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KIDS' SAFE & HEALTHFUL FOODS PROJECT

Robert Wood Johnson Foundation

THE PEW CHARITABLE TRUSTS

Serving Healthy School Meals

U.S. schools need updated kitchen equipment

The Kids' Safe and Healthful Foods Project is a collaboration between The Pew Charitable Trusts and the Robert Wood Johnson Foundation that provides nonpartisan analysis and evidence-based recommendations on policies that impact the safety and healthfulness of school foods. For more information, see healthyschoolfoodsnow.org.

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The analysis included in this report is that of The Pew Charitable Trusts and the Robert Wood Johnson Foundation and does not necessarily reflect the views of outside reviewers. This report is intended for educational and informative purposes. References to specific policymakers, individuals, schools, policies, or companies have been included solely to advance these purposes and do not constitute an endorsement, sponsorship, or recommendation.

About this series of reports

This is the second in a series of reports that summarizes how schools are putting in place updated U.S. Department of Agriculture, or USDA, meal standards and the challenges they must overcome to reach full implementation. Specifically, this report will address school food service equipment and infrastructure needs.

The first report summarized districts' readiness to meet updated nutrition standards. The key findings from that report, "Serving Healthy School Meals: Despite Challenges, Schools Meet USDA Meal Requirements," are:

- **Finding 1:** Ninety-four percent of school food authorities expected to be able to meet the updated lunch requirements by the end of school year 2012-13, which was the year that the new requirements first went into effect.
- **Finding 2:** Although the vast majority of school food authorities intended to meet the updated standards by the end of the school year, most—91 percent—also indicated that they faced one or more challenges to reaching full implementation. These included, for example, the lack of adequate equipment or training and issues with food costs and availability.
- **Finding 3:** Most school food authorities without adequate equipment reported "making do" with some type of less-efficient process, or workaround, which in turn was widely considered to be inadequate, expensive, inefficient, and/or unsustainable.

The third report will address the training of school nutrition staff. Fact sheets will also be released addressing the needs of individual states regarding implementation of USDA's standards.

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Overview

Schools play a critical role in influencing the health of our nation's children. More than 31 million children in the United States participate in the National School Lunch Program, or NSLP, each school day,[1] and a large number of students consume up to half of their daily calories at school.[2] Yet, many schools were built decades ago and face challenges as they strive to serve foods that meet children's dietary needs. This report focuses on one crucial set of challenges that school districts face in meeting nutrition standards for meals: the need for improved equipment and infrastructure.

In January 2011, the U.S. Department of Agriculture proposed updated nutrition standards for school meals to align them with the 2010 Dietary Guidelines for Americans[3] and current information on children's nutritional requirements.[4] Schools were required to implement the updated standards for lunches in school year, or SY, 2012–13 that incorporate more fruits and vegetables, whole grains, and low-fat dairy products.

School food authorities,* or SFAs, are managing to serve healthier meals despite challenges, such as limitations in their existing kitchen equipment and infrastructure and in the knowledge and skills of food service staff.[5] As of September 2013, USDA data confirm that 80 percent of schools reported meeting the standards.[6] These changes are a huge step forward for child nutrition and, therefore, children's health.

Since the beginning of the National School Lunch Program, the federal government has provided funding for school kitchen equipment. However, until 2009, nearly 30 years had passed without funding for this priority. In 2009 and 2010, primarily with funds from the American Recovery and Reinvestment Act, the USDA provided $125 million to SFAs to purchase, renovate, or replace food service equipment. The agency received more than $630 million in grant requests from SFAs in response to ARRA funding, suggesting a substantial unmet need.

> This report is the second in a series by the Kids' Safe and Healthful Foods Project—a joint initiative of The Pew Charitable Trusts and the Robert Wood Johnson Foundation—which began work in January 2012 on the first national study to assess the equipment, infrastructure, and training needs of school food authorities. The first study of this series, "Serving Healthy School Meals: Despite Challenges, Schools Meet USDA Meal Requirements," analyzed the extent to which SFAs believed they would be able to comply with the updated standards.

The information presented in this report is based on a self-administered, online survey of school food service directors or their designees (primarily food service managers) from a nationally representative sample of the administrators of public school food authorities.

* A school food authority is the local administrative unit that operates the national school breakfast and lunch programs for one or more school districts.

Kitchen Infrastructure, Training, and Equipment in Schools Workshop

In addition to the survey, the project convened food service directors, school administrators, industry representatives, nonprofit organizations, foundations, and financiers in July 2013 to discuss how schools could meet and exceed the updated nutrition standards by finding the resources to update their kitchens and cafeterias. The group developed strategic approaches to finance equipment and infrastructure upgrades that leverage partnerships, sponsorship funding, low-interest loans, and revenue generated outside of the school meal setting. The model approaches, many of which have already been demonstrated by schools across the country, are detailed in "Serving Healthy School Meals: Financing strategies for school food service," proceedings from the workshop.

Key findings

This report presents findings about the challenges districts face in implementing the updated meal standards, specifically as they relate to equipment and infrastructure needs. Below are the key findings:

Finding 1: The vast majority of school food authorities (88 percent) needed one or more pieces of equipment to help them meet the current lunch standards. Of those that reported having inadequate equipment, more than 85 percent are "making do" with a less-efficient process or workaround.

Finding 2: Only 42 percent of school food authorities reported having a budget to purchase capital equipment, and less than half expected the budget to be adequate to meet their equipment needs.

Finding 3: More than half of all school food authorities (55 percent) need kitchen infrastructure changes at one or more schools to meet the lunch requirements.

Schools across the country are working hard to put safe and healthful meals on the cafeteria table. This report will outline the equipment and infrastructure they need to do so.

Recommendations

In light of the report findings and a series of specific suggestions discussed in the Kitchen Infrastructure, Training, and Equipment in Schools Workshop, the project recommendations are as follows:

Recommendation 1: School officials and local policymakers should work collaboratively with parents, teachers, students, and funders to identify and implement strategies for meeting equipment, infrastructure, and training needs.

Recommendation 2: Federal, state, and local governments should prioritize making funds available to help schools upgrade their kitchen equipment and infrastructure to efficiently serve healthy and appealing meals.

Recommendation 3: Nonprofit and for-profit organizations that have an interest in improving children's health, education, school infrastructure, and community wellness should assist schools in acquiring the necessary equipment.

Background

Established in 1946, the National School Lunch Program operates in nearly all public schools and in 94 percent of public and private schools combined.[7] The main goal of the National School Lunch and School Breakfast Programs is to promote the health and well-being of children by ensuring that they have access to nutritious meals that support normal growth and development. Schools that participate in the lunch program must make meals available to all children, and provide lunches to children from low-income families for free or at a reduced price.

About the survey of school food service directors

The findings presented in this report are based on a survey, conducted by Mathematica Policy Research, of school food service directors or their designees (those deemed to be most knowledgeable about the district's equipment, infrastructure, and training needs) from a nationally representative sample of public SFAs. In most cases (67 percent), respondents were food service or nutrition directors. Other respondents included food service, kitchen, or cafeteria managers (17 percent) and those who held other positions within the SFA (14 percent). The questionnaire was developed with assistance from a consultant who works with school food authorities to implement the updated meal requirements. In addition, a panel of child nutrition and food service experts from across the country helped identify and frame the key issues to be measured. The questionnaire covered four main topic areas, each focusing on the needs of SFAs relative to implementing the updated requirements for school lunches:*

- Readiness for and barriers to meeting the updated requirements.
- Adequacy of and need to replace or add food service equipment.
- Kitchen infrastructure needs.
- Staff training needs.

