____ (1) Yes
_____ (2) No

6. Do any students bring sack lunches at noon? (If No, skip to question 8.)

_____ (1) Yes
_____ (2) No

7. What percentage do you estimate usually bring sack lunches?

_____ (1) Less than 25%
_____ (2) More than 25%

8. Are students allowed to leave the campus at noon for lunch? (If No, skip to Section III.)

_____ (1) Yes
_____ (2) No

9. What percent do you estimate usually leave the campus for lunch?

_____ (1) Less than 25%
_____ (2) More than 25%

10. Are off-campus fast food outlets readily available to students at noon? (If No, skip to Section III.)

_____ (1) Yes
_____ (2) No

11. What types of outlets are available?

_____ (1) Restaurants (McDonald's, Hardee's, . . .)
_____ (2) Mobile units
_____ (3) Other (please specify)
_____

12. How close are the nearest fast food outlets located to school?

_____ (1) One block or less
_____ (2) 2-3 blocks
_____ (3) 3-6 blocks
_____ (4) Over 6 blocks

SECTION III: SCHOOL MEAL FACILITIES AND PROMOTION

1. Where is the food prepared which is served at this school? (Check all appropriate boxes.)

Place Prepared	Breakfast	Lunch	A la Carte
On Site			
Base or Central Kitchen			
Commercial Firm			
Other _____ (specify)			

2. Does this school participate in the commodity or cash in lieu of commodity program?

_____ (1) commodity
_____ (2) cash in lieu

3. Is the room where the meals are served:

_____ (1) Used only as a lunchroom?
_____ (2) Dual-purpose, such as a gym?

4. At meal time, is the lunchroom:

_____ (1) Crowded?
_____ (2) About the right size?
_____ (3) Too big?

5. Is the lunch period:

_____ (1) A single shift?
_____ (2) Split and/or staggered?

6. How much time is allowed for each group of students to be served and to eat their lunch?

_____ length of lunch period (in minutes)

7. How many serving lines are used for the lunch?

_____ no. serving lines

8. How is the money for the meals collected?

_____ (1) School foodservice cashier
_____ (2) Teacher or school official
_____ (3) Other (please specify)
_____

9. Do you use a menu cycle for school lunches? (If No, skip to question 11.)

_____ (1) Yes
_____ (2) No

10. What is the length of the cycle? (Enter number of days.)

_____ length of cycle (in days)

11. a. Are alternate school lunch meal approaches available (e.g., school lunch salad bar, etc.)?

_____ (1) Yes, at elementary level
_____ (2) Yes, at secondary level
_____ (3) No

b. If Yes, what school lunch alternatives are regularly available? (Check all that apply.)

_____ (1) Regular school lunch
_____ (2) Salad school lunch
_____ (3) "Snack" school lunch
_____ (4) Soup and sandwich school lunch
_____ (5) Other, please specify

_____

12. Do students have a choice of items with the regular school lunch?

_____ (1) Yes, at elementary level
_____ (2) Yes, at secondary level
_____ (3) No

13. If Yes, does the choice of items include:

a. Main entree?

_____ (1) Yes
_____ (2) No

b. Vegetable, fruit or dessert?

_____ (1) yes
_____ (2) No

c. Other?

_____ (1) Yes
_____ (2) No

If Yes, please specify

_____

14. Is family style service used?

_____ (1) Yes, at elementary level
_____ (2) Yes, at secondary level
_____ (3) No

15. Is the "offer vs. serve" option available?

_____ (1) Yes, at elementary level
_____ (2) Yes, at secondary level
_____ (3) No

16. Are student taste panels used in your menu development?

_____ (1) Yes
_____ (2) No

17. Are students involved in menu planning?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

18. Are student evaluations or reactions to foodservice obtained?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

19. Are students involved in testing new food products and/or recipes?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

20. Are special events or feature days sponsored for students?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

Please turn to last page to complete the questionnaire.

21. Are class tours of foodservice facilities arranged?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

22. Is plate waste checked?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

23. Are standardized recipes used?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

24. Are serving temperatures of foods checked?

_____ (1) Rarely
_____ (2) Occasionally
_____ (3) Regularly

25. Do you have a student foodservice advisory council?

_____ (1) Yes
_____ (2) No

SECTION IV: CHARACTERISTICS OF GEOGRAPHIC AREA

1. What is the population of the city, town or area where the school is located?

_____ (1) 500,000 or more
_____ (2) 50,000-499,999
_____ (3) 10,000-49,000
_____ (4) Less than 10,000

2. Approximately what percentage of the students come to school by: (It may be helpful to contact other school officials, e.g., bus company, transportation supervisor, etc.)