Additional information was collected on demographic and operational characteristics of the SFAs and on the credentials and experience of survey respondents.

SFAs were sampled from a USDA database of those participating in the National School Lunch Program. A total of 3,372 representatives completed the survey, for a response rate of 54.3 percent.

Data were collected between August and December 2012, and responses reflect circumstances in SY 2012–13 as schools worked to implement the updated lunch requirements. The panel of experts developed the survey with a particular focus on what districts *need*, not what they *want*, in order to meet the updated meal standards. As a result, the questionnaire asked about those needs tied to changes in the meal pattern based on function (i.e., storage and receiving, meal preparation, holding and transportation, and meal service). (See Appendix E.)

Key findings were examined for differences among subgroups defined by size (total student enrollment), community type (urban, suburban, and rural), region of the country (as defined by the Food and Nutrition Service), and poverty category (based on the percentage of enrolled students approved for free or reduced-price meals). More information on the methodology can be found in Appendix C.

* The study focused only on the updated requirements for the National School Lunch Program, both to limit the burden on respondents and because updated meal requirements for the school breakfast program had not yet gone into effect at the time of the survey.

In December 2010, the Healthy Hunger-Free Kids Act reauthorized the school breakfast and lunch programs with a focus on improving children's access to healthy foods in schools and promoting healthy eating and physical activity behaviors. Congress directed USDA to update nutrition standards for all foods sold on campuses during the school day and made available, for the first time in more than 30 years, additional funding for the lunch program.* In January 2011, the agency proposed updated nutrition standards for school meals that would require schools to offer more fruits, vegetables, and whole grains, and limit milk to fat-free and low-fat varieties. An additional 6 cents per lunch is now available to school food authorities that comply with updated meal requirements and is intended to help cover the costs of offering meals with more fruits, vegetables, and whole grains.

The final rule establishing the updated meal requirements was issued in January 2012 and went into effect on July 1, 2012.[8] These requirements mark the first major changes to the nutrition standards for school meals in more than 15 years. Schools were required to implement the updated requirements for lunches beginning in SY 2012–13 and to begin implementing the updated requirements for the school breakfast program in SY 2013–14.

Proper kitchen equipment and infrastructure are necessary to prepare and serve healthy meals. For example, schools need ovens to bake rather than fry foods; refrigerators to hold fruits, vegetables, and low-fat dairy products; and proper infrastructure such as electrical capacity, plumbing, and physical space to prepare and store foods.

In addition to various nongovernment grants and funding sources, the federal government has a historical role in providing funding for school kitchen equipment. Early in the history of the National School Lunch Program in 1946, and between 1966 and the early 1980s, Congress appropriated federal funding for the purchase of new kitchen equipment or the renovation of existing equipment to help establish and expand the school meal programs. After a long period without such assistance, USDA in 2009 used funds from the American Recovery and Reinvestment Act to provide $100 million in equipment grants for SFAs to purchase, renovate, or replace food service equipment.[9] In 2010, an additional one-time appropriation of $25 million was also made available for this purpose.[10] Applications from SFAs for these grants exceeded $630 million,[11] suggesting there was a substantial unmet need for equipment upgrades.

The first report in this series revealed that 94 percent of U.S. school districts anticipated being able to meet the updated standards by the end of the 2012-13 school year.[12] However, 90 percent of districts face challenges. One-third reported having inadequate equipment and nearly one-quarter faced infrastructure challenges, such as a lack of necessary electrical or plumbing capacity. This report takes a deeper look into the equipment and infrastructure needs of school districts across the country.

* Reimbursement rates for the school lunch and breakfast programs are adjusted annually to reflect changes in the Consumer Price Index (Food Away From Home series for All Urban Consumers). (Source: Federal Register, *National School Lunch, Special Milk, and School Breakfast Programs, National Average Payments/Maximum Reimbursement Rates*, U.S. Department of Agriculture, 77, no. 142 (July 24, 2012), http://www.fns.usda.gov/cnd/governance/notices/naps/NAPs12-13.pdf.)

Equipment needs and costs

To understand the food service equipment needs of school food authorities, respondents were asked to:

- Characterize the adequacy of their existing equipment, including whether they had to use a less-efficient process, or a "workaround," to deal with equipment inadequacies.
- Identify any new equipment they need to prepare and serve meals that meet the lunch requirements.
- Indicate the existence of equipment replacement and upgrade plans and capital equipment budgets available for their SFA.

For further explanation on different types of kitchens, refer to Appendix B.

Data on equipment needs and costs were gathered and analyzed separately for central kitchens/commissaries and all other production facilities. Estimated costs for needed equipment were calculated using average food service equipment prices, including typical manufacturer discounts, installation costs, and other expenses. Survey results for school kitchens—full-service, production, and finishing/satellite kitchens—were summarized separately from central production facilities because the latter require a different scale of equipment.

School food authorities by size

For the survey, SFAs were grouped into five categories based on the number of enrolled students.

- Very small (fewer than 1,000).
- Small (1,000 to 2,499).
- Medium (2,500 to 9,999).
- Large (10,000 to 24,999).
- Very large (25,000 or more).

Half of all public SFAs have fewer than 1,000 enrolled students and can be characterized as very small. Another 44 percent are either small or medium (roughly equal proportions of each). Large and very large SFAs (10,000 or more students) are much less common, accounting for only 7 percent of all SFAs but serving 55 percent of public school children. See Appendix B for more information on the demographic characteristics of school food authorities.

Adequacy of existing equipment

SFA respondents were asked to characterize the adequacy of their existing food service equipment for making five critical changes defined in the updated lunch requirements:

- Including more fruit and vegetable items on daily menus.
- Offering a greater variety of fruits and vegetables in both type and form (e.g., whole or sliced, fresh or canned).
- Ensuring that at least half of the grains offered are whole grain-rich.
- Providing different portion sizes for each grade group.*

* USDA defined the updated meal requirements for three grade groups: K-5, 6-8, and 9-12.

- Meeting calorie ranges and saturated fat, trans fat, and sodium targets.

For each change, respondents were asked to think about the adequacy of their existing equipment for four different food service functions that would be necessary to put the changes into place:

- Receiving and storage.
- Food preparation.
- Holding and transportation.
- Meal service.

Survey response options were as follows:

- Adequate, either as is or using a workaround.
- Inadequate, but making do with a workaround.
- Inadequate and no workaround.

> We had a variety of schools that were built in the 1920s before the National School Lunch Program was in place. The feasibility study we conducted showed us a wide range of needs that we had to address through facility upgrades—everything from electrical systems, to new equipment, to plumbing. … The study showed that we would achieve significant cost savings going from a lot of pre-prepared foods to more fresh or from scratch food.
>
> **Jennifer LeBarre,** *executive director, nutrition services, Oakland Unified School District (Oakland, CA)*

Adequacy of equipment in school kitchens

Across the five key changes defined in the updated requirements, 17 to 34 percent of SFAs characterized the existing equipment in their school kitchens as **inadequate**. (See the two columns under the heading "Inadequate" in Table 1.) Most of those who reported inadequacies are making do with some type of workaround in place, but approximately 2 to 3 percent reported that no workaround was available.

The greatest difficulties for SFAs in terms of their equipment needs involve adding more and a greater variety of fruit and vegetables to their daily menus. About one-quarter to one-third (27 to 34 percent) of SFAs said the existing equipment in their school kitchens is inadequate to make these changes, with or without a workaround. Equipment for receiving and storing fruits and vegetables was most likely to be inadequate.

The reported inadequacy of existing equipment for meeting the lunch requirements differed by size and region for a few of the key changes queried, as follows:

- Districts considered to be large and very large (greater than 10,000 students) were the most likely to report that they were making do with workarounds to meet two requirements: including more fruit and vegetable items on daily menus and offering a greater variety of fruits and vegetables. (See Appendix Table A.1.) Very small districts (fewer than 1,000 students) were more likely to report having adequate equipment and less likely to report making do with workarounds.

Table 1

Reported Adequacy of Food Service Equipment for Meeting Lunch Requirements

School Kitchens

	Percentage of SFAs			
	Inadequate		Adequate	Missing
	Making do with a workaround	No workaround		
More fruit and vegetable items on daily menus				
Receiving and storage	31.6	2.7	64.0	1.7
Preparation	25.5	2.2	69.9	2.4
Holding and transportation	23.9	2.8	69.3	3.9
Meal service	28.0	2.2	67.6	2.2
Greater variety of fruits and vegetables				
Receiving and storage	30.6	3.3	62.7	3.3
Preparation	26.9	2.4	66.8	3.9
Holding and transportation	25.5	3.1	66.4	5.0
Meal service	28.2	2.2	65.7	3.9
At least half of grains offered are whole grain-rich				
Receiving and storage	16.5	2.2	78.0	3.4
Preparation	17.1	1.8	77.0	4.2
Holding and transportation	15.2	1.9	78.4	4.5
Meal service	15.8	2.0	78.0	4.2
Different portion sizes for each grade group (K-5, 6-8, 9-12)				
Receiving and storage	19.1	2.5	74.6	3.7
Preparation	23.7	2.7	69.6	4.0
Holding and transportation	18.9	2.5	73.8	4.8
Meal service	24.6	3.4	68.0	4.1
New calorie ranges and saturated fat, trans fat, and sodium targets				
Receiving and storage	18.8	3.0	74.5	3.8
Preparation	23.3	3.2	69.7	3.9
Holding and transportation	17.8	2.8	74.2	5.2
Meal service	19.2	3.2	73.3	4.3
Number of SFAs (unweighted)*	3,372			
Number of SFAs (weighted)*	13,813			

Note:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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- SFAs in the Western region were the most likely to report having inadequate equipment but were making do with a workaround for offering more fruit and vegetable items on daily menus (30 to 38 percent) and having at least half of all grains be whole grain-rich for the school week (20 to 22 percent). (See Appendix Table A.3.)
- There were few statistically significant differences among SFAs' reports of equipment inadequacy by community type or poverty category. (See Appendix Tables A.2 and A.4.)

Adequacy of equipment in central kitchens and commissaries

Respondents with central kitchens and commissaries also characterized the adequacy of the existing equipment in those facilities. Across the five key changes specified in the updated lunch requirements, between 13 and 30 percent of SFAs with central kitchens/commissaries characterized the existing equipment in these facilities as inadequate. (See the two columns under the heading "Inadequate" in Table 2.) Between 70 and 90 percent of these SFAs were making do with some type of workaround. Between 2 and 5 percent said the equipment they currently have on hand was inadequate with no workaround available.

As in school kitchens, the changes that posed the greatest challenge for central kitchens and commissaries were the two related to fruits and vegetables. Roughly one-quarter to one-third (24 to 30 percent) of SFAs reported that the existing equipment in their central kitchen/commissary was inadequate to make these changes, particularly for receiving and storage.

> One of the biggest needs that we identified in meeting the nutrition standards was increased food storage capacity. What we found this year is that we purchased more than $1 million of additional fruits and vegetables. One of the biggest, most impactful projects is actually happening this summer, where we are expanding the walk-in cooler, walk-in freezer, and dry goods storage capacity at four schools.
>
> **Michael Rosenberger,** *director, food and nutrition services, Irving Independent School District (Irving, TX)*

Workarounds for inadequate equipment

Most respondents who said their existing equipment was inadequate reported that they were making do with a workaround, such as manually chopping and slicing fruits and vegetables because slicers and choppers were unavailable; storing fruits and vegetables in off-site locations and transporting them daily; keeping fruits and vegetables in temporary storage containers such as milk crates and small coolers, or increasing the frequency of food delivery to avoid having to store fruits and vegetables; and preparing lunches in shifts because of inadequate preparation and/or meal service space.

Table 2

Reported Adequacy of Food Service Equipment for Meeting Lunch Requirements

Central Kitchens and Commissaries (among SFAs with central production facilities)

	Percentage of SFAs			
	Inadequate		Adequate	Missing
	Making do with a workaround	No workaround		
More fruit and vegetable items on daily menus				
Receiving and storage	24.9	4.8	55.1	15.1
Preparation	20.3	3.2	61.5	14.9
Holding and transportation	20.8	4.2	60.0	14.9
Meal service	22.6	3.0	57.2	17.3
Greater variety of fruits and vegetables				
Receiving and storage	25.6	3.5	57.6	13.4
Preparation	23.2	2.9	60.3	13.6
Holding and transportation	21.9	3.4	60.1	14.6
Meal service	22.2	4.4	58.1	15.3
At least half of grains offered are whole grain-rich				
Receiving and storage	11.9	4.1	67.4	16.6
Preparation	11.3	3.1	68.7	16.9
Holding and transportation	11.9	4.2	66.9	16.9
Meal service	11.5	2.4	67.5	18.6
Different portion sizes for each grade group (K-5, 6-8, 9-12)				
Receiving and storage	16.9	3.9	62.8	16.5
Preparation	18.0	3.2	61.7	17.2
Holding and transportation	16.7	4.8	61.6	16.9
Meal service	17.2	3.3	61.1	18.5
New calorie ranges and saturated fat, trans fat, and sodium targets				
Receiving and storage	9.5	3.7	71.3	15.6
Preparation	13.7	2.8	66.7	16.8
Holding and transportation	10.8	4.1	67.3	17.8
Meal service	12.2	2.7	65.8	19.2
Number of SFAs (unweighted)*	340			
Number of SFAs (weighted)*	1,244			

Note:

* The data are weighted to be representative of all public SFAs participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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> When you are renovating a facility or building a new school and with it a new school kitchen, you are buying the same way that a chain restaurant buys. That's your one time to buy in volume. Pay attention to that and understand that you're the customer. Think about how to get the biggest bang for your buck. My biggest piece of advice would be to understand your buying power and produce a procurement strategy to take advantage of that buying power.
>
> **Scott Reitano,** *principal, Reitano Design Group (Indianapolis)*

Respondents were asked to provide examples of their workarounds and to explain why they were not sufficient. More than one-third of those that responded* reported that the workarounds were expensive and/or inefficient (37 and 35 percent, respectively), and 11 percent reported that they were unsustainable. (See Appendix Table A.5.) Of those SFAs that gave "other" reasons why their workarounds were inadequate, the main issue reported was space—food storage space, workspace, space for equipment such as coolers, and space to enlarge serving lines or display food. Multiple respondents also said they lacked the space to expand kitchens to address these issues.