_____ a. School bus, bused more than 30 minutes?
_____ b. School bus, bused less than 30 minutes?
_____ c. Walking, bikes, or private car?
_____ d. Other, please specify

_____

Thank you for completing this questionnaire. Please return it in the enclosed, postage paid envelope.

APPENDIX C

Correspondence to Accompany Research Instrument

(KSU Letterhead)

(Cover Letter to Principals of Colorado Schools)

November 28, 1983

Dear School Administrator:

The Department of Dietetics, Restaurant and Institutional Management at Kansas State University is conducting a study investigating factors affecting participation in child nutrition programs. In 1979, we conducted a similar study and we are undertaking this current investigation to examine the impact of legislation enacted between 1979 and 1983 on program participation. Schools in Colorado, Iowa, Kansas, and Missouri that were involved in the 1979 study are being asked to provide current data for these comparisons and analysis. A school (or schools) in your district was included in that study. Approximately two hundred schools from each state are included in the project.

State directors of school foodservice in Colorado and the other participating states have approved the project. The Colorado State Department of Education will receive a complete copy of the final report and a summary will be sent to each participating school district. A letter of endorsement with the approval from Colorado's DARU committee is enclosed from Mr. Daniel Wisotzkey, Colorado Executive Director of Child Nutrition/Traffic Safety, encouraging participation of your district in the project.

Enclosed is a questionnaire for a school in your district that was surveyed in the original study. The name of the school selected is indicated on the cover page. Please request that the school foodservice director in your school district and/or the manager of the school selected for the study complete the questionnaire as soon as possible. When completed, please ask that it be returned to us in the enclosed stamped envelope.

If you have any questions concerning this research, please contact us by telephone or mail. Thank you for your cooperation and time. We hope to obtain data from all schools in order to assess legislative impact. This study should yield valuable data for policy analysis in child nutrition.

Sincerely,

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

ns

Enclosures

(Note Attached to Questionnaire
for Colorado Schools)

Dear School Administrator:

We apologize for the delay in sending the enclosed school foodservice survey to you, but we felt it was important to secure DARU approval for this study prior to mailing--this approval required longer than we anticipated. We look forward to hearing from you, and will appreciate your cooperation in completing the enclosed questionnaire. Please note we are requesting October 1983 data.

Sincerely yours,

Sharon A. Hearne, R.D.
Allene G. Vaden, Ph.D., R.D.
Kansas State University

(KSU Letterhead)

(Cover Letter to Superintendents of Iowa Schools)

November 28, 1983

Dear School Administrator:

The Department of Dietetics, Restaurant and Institutional Management at Kansas State University is conducting a study investigating factors affecting participation in child nutrition programs. In 1979, we conducted a similar study and we are undertaking this current investigation to examine the impact of legislation enacted between 1979 and 1983 on program participation. Schools in Colorado, Iowa, Kansas, and Missouri that were involved in the 1979 study are being asked to provide current data for these comparisons and analysis. A school (or schools) in your district was included in that study. Approximately two hundred schools from each state are included in the project.

The study has been reviewed and approved by the Iowa school foodservice director and the state directors in the other participating states. The Iowa Department of Public Instruction will receive a complete copy of the final report and a summary will be sent to each participating district. A letter of endorsement is enclosed from Dr. Lewis Smith, Director of Child Nutrition Programs in Iowa, encouraging participation of your district in the project.

Enclosed is a questionnaire for the school in your district that was surveyed in the original study. The name of the school selected is indicated on the cover page. Multiple questionnaires are included if more than one school were selected in your district. Please request that the school foodservice director in your school district and/or the manager of the school or schools selected for study complete the questionnaire as soon as possible. When completed, please ask that it be returned to us in the enclosed stamped envelope.

If you have any questions concerning this research, please contact us by telephone or mail. Thank you for your cooperation and time. We hope to obtain data from all schools in order to assess legislative impact. This study should yield valuable data for policy analysis in child nutrition.

Sincerely,

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

ns

Enclosures

(KSU Letterhead)

(Cover Letter to Superintendents of Kansas Schools)

November 28, 1983

Dear School Administrator:

The Department of Dietetics, Restaurant and Institutional Management at Kansas State University is conducting a study investigating factors affecting participation in child nutrition programs. In 1979, we conducted a similar study and we are undertaking this current investigation to examine the impact of legislation enacted between 1979 and 1983 on program participation. Schools in Colorado, Iowa, Kansas, and Missouri that were involved in the 1979 study are being asked to provide current data for these comparisons and analysis. A school (or schools) in your district was included in that study. Approximately two hundred schools from each state are included in the project.