Estimated costs of needed equipment

To estimate the costs associated with equipment needs, respondents were presented with a list and asked to indicate which items and how many they would need to replace or add to meet the updated requirements for school lunches.† An outside food service equipment consultant compiled estimated costs for purchasing, transporting, and installing new equipment and accessory parts. These estimated unit costs were independently reviewed by external industry consultants. See Appendix C for additional details on how these unit costs were determined.

Estimated equipment costs: Overall and by kitchen type

The vast majority (88 percent) of respondents reported needing at least one piece of equipment to meet the updated lunch requirements. (See Appendix Table A.6.) The costs of needed equipment varied widely, owing to factors such as the type, number, size, and age of their kitchens. Some districts reported needing no additional equipment, whereas others required more than $16 million in upgrades. (See Table 3.)‡ The median cost of equipment was $131,000 per school food authority, which broke down to approximately $122,000 for those without a central kitchen or commissary and $148,000 for those with central kitchens or commissaries.

* Questions that asked for examples of workarounds that SFAs were using and reasons why the tactics were inadequate were added to the survey approximately one-quarter of the way through the field period. Because of the late addition and because some respondents did not answer the questions, only 47 percent (weighted) of the SFAs that reported making do with a workaround provided this information.

† The survey question asked respondents to "please think only about what you really need, as opposed to what would be nice to have" and to provide their "best estimate" of the number of pieces needed. Per-unit cost estimates were not disclosed in the survey.

‡ Among the five SFAs with the highest costs of equipment needed, four are very large (44-228 schools) and might be expected to have higher equipment costs. Some of these SFAs reported needing the same pieces of equipment for all of their schools. Two of the SFAs with the highest estimated costs have central kitchens and reported needing many different types of equipment for multiple (but not all) kitchens. Despite instructions to the contrary, school food authorities may have identified some pieces of equipment that "would be nice to have" but were not, in fact, essential to meeting the updated meal requirements.

Table 3

Estimated Costs of Equipment Needed per SFA by Kitchen Type

	Estimated costs			Number of SFAs (unweighted)*	Number of SFAs (weighted)*
	Median (dollars)	Minimum (dollars)	Maximum (dollars)		
Full-service, production, and finishing/satellite kitchens	122,055	0	16,164,365	3,346	13,720
Central kitchens and commissaries	147,736	0	8,323,568	295	1,084
All kitchens	**131,269**	**0**	**17,860,392**	**3,347**	**13,725**

Notes:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Estimates include zero dollars for 317 SFAs (12 percent) that responded to needing one or more types of equipment, but did not report the quantity needed.

Estimated costs are slight underestimates because some SFAs did not answer one or more questions about whether a specific piece of equipment was needed, and these were treated as "no" responses.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Distribution of equipment costs: All kitchen types

As described in the previous section, the estimated costs of replacing and acquiring new food service equipment varied widely across SFAs. Figure 1 shows the distribution of estimated equipment costs per SFA for all types of kitchens: 12 percent needed no equipment; 8 percent needed less than $10,000 worth of equipment; 13 percent needed between $10,000 and $50,000 of equipment; and more than one-quarter of SFAs (28 percent) needed between $150,000 and $500,000 of new equipment.

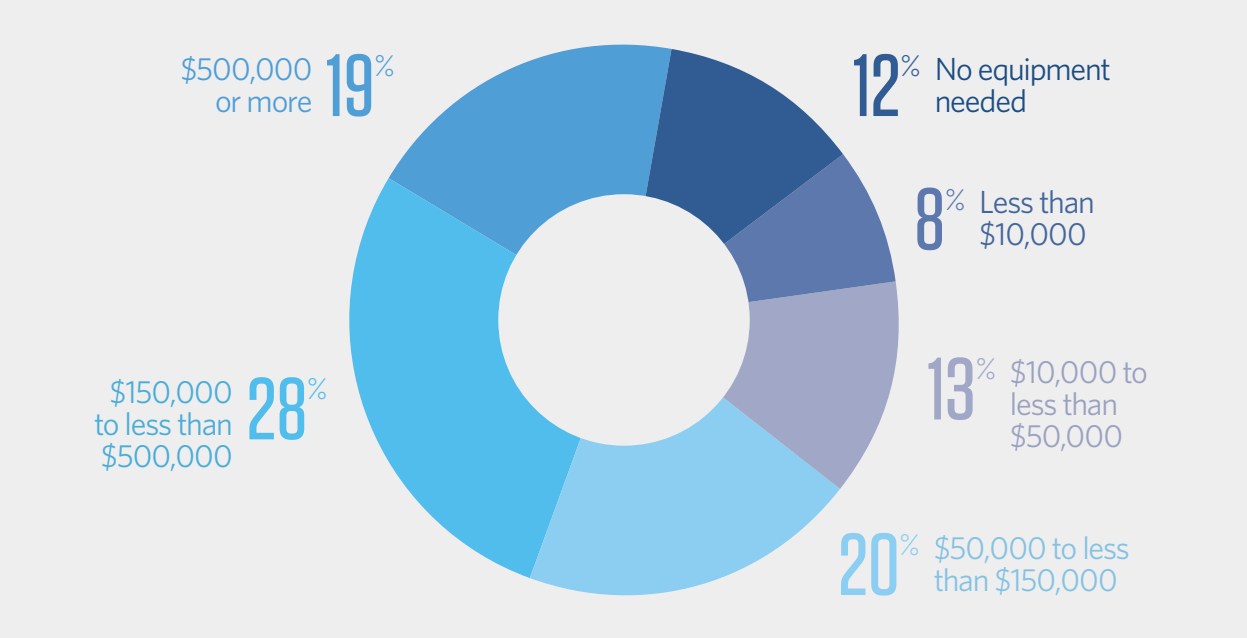
To provide additional insights about the costs of equipment needed by SFAs to meet the lunch requirements, the total reported costs for each SFA were divided by the number of schools operating the National School Lunch Program in that SFA.* Even after standardizing the data in this way, the cost of needed equipment varies greatly, with some SFAs needing no new equipment or less than $5,000 worth of equipment per school (together, 23 percent) and others needing more than $100,000 per school (22 percent). (See Figure 2.) The average cost for new equipment per school is $69,000 with a median of $37,000. (See Table 4.)

There were significant differences in needed equipment costs per school based on size, region, and poverty category. Larger SFAs (those with 10,000 or more enrolled students), SFAs in the Mountain Plains region, and SFAs in the intermediate poverty category have significantly lower estimated costs for new equipment than other types of SFAs. Mean costs per school among these SFAs ranged from approximately $42,000 for very large SFAs to $57,500 for SFAs in the Mountain Plains. Meanwhile, estimated equipment costs per school were highest among urban SFAs, SFAs in the Western region, and SFAs in the high poverty category (approximately $88,000, $87,500, and $81,000, respectively).

* Data on the number of National School Lunch Program schools in each SFA were obtained from the SFA Verification Summary Report, Form FNS-742 for SY 2010–11.

Figure 1

Distribution of Estimated Equipment Costs per SFA



Notes:

The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program.

Estimates include zero dollars for 317 SFAs (12 percent) that responded to needing one or more types of equipment but did not report the quantity needed.