The study has been reviewed and approved by the Kansas school foodservice director and the state directors in the other participating states. The Kansas State Department of Education will receive a complete copy of the final report and a summary will be sent to each participating district. A letter of endorsement is enclosed from Mrs. Rita Hamman, Director, State School Food Service in Kansas, encouraging participation of your district in the project.

Enclosed is a questionnaire for the school in your district that was surveyed in the original study. The name of the school selected is indicated on the cover page. Multiple questionnaires are included if more than one school were selected in your district. Please request that the school foodservice director in your school district and/or the manager of the school or schools selected for study complete the questionnaire as soon as possible. When completed, please ask that it be returned to us in the enclosed stamped envelope.

If you have any questions concerning this research, please contact us by telephone or mail. Thank you for your cooperation and time. We hope to obtain data from all schools in order to assess legislative impact. This study should yield valuable data for policy analysis in child nutrition.

Sincerely,

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

ns

Enclosures

(KSU Letterhead)

(Cover Letter to Superintendents of Missouri Schools)

November 28, 1983

Dear School Administrator:

The Department of Dietetics, Restaurant and Institutional Management at Kansas State University is conducting a study investigating factors affecting participation in child nutrition programs. In 1979, we conducted a similar study and we are undertaking this current investigation to examine the impact of legislation enacted between 1979 and 1983 on program participation. Schools in Colorado, Iowa, Kansas, and Missouri that were involved in the 1979 study are being asked to provide current data for these comparisons and analysis. A school (or schools) in your district was included in that study. Approximately two hundred schools from each state are included in the project.

The study has been reviewed and approved by the Missouri school foodservice director and the state directors in the other participating states. The Missouri Department of Elementary and Secondary Education will receive a complete copy of the final report and a summary will be sent to each participating district. A letter of endorsement is enclosed from Mr. Wilbert Grannemann, Director of School Food Services in Missouri, encouraging participation of your district in the project.

Enclosed is a questionnaire for the school in your district that was surveyed in the original study. The name of the school selected is indicated on the cover page. Multiple questionnaires are included if more than one school were selected in your district. Please request that the school foodservice director in your school district and/or the manager of the school or schools selected for study complete the questionnaire as soon as possible. When completed, please ask that it be returned to us in the enclosed stamped envelope.

If you have any questions concerning this research, please contact us by telephone or mail. Thank you for your cooperation and time. We hope to obtain data from all schools in order to assess legislative impact. This study should yield valuable data for policy analysis in child nutrition.

Sincerely,

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

ns

Enclosures

APPENDIX D

Endorsement Letters from State Directors

COLORADO DEPARTMENT OF EDUCATION
State Office Building, 201 E. Colfax
Denver, Colorado 80203
Telephone (303) 866-2212

Calvin M. Frazier, *Commissioner of Education*

M E M O R A N D U M

TO: Superintendents of Schools, Food Service Directors
Sponsor Representatives

FROM: Daniel G. Wisotzkey, Executive Director
Child Nutrition Unit

DATE:

SUBJECT: Food Service Survey from Kansas State University

Approximately three years ago you cooperated with Kansas State University in a survey about school food services. Colorado was one state out of four that participated. The returns were excellent and information obtained was very helpful in our battle to retain the food service program.

The attached questionnaire is an update of the original survey and should be completed by the person to whom it is addressed. Changes have occurred in the program because of budget cuts, change in income guidelines, rates of reimbursement that have affected your program. The comparison of what was, with what is, could be a valuable tool in our continuing efforts to save and improve the program.

DGW:dlm

attachment

CDE - DARU FORM CLEARANCE RECOMMENDED
FORM NO. CDE-403
UNIT Child Nutrition
APPROVAL through June 1984

Iowa
a place to grow

STATE OF IOWA • DEPARTMENT OF PUBLIC INSTRUCTION
GRIMES STATE OFFICE BUILDING • DES MOINES, IOWA 50319

ROBERT D. BENTON, Ed.D., STATE SUPERINTENDENT
David H. Bechtel, M. S., Administrative Assistant
JAMES E. MITCHELL, Ph.D., DEPUTY SUPERINTENDENT

Dear School Administrator

One of the schools in your district has been selected to participate in a study being conducted and funded by Kansas State University concerning factors affecting participation in child nutrition programs. Selected schools in Colorado, Kansas, and Missouri have also been asked to participate.