Estimated total costs per SFA are slight underestimates because some did not answer one or more questions about whether a specific piece of equipment was needed and these were treated as "no" responses.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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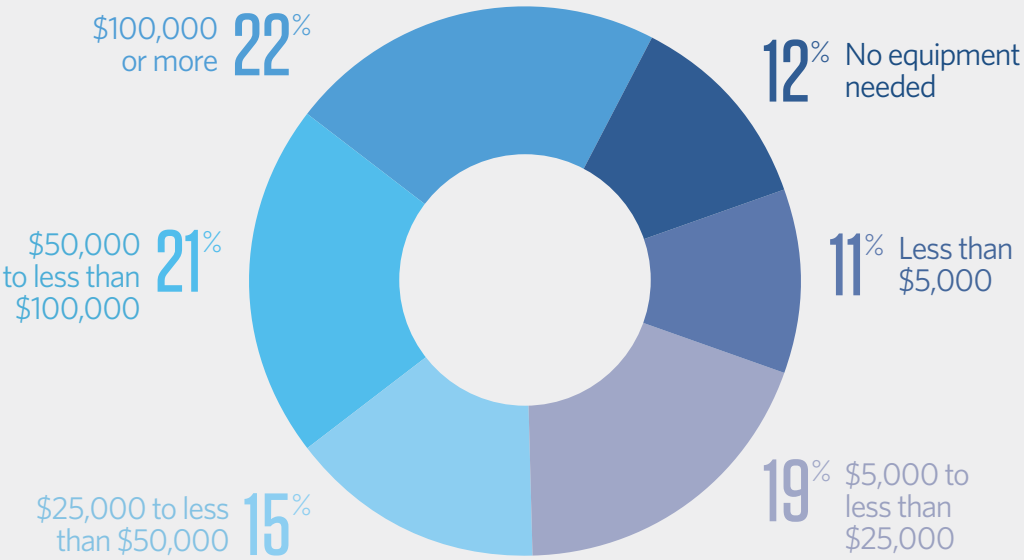
Figure 2

Distribution of Estimated Equipment Costs per School



Notes:

The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program.

Estimates include zero dollars for 317 SFAs (12 percent) that responded to needing one or more types of equipment but did not report the quantity needed.

Estimated total costs per school are slight underestimates because some SFAs did not answer one or more questions about whether a specific piece of equipment was needed and these were treated as "no" responses.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Table 4

Estimated Costs of Equipment Needed per School by SFA Characteristics (all kitchens)

Characteristic	Mean cost per school (dollars)	Number of sample SFAs (unweighted)*	Number of SFAs (weighted)*
All SFAs	$68,682	3,347	13,725
Size (number of students)			
Very small (fewer than 1,000)	67,782	1,014	6,835
Small (1,000 to 2,499)	75,937	676	3,076
Medium (2,500 to 9,999)	68,579	1,129	2,855
Large (10,000 to 24,999)	57,178†	344	645
Very large (25,000 or more)	41,678†	184	313
Community type			
Urban	87,743	634	2,172
Suburban	64,358	914	3,053
Rural	65,470	1,789	8,450
Missing	47,611	10	50
Region			
Northeast	67,883	410	1,567
Mid-Atlantic	75,278	301	1,164
Southeast	70,477	505	1,225
Midwest	65,956	512	3,329
Southwest	63,121	348	1,972
Mountain Plains	57,543†	686	2,425
Western	87,501†	585	2,043
Poverty category‡			
Low (fewer than 40%)	65,105	1,204	5,060
Intermediate (40% to 60%)	61,638†	1,125	4,555
High (more than 60%)	80,891†	1,018	4,110

Notes:

* The data are weighted to be representative of all public SFAs participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Estimates include zero dollars for 317 SFAs (12 percent) that responded to needing one or more types of equipment but did not report the quantity needed.

Estimated costs per school are slight underestimates because some SFAs did not answer one or more questions about whether a specific piece of equipment was needed and these were treated as "no" responses.

† Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

‡ Categories based on percentages of students approved for free or reduced-price meals.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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A school or district's ability to fund new kitchen equipment and infrastructure upgrades may rely on cutting costs and generating additional revenue. Here are some ideas for schools:

Realize savings by developing a detailed procurement strategy for equipment and supplies, which may include:

- Soliciting multiple bids from suppliers
- Joining a regional or national purchasing group
- Finding local procurement opportunities—farmers, food banks—to help decrease costs
- Standardizing equipment throughout the district to allow lower-price bulk purchasing and reduce the cost of maintenance and replacement parts
- Seeking opportunities from major equipment manufacturers for financing
- Taking advantage of all manufacturer's product rebate opportunities
- Exploring leasing opportunities with equipment manufacturers

Streamline operations to reduce costs by:

- Using central kitchens and finishing/satellite kitchens
- Developing menus based on available equipment
- Selling or swapping unused or underused equipment
- Conducting an energy audit to leverage energy savings

Work with other school districts by:

- Aggregating and leveraging purchasing power
- Sharing equipment at central kitchens
- Sharing best practices and success stories
- Identifying equipment that can be liquidated for funding or sold to other schools at reduced prices

Creating revenue opportunities through:

- Selling meals at kiosk locations throughout school campus to increase sales
- Renting school kitchen facilities to others when school is not in session
- Establishing a community kitchen or processing center to offer specialty food processors, farmers, and caterers a relatively inexpensive place to license food processing activities
- Producing meals for other schools, day care centers, or senior centers in the area or region
- Hosting fundraisers, such as meals prepared by local chefs

Secure funding through:

- Broader school financing plans, such as bonds, local option sales tax, capital campaigns
- State appropriations tied to health and educational outcomes
- Private grants (e.g., breakfast in the classroom grants programs, Let's Move Salad Bars to Schools)
- Public grants (e.g., USDA fruit and vegetables grants, CDC "great trays" grants, USDA Rural Development Community Facilities Program grants)
- Public loans (e.g. USDA community facilities loans, Department of Housing and Urban Development Community Development Block Grant loans and grants that are federally, state- or locally-administered)

Source: Serving Healthy School Meals: Financing strategies for school food service, The Pew Charitable Trusts.
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Equipment needs

The equipment list for school kitchens included 49 items, ranging from student meal trays, to sets of knives with cutting boards, to automated conveyor systems that wrap and label foods. A separate list for central kitchens/commissaries included 27 items. Unit costs for the equipment for school kitchens ranged from $5 for a student meal tray to $52,417 for a conveyor/wrapper system. Unit costs for the items on the central kitchen/commissary list ranged from $318 for a dry storage shelving unit to $297,094 for an industrial-sized steam-jacketed kettle with a 5,000 meal-per-day cook-chill system. Unit costs were not included on the questionnaire.