You are encouraged to cooperate with the University project by completing the questionnaire. This study should make a worthwhile contribution to research in the area of child nutrition programs.

Thank you for the time involved.

Sincerely,

Louis E. Smith

Louis E. Smith, Director
Child Nutrition Programs Division

LES:nam

Kansas State Department of Education
Kansas State Education Building
120 East 10th Street Topeka, Kansas 66612

November 23, 1983

School Administrators

SCHOOL FOOD SERVICE STUDY

The Department of Dietetics, Restaurant, and Institutional Management at Kansas State University is conducting a study of factors affecting participation in Child Nutrition Programs. One or more schools in your district has been randomly selected to provide data for the study. Schools in Colorado, Iowa, and Missouri will also be participating.

Although providing the data is voluntary, I encourage your school personnel to complete the questionnaire. The information obtained from this study will be helpful to the Kansas State Department of Education as we provide assistance to Kansas schools.

Rita Hamman

Rita Hamman, Director
School Food Service

dl

ARTHUR L. MALLORY
Commissioner

Area Code 314
751-3526

State of Missouri
DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION
P.O. BOX 480
JEFFERSON CITY, MISSOURI 65102

Dear Authorized Representative:

The Department of Dietetics, Kansas State University, is conducting a follow-up study to the one conducted in 1979 including schools in Missouri, Kansas, Iowa, and Colorado in which you participated.

Kansas State University would like for you to participate in the current study also, which is designed to determine the impact of recent legislation on participation in the child nutrition programs. Although participation in the study is voluntary, the selected schools are encouraged to cooperate with Kansas State University in this project.

The Department of Elementary and Secondary Education will be provided a copy of the final study, and hopefully it will be helpful to us as we work with schools in administering the child nutrition programs.

Sincerely,

Wilbert Grannemann, Director
School Food Services

APPENDIX E

Follow-up Correspondence

(KSU Letterhead)

(First Follow-up Correspondence to School Administrators in Iowa, Kansas, and Missouri)

January 16, 1984

Dear School Administrator:

Last month we mailed a questionnaire(s) to you entitled "Survey of School Food Programs" to be completed on the school foodservice for one or more schools in your district. In the event you did not receive the survey(s), we would like to restate the purpose of the study. The objective of this research effort is to investigate factors affecting participation in child nutrition programs in light of recent legislation. Schools in Colorado, Iowa, Kansas, and Missouri that participated in a similar study in 1979 are being asked to provide data from October, 1983 for the purpose of comparison and analysis. The state department of education of each state has approved and endorsed this study. Responses from the school or schools in your district are very important to the validity of the survey.

If the reply or replies from your district are in the mail, thank you for the time and help! Should an additional survey form or forms be needed, we have included one or more for the school or schools in your district with this letter. The name of the target school or schools in your district is indicated on each form.

Thank you in advance for your cooperation! We hope to receive all completed forms by the end of January.

Sincerely yours,

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

Enclosure

(KSU Letterhead)

(First Follow-up Correspondence to School Administrators in Colorado)

February 1, 1984

Dear School Administrator:

Last month we mailed a questionnaire to you entitled "Survey of School Food Programs." In the event you did not receive the survey, we would like to restate the purpose of the study. The objective of this research effort is to investigate factors affecting participation in child nutrition programs in light of recent legislation. Schools in Colorado, Iowa, Kansas, and Missouri that participated in a similar study in 1979 are being asked to provide data from October, 1983 for the purpose of comparison and analysis. The state department of education of each state has approved and endorsed this study. Your response is very important to the validity of the survey.

If your reply is in the mail, thank you for your time and help! Should another survey form be needed, one has been included with this letter. When you have completed the questionnaire, please place it in the enclosed stamped envelope and return it to us. Thank you in advance for your cooperation!

Sincerely yours,

Sharon A. Hearne, R.D.
Graduate Research Assistant

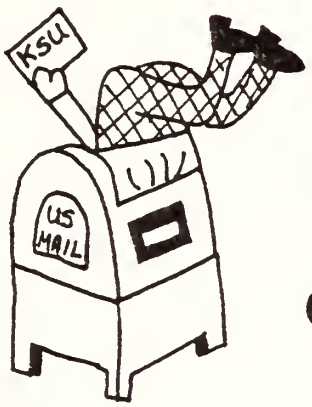
Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

Enclosure

(KSU Letterhead)

(Second Follow-up Correspondence to
Iowa School Administrators)

February 17, 1984



CROSSED IN THE MAIL ??

Dear School Administrator:

Last month we sent you a questionnaire entitled "Survey of School Food Programs". If your response and this letter have "crossed in the mail", thank you for your help and please disregard this notice.

Should you discover that you have not returned the questionnaire, we urge you to complete the form as soon as possible and return it to us. Approximately 90 percent of the schools surveyed in Iowa have responded to date. Only 15 schools in your state have not yet returned the questionnaire. We need your help! Every survey form is important to the validity of this study.

We would like to remind you that data requested are for October, 1983. We look forward to hearing from you, and appreciate your cooperation. For your convenience, a copy of the survey form or forms and a postage-paid return envelope are enclosed.

Sincerely yours,

Allene G. Vaden

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

(KSU Letterhead)

(Second Follow-up Correspondence to
Kansas School Administrators)

February 17, 1984

CROSSED IN THE MAIL ??

Dear School Administrator:

Last month we sent you a questionnaire entitled "Survey of School Food Programs." If your response and this letter have "crossed in the mail," thank you for your help and please disregard this notice.

Should you discover that you have not returned the questionnaire, we urge you to complete the form as soon as possible and return it to us. Approximately 90 percent of the schools surveyed in Kansas have responded to date. Only 16 schools in your state have not yet returned the questionnaire. We need your help! Every survey form is important to the validity of this study.

We would like to remind you that data requested are for October, 1983. We look forward to hearing from you, and appreciate your cooperation. For your convenience, a copy of the survey form or forms and a postage-paid return envelope are enclosed.

Sincerely yours,

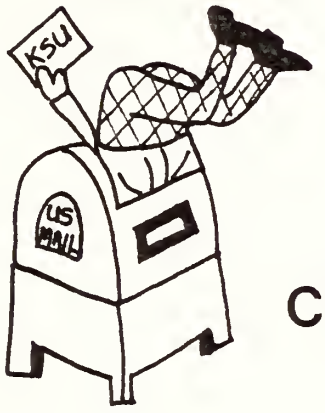
Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

(KSU Letterhead)

(Second Follow-up Correspondence to
Missouri School Administrators)

February 17, 1984



CROSSED IN THE MAIL??

Dear School Administrator:

Last month we sent you a questionnaire entitled "Survey of School Food Programs". If your response and this letter have "crossed in the mail", thank you for your help and please disregard this notice.

Should you discover that you have not returned the questionnaire, we urge you to complete the form as soon as possible and return it to us. Approximately 90 percent of the schools surveyed in Missouri have responded to date. Only 19 schools in your state have not yet returned the questionnaire. We need your help! Every survey form is important to the validity of this study.

We would like to remind you that data requested are for October, 1983. We look forward to hearing from you, and appreciate your cooperation. For your convenience, a copy of the survey form or forms and a postage-paid return envelope are enclosed.

Sincerely yours,

Allene G. Vaden

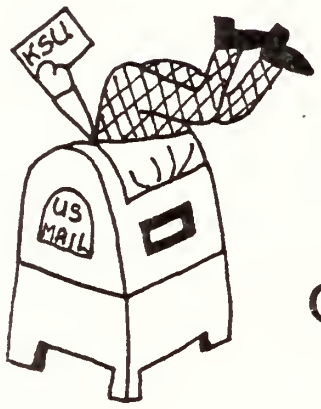
Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Direct

(KSU Letterhead)

(Second Follow-up Correspondence to
Colorado School Administrators)

February 24, 1984



CROSSED IN THE MAIL??

Dear School Administrator:

Last month we sent you a questionnaire entitled "Survey of School Food Programs". If your response and this letter have "crossed in the mail", thank you for your help and please disregard this notice.

Should you discover that you have not returned the questionnaire, we urge you to complete the form as soon as possible and return it to us. Approximately 90 percent of the schools participating in Kansas, Iowa, and Missouri have responded to date. Only 60 percent of Colorado schools in the research sample have returned the survey forms, however. We realize that your receipt of the questionnaire was delayed pending DARU approval, but we need your help! Every survey form is important to the validity of this study.

We would like to remind you that data requested are for October, 1983. We look forward to hearing from you, and appreciate your cooperation. For your convenience, a copy of the survey form or forms and a postage-paid return envelope are enclosed.