The equipment lists*

The survey's equipment lists for school kitchens and central production facilities (see Appendix F for select descriptions of these equipment items)

School kitchen list

Receiving and storage

- Platform and hand trucks
- Industrial scales
- Dry storage shelving units
- Dunnage racks
- Basket dollies
- Walk-in refrigerators
- Walk-in freezers

Production

- Fruit and vegetable preparation sinks
- Stainless steel work tables
- Utility sinks
- Slicers
- Industrial can openers
- Large-capacity food processors
- Mixers
- Sectionizers
- Sets of knives with cutting boards
- Rolling sheet pan or steam table pan racks
- Utility carts
- Convection ovens (double deck)
- Steam-jacketed kettles
- Tilting skillet
- Combi ovens
- Convection steamer
- Pressure steamer
- Rethermalization and holding ovens
- Commercial microwave
- Blast chillers
- Reach-in freezers
- Reach-in refrigerators
- Hot holding cabinets
- Conveyor/wrapper system with containers configured to menu
- Meal baskets and dollies

Holding and transportation

- Walk-in cooler
- Hot and/or cold transport containers or carts
- Nonrefrigerated trucks
- Refrigerated trucks

Meal serving area

- Cold food merchandisers
- Utility serving counters (5-foot length)
- Mobile milk coolers
- Mobile utility serving counter (5-foot length)
- Hot food serving line counters (4-5 wells)
- Cold food serving line counters (5-foot pan)
- Salad or fruit/vegetable bar (free standing, self-serve)
- Student meal trays
- Steam table pans (stainless steel or plastic)
- Serving portion utensils

Administrative

- Computer
- Software programs
- Other (please specify)

Central kitchen list

Receiving and storage

- Fork lifts and pallet jacks
- Industrial scales
- Dry storage shelving units
- Walk-in refrigerators
- Walk-in freezers

Production

- Fruit and vegetable preparation sinks
- Stainless steel work tables
- Slicers
- Automatic can openers
- Large-capacity food processors
- Vertical cutters
- Mixers
- Sets of knives with cutting boards
- Roll-in convection oven
- Rolling sheet pan and steam table racks
- Steam jacketed kettles with pumps/filler
- Blast or tumble chillers
- Conveyor/wrapper system with containers configured to menu
- Denester and fillers
- Meal baskets and dollies

Holding and transportation

- Walk-in cooler
- Hot holding mobile carts
- Nonrefrigerated trucks
- Refrigerated trucks

Administrative

- Computer
- Software programs
- Other (please specify)

* The study focused only on the updated requirements for the National School Lunch Program, both to limit the burden on respondents and because updated meal requirements for the School Breakfast Program had not yet gone into effect at the time of the survey.

Types of equipment needed in school kitchens

Eighty-seven percent of respondents reported needing equipment for their school kitchens. (See Appendix Table A.6.) The top five pieces of equipment needed for these kitchens were:

- Utility carts for efficiently transporting food (43 percent).
- Serving portion utensils (42 percent).
- Sets of knives with cutting boards (42 percent).
- Large-capacity food processors (40 percent).
- Industrial scales (39 percent).

The estimated unit costs of these items ranged from $32 (for serving portion utensils) to $1,941 (for large-capacity food processors). (See Table 5.)

Table 5

Top Five Pieces of Equipment Needed in School Kitchens

Equipment	Percentage of SFAs that need this piece of equipment	Estimated unit cost (dollars)	Number of SFAs (unweighted)*	Number of SFAs (weighted)*
Utility cart	43.1	490	1,569	5,948
Serving portion utensils	41.9	32	1,547	5,787
Sets of knives with cutting boards	41.6	530	1,534	5,742
Large-capacity food processor	39.8	1,941	1,461	5,492
Industrial scale	39.3	848	1,449	5,422

Notes:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Multiple responses were allowed.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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There were some notable differences in the types of equipment needed. (See Appendix Tables A.9-A.12 for detailed results by SFA size, community type, region, and poverty category.) The responses are summarized below.

- Districts with more than 2,500 students—classified as medium, large, and very large—were significantly more likely to need utility carts than other types of SFAs and most likely to need large equipment items, such as walk-in refrigerators and freezers (approximately $30,000 each) and reach-in refrigerators (approximately $6,000). (See Appendix Table A.9.)
- Equipment to set up self-serve salad or fruit/vegetable bars, with an estimated cost of close to $11,000 per unit, was among the top five needs of districts with 1,000 to 2,499 students, classified as small SFAs.

- Very small SFAs, or those with fewer than 1,000 students, were the most likely to report needing software programs (costing about $750), such as those used for menu planning and nutrient analysis.
- Our analyses did not find many differences in the leading pieces of equipment needed in urban, suburban, and rural communities. (See Appendix Table A.10.) However, suburban SFAs were the most likely to need walk-in refrigerators and freezers, and rural SFAs most often needed food processors and software programs. Hot holding cabinets that maintain the temperature of hot meals prior to serving, estimated at $6,000 each, were among the top five pieces of needed equipment in urban communities.
- Sets of knives with cutting boards at $530 each were one of the leading pieces of equipment needed in all regions of the country, especially in the Southeast and West. (See Appendix Table A.11.) These regions also were most likely to need utility carts and walk-in freezers. Combination convection ovens/steamers (approximately $24,000) and sectionizers* for fresh fruit and vegetables ($290) were among the top five needs of districts in the Southeast, and mobile milk coolers for serving areas (approximately $3,000) were among the top five equipment needs reported by SFAs in the Western region. (See Appendix F for equipment descriptions.)
- In general, the top equipment needs reported by SFAs do not appear to differ by poverty category, except for one statistically significant difference: SFAs within the high poverty category, those in which more than 60 percent of students qualify for free for reduced-price meals, were more likely than all other SFAs to report needing walk-in freezers. (See Appendix Table A.12.)

SFAs needed a variety of different types of equipment for their school kitchens with a wide range of unit costs. Some SFAs needed high-price items that cost in excess of $50,000. Twelve percent of all SFAs, for example, needed conveyor/wrapper systems that were estimated to cost $52,417. (See Appendix F for equipment descriptions.) Nine percent of SFAs needed one or more refrigerated trucks at a cost of approximately $50,875 per truck. Table 6 shows the top five most expensive pieces of equipment needed for school kitchens and the percentage of SFAs that need them.

Types of equipment needed in central production facilities

Of the 9 percent of SFAs with central production facilities—central kitchens or commissaries—67 percent had inadequate equipment to meet the updated lunch requirements. (See Appendix Table A.6.) The top five pieces of equipment needed were hot holding mobile carts (34 percent), sets of knives with cutting boards (32 percent), automatic high-capacity can openers (30 percent), walk-in freezers (30 percent), and walk-in refrigerators (29 percent). (See Table 7.) The per-unit costs of this equipment range from $530 to more than $31,000.

Central production facilities typically produce food for multiple schools and large numbers of students, requiring larger and more expensive food service equipment. In addition, when food production is centralized, facilities require equipment for transporting the food or meals to the schools. As expected, a notable portion of SFAs with central kitchens/commissaries reported needing equipment costing more than $100,000 per unit. Table 8 shows the top five most expensive pieces of equipment needed in central production facilities. More than a quarter (27 percent) of those with central kitchens/commissaries needed walk-in coolers, at more than $201,000 each. The most expensive piece of equipment needed by these SFAs, estimated at close to $300,000, was a steam-jacketed kettle.

Equipment replacement or upgrade plans and budgets

When asked about the existence of an equipment replacement and upgrade plan, only about one-quarter (26

* Sectionizers are machines used to quickly slice high volumes of fresh fruits and vegetables.

Table 6

Top Five Most Expensive Pieces of Equipment Needed in School Kitchens

Equipment	Estimated unit cost (dollars)	Percentage of SFAs that need this piece of equipment	Number of SFAs (unweighted)*	Number of SFAs (weighted)*
Conveyor/wrapper system	52,417	12.2	467	1,689
Refrigerated truck	50,875	9.4	526	1,303
Nonrefrigerated truck	31,500	7.3	347	1,012
Walk-in freezer	31,276	32.6	1,177	4,505
Walk-in refrigerator	29,056	39.1	1,534	5,401

Notes:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Multiple responses were allowed.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Table 7

Top Five Pieces of Equipment Needed in Central Kitchens/ Commissaries* Among SFAs with Central Production Facilities

Equipment	Percentage of SFAs that need this piece of equipment	Estimated unit cost (dollars)	Number of SFAs (unweighted)†	Number of SFAs (weighted)†
Hot holding mobile cart	34.1	6,079	115	424
Sets of knives with cutting boards	31.9	530	114	397
Automatic can opener	29.7	3,537	112	370
Walk-in freezer	29.7	31,500	107	370
Walk-in refrigerator	29.2	29,056	103	364

Notes:

* Number of SFAs with central kitchens or commissaries is 340 unweighted and 1,244 weighted.

† The data are weighted to be representative of all public schools food authorities offering the National School Lunch Program.

Multiple responses were allowed.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Table 8

Top Five Most Expensive Pieces of Equipment Needed in Central Kitchens/Commissaries* Among SFAs with Central Production Facilities

Equipment	Estimated unit cost (dollars)	Percentage of SFAs that need this piece of equipment	Number of SFAs (unweighted)†	Number of SFAs (weighted)†
Steam-jacketed kettle with pump/filler	297,094	11.3	59	140
Walk-in cooler	201,705	26.5	100	329
Blast or tumble chiller	192,021	13.4	75	167
De-nester and filler	185,000	6.4	40	79
Conveyor/wrapper system‡	165,000	16.0	82	199

Notes:

Multiple responses were allowed.

* Number of SFAs with central kitchens or commissaries is 340 unweighted and 1,244 weighted.

† The data are weighted to be representative of all public SFAs participating in the NSLP. For further information about weighting, refer to the report methodology in Appendix C.

‡ The capacity, speed, and automation features of the conveyor/wrapper systems used in a central kitchen are considerably different and more expensive than a conveyor system designed for a smaller operation, such as an on-site production kitchen.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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percent) of respondents reported having such a plan. (See Appendix Table A.13.) Another 24 percent did not know whether their SFA had a plan.

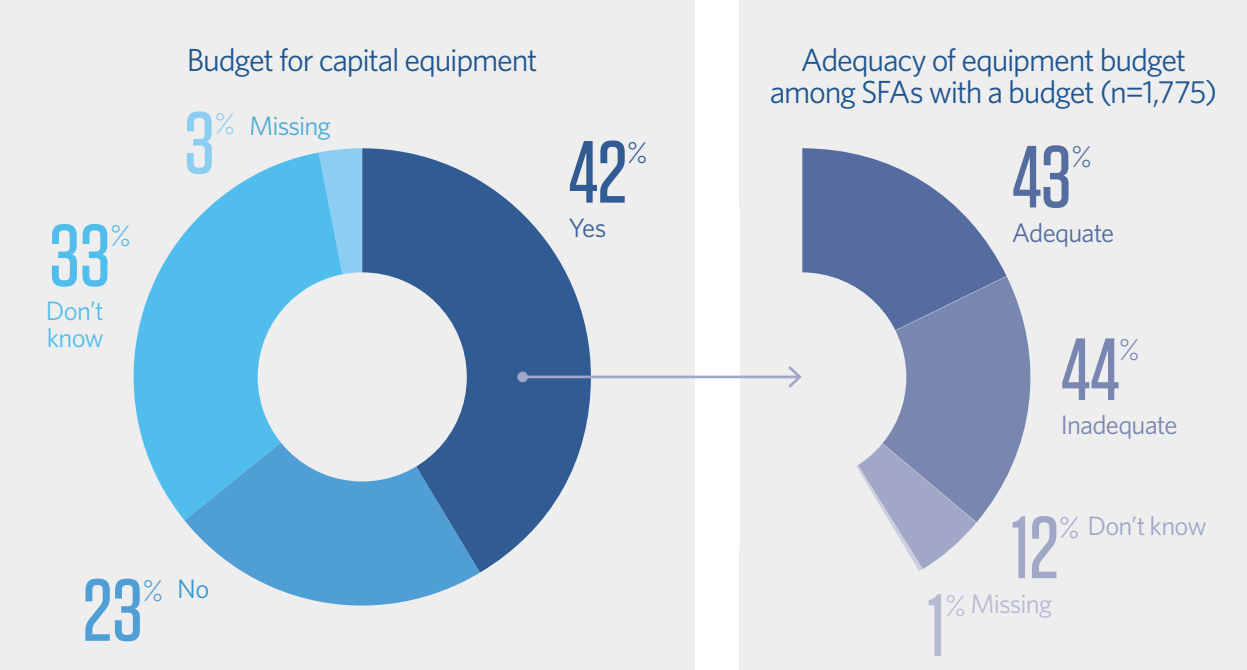
A substantial share of SFA respondents (42 percent) reported having a line item for capital equipment purchases* in their annual budget, but approximately one-third (33 percent) did not know whether they had one (Figure 3). Among the SFAs that had a line item for capital purchases, only 43 percent reported that the budgeted amount was adequate for the equipment needed to implement the updated lunch requirements, with 44 percent reporting that the budget was inadequate and nearly 12 percent not knowing whether the amount was adequate.

Although the Food and Nutrition Services does not require SFAs to create formal equipment and replacement upgrade plans and budgets, federal resources are available to assist schools with the endeavor. USDA and the National Food Service Management Institute provide detailed online resources to assist food service directors in their planning, budgeting, and management of equipment and infrastructure upgrades and replacements. Occasionally, federal grant funds have been made available for capital equipment purchases. For instance, some SFAs received equipment grants through the American Recovery and Reinvestment Act.[13] Additionally, in 2010, a $25 million appropriation in small grants was available to eligible school nutrition programs to replace their outdated equipment with energy-efficient food service equipment.[14]

* For purposes of the survey, "capital purchases" were defined as purchases of equipment costing at least $1,000, which can depreciate over time. According to the U.S. Department of Education's National Center for Education Statistics (2009), capital assets can include land, building and infrastructure improvements, machinery and equipment, technological assets, and software, among other items.

Figure 3

Budget for Capital Equipment Purchases and Adequacy of Budget for Meeting Updated Lunch Requirements



Note:

The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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> I had to look at my school district as 10 restaurants, not just school cafeterias. If I wasn't able to market to the students, they would either go off campus in their cars or bring their lunch from home. So that was the reason when I went into the renovation of the schools, I marketed it just like a restaurant.
>
> **Jack Koser,** *president, John Koser Consulting (PA)*

Equipment replacement or upgrade plans and budgets by SFA characteristics

Having an equipment replacement and upgrade plan is positively associated with the size of the SFA. (See Table 9.) Very small SFAs were the least likely to have an equipment replacement and upgrade plan or a line item for capital equipment in their annual budget, and the most likely to not know whether they even had these plans and budgets. The results are summarized below.