Sincerely yours,

Allene G. Vaden

Sharon A. Hearne, R.D.
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.
Professor and Project Director

TRENDS IN SCHOOL BREAKFAST AND LUNCH PARTICIPATION: 1979 AND 1983

by

SHARON ANTONELLI HEARNE

B.S., Texas Tech University, 1977

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Dietetics, Restaurant
and Institutional Management

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1984

ABSTRACT

In 1979, a study assessing factors affecting participation in child nutrition programs in Colorado, Iowa, Kansas, and Missouri was conducted by Keyser. Because of the significant legislative changes since 1980, and the resultant impact on program participation, this study extended Keyser's research by compiling a 1983 data base and conducting comparative analysis of changes from 1979 to 1983.

Schools in the four-state midwestern region in the Keyser study were asked to participate in the 1983 study to permit examination of changes in the same sample of schools. Specific objectives of the study were to study participation rates in the school lunch and breakfast programs in relation to a number of selected variables, to determine availability of the NSLP to students, to examine data on school foodservice facilities and institutional arrangements being used, to study activities and functions identified as components of school foodservice program quality, and to compare data reported in 1979 with those collected in 1983 to permit examination of changes during this period. Ninety-two percent of the survey schools (N = 628) returned the mail questionnaires. Data were examined for elementary, secondary, and for school cafeterias serving both elementary and secondary students.

All schools in the 1983 study participated in the National School Lunch Program (NSLP). School Breakfast Program (SBP) participation was reported in only 12.5% (N = 90) of the survey schools in 1979 and in only 11.8% (N = 67) in 1983.

Breakfast and lunch prices increased significantly in 1983, compared to 1979. Mean 1983 breakfast prices ranged from 31¢ in Iowa schools to 50¢ in Missouri, and were lowest for combined schools, or those serving both elementary and secondary students.

Mean lunch prices varied from 88¢ in Iowa to $1.05 in Kansas in 1983. Overall mean lunch price was 57¢ in 1979 and 89¢ in 1983, an increase of approximately 36%. Secondary schools in 1979 charged from 4 to 13¢ more for lunch than elementaries, and in 1983, from 5 to 72¢ more. These differences were greatest in the larger cities.

In 1983, Colorado schools reported the lowest mean percentage of students qualifying for free meals (17.3%) while Missouri schools reported the largest (29.6%). Significant increases were found in schools in all states except Colorado, ranging from 3.2 to 9.3%. Modest increases were observed in reduced price meal eligibility, except in Colorado schools.

Increases in the percentage of schools involving students in menu planning, obtaining student evaluations, using taste panels, sponsoring special events, and arranging class tours of foodservice facilities were found between 1979 and 1983. Increases also were reported for all school types in percentage of schools reporting provision of alternate approaches to the school lunch. Alternate meal approaches were most common, however, in schools serving high school students. Choices within the regular lunch menu pattern increased for all school types, and were offered in 32% of the elementary, 81% of the secondary, and 54% of the combined schools. Plate waste and serving temperature checks and use of standardized recipes were common practices in most schools.

Mean percentage average daily participation (ADP) lunch ranged from almost 54% in Colorado to 71% in Iowa in 1983. Schools in all states

except Colorado indicated a drop in ADP from 1979 to 1983. Participation in elementary schools at all population levels and in combined schools was higher than in secondary schools in both 1979 and 1983 survey periods. Significant increases were found from 1979 to 1983 in the percentage of meals served free in schools in all four states in all population areas. Elementary schools generally served more free meals than did secondary schools. The percentage of students served reduced price meals did not change significantly in 1983, compared to 1979, except in Missouri schools where a slight decrease was registered. The percentage of paid meals served declined in schools in all four states and in all population areas between 1979 and 1983. The decline ranged from 2.9% in the large city elementary schools to 17.3% in the large city high schools. For breakfast data, % ADP did not change significantly between the two study periods and ranged from almost 14% in Colorado to more than 28% in Iowa in those schools offering breakfast.

Lower lunch prices were predictive of a higher overall ADP rate and % ADP, paid, indicating that the higher prices in 1983 had a negative effect on lunch participation. Greater efforts to involve students and to improve food quality, however, were positive factors encouraging participation. Percentage of students qualifying for free and reduced price meals were positive predictors of both % ADP breakfast and % ADP, free, in 1983, indicating that schools with larger numbers of students with approved applications had more students who ate school breakfast. Percentage of students bussed was a negative predictor for % ADP breakfast. Perhaps bus schedules did not allow students to arrive at school in sufficient time to take part in school breakfast.