- SFAs in rural areas were significantly less likely to report having equipment replacement and upgrade plans than all other SFAs (21 percent), although more than a quarter (27 percent) did not know whether they had one. (See Appendix Table A.14.) Similarly, rural SFAs were the least likely to report having a line item for capital equipment purchases in their annual budgets, and more than one-third (37 percent) did not know if they did.
- Regionally, those in the Mountain Plains were the least likely to have plans (20 percent) or a budget line item (33 percent). (See Appendix Table A.15.) This group was the most likely to provide a "don't know" response to both survey items.
- There were few statistically significant differences in the prevalence of equipment replacement/upgrade plans or capital equipment budgets between SFAs by poverty category. (See Appendix Table A.16.)

Table 9

SFAs with Equipment Replacement and Upgrade Plans and Budget for Capital Equipment by SFA Size

	Percentage of SFAs					All SFAs
	Very small (fewer than 1,000 students	Small (1,000 to 2,499 students)	Medium (2,500 to 9,999 students)	Large (10,000 to 24,999 students)	Very large (25,000 or more students)	
Equipment replacement and upgrade plan						
Yes	15.7*	24.6	39.3*	54.7*	76.5*	25.8
No	49.1	51.3	51.9	38.0*	21.4*	49.0
Don't know	34.6*	22.2	7.9*	6.6*	2.1*	24.2
Missing	0.6	1.9	0.9	0.7	0.0	1.0
Line item for capital equipment purchases in annual budget						
Yes	25.3*	45.5	65.4*	79.9*	86.0*	42.2
No	25.1*	23.4	19.2*	12.6*	8.6*	22.5
Don't know	46.9*	28.5*	12.8*	6.7*	3.2*	32.8
Missing	2.6	2.6	2.6	0.8	2.2	2.5
Number of SFAs (unweighted)†	**1,021**	**681**	**1,142**	**344**	**184**	**3,372**
Number of SFAs (weighted)†	**6,855**	**3,107**	**2,893**	**645**	**313**	**13,813**

Note:

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Collaboration, entrepreneurship, resourcefulness, and creativity

More than 75 people from 31 states attended a workshop hosted by the Kids' Safe and Healthful Foods Project to discuss how schools can meet and exceed school meal nutrition standards by overcoming budget constraints and finding the resources to update their kitchens and cafeterias. The Kitchen Infrastructure, Training, and Equipment in Schools Workshop, which took place in Chicago, July 28-30, 2013, drew upon the insights of food service directors, school administrators, industry representatives, non-profit organizations, foundations, and financiers. The proceedings for this workshop are summarized in "Serving Healthy School Meals: Financing strategies for school food service."

Collaboration, entrepreneurship, resourcefulness, and creativity were cited as crucial components of a program's success in a time of budget tightening. School districts are thinking about school foods in a new way that places a priority on health, but they also need to find innovative financing strategies to pay for the equipment and infrastructure changes they need to put healthy foods on the lunch tray.

> We opened a cafeteria ... It was an old historical school that we renovated. We had some additions to that school, but we also completely redid the cafeteria. The cafeteria was based on the theme of that school, which was an art and science magnet. The newspaper reporters were there the first day of school, and a child was being interviewed. And the reporter asked, 'What's your favorite thing about your new school?' The child said, 'Oh. It's the cafeteria. The cafeteria is absolutely great.' So we felt like that made an impact on students. It really did let us know that sometimes we think that our efforts are going unnoticed, but they are not. Students realize that. They may not always be able to verbalize it. This one was able to, but in many cases they don't. They just show up. That's how they let us know that it's well worth it.
>
> **Cleta Long,** *school nutrition director, Bibb County Schools (Macon, GA)*

To be successful, the attendees decided, the first step must be to make the business case for upgrades and improvements by:

- Gathering data that show the financial benefit of improved kitchen facilities that drive streamlined operations and expansion of the meal program.
- Emphasizing the role of food in improving the health of children and families.
- Explaining how better food can create more satisfied student-customers, increasing revenue for the school.
- Conducting energy audits to demonstrate the cost savings of new energy-efficient equipment. Manufacturers' representatives can be of assistance with the audits.

Participants also emphasized the need for planning and evaluation. Successful districts created business plans that include near-term (to meet requirements and make relatively minor improvements) and long-term (for more substantial improvements) financing and procurement strategies that are integrated over time. They also researched and evaluated the options for obtaining equipment and/or upgrading infrastructure, such as leasing equipment, buying and selling used equipment, securing equipment donations, and getting price quotes from multiple sources.

Strategic models

Participants shared successful approaches and brainstormed potential strategies for financing new equipment and infrastructure upgrades. These were summarized into models that could be used by districts to leverage resources and partnerships to improve and enhance school meal programs. Selected models include:

Sponsorship model

- Develop "adopt a school" campaigns within school districts targeted at local businesses or philanthropies.
- Name updated and remodeled cafeterias and kitchens after key sponsors and funders.
- Invite core organizations, such as parent teacher organizations, booster clubs, and student government associations, to take the lead in building robust funding support for improvements to schools' kitchen and cafeteria equipment and infrastructure.

Investment model

- Work with local banks and credit unions to secure low-interest loans.
- Attract donors by matching funds.
- Encourage private industry to invest in municipality bonds.
- Use federal and state funds to leverage funding from other sources (e.g., matching funds, bonds).
- Use projected enrollment growth to secure modernization funds.

Entrepreneurial model

- Generate revenue by leasing or renting schools' kitchens/cafeterias for non-school events and activities.
- Contract with other facilities such as child care or senior centers to provide meals.
- Sell unneeded equipment.
- Set up food kiosks outside of the cafeteria to sell breakfast, lunch, and snacks.
- Develop a catering operation by making the school food service facility and staff available to cater internal and external events.

Partnership model

- Partner with other schools, districts, or community organizations to share equipment and procurement information, a business plan "toolbox," grant information, menu development, and business skills.
- Build food and equipment bids with other districts and state entities (e.g., prisons, municipal buildings).
- Barter services with local businesses and other community groups (e.g., marketing, grant writing).
- Engage the local culinary community to help train and professionalize food service staff, revamp menus, generate excitement, and raise the profile of school lunches.

Source: Serving Healthy School Meals: Financing strategies for school food service, The Pew Charitable Trusts.
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Infrastructure changes

To implement the updated meal requirements for school lunches, SFAs may need more than equipment upgrades and replacements. In some cases, acquiring new equipment such as refrigerators and freezers to store fruits and vegetables will also require that infrastructure changes be made at schools and central kitchens to accommodate the new equipment.

Respondents were asked about their need for six types of infrastructure changes:

- Increased physical space for storage, preparation, or serving.
- Additional electrical capacity, such as more amps, voltage, or locations of outlets.
- More natural gas, such as increased pressure or location of gas lines.
- Additional plumbing, such as new water supply or location of sinks and drains.
- Ventilation, such as exhaust hoods or fire suppression systems.
- Remodeling that would require bringing the facility up to local health department code.

In the following sections, results for school kitchens and central production facilities are presented separately.

> The cafeteria is not a place of, 'I don't want to go there. I just have to go there and get my lunch.' It's, 'I want to go there because it's a cool place to be. My friends are going there.' We have different arrangements and seats, from booths to high top tables, to window seating, all kinds of things that really attract students and make it an environment that kids want to be in. That, in return, gives us a little bit more positive outlook from students. Plus, they want to come in and eat with us. If we complement that with great food, healthy food, and being really interested in the students, then that drives our participation up.
>
> **Cleta Long,** *school nutrition director, Bibb Conty Schools (Macon, GA)*

Infrastructure changes needed in school kitchens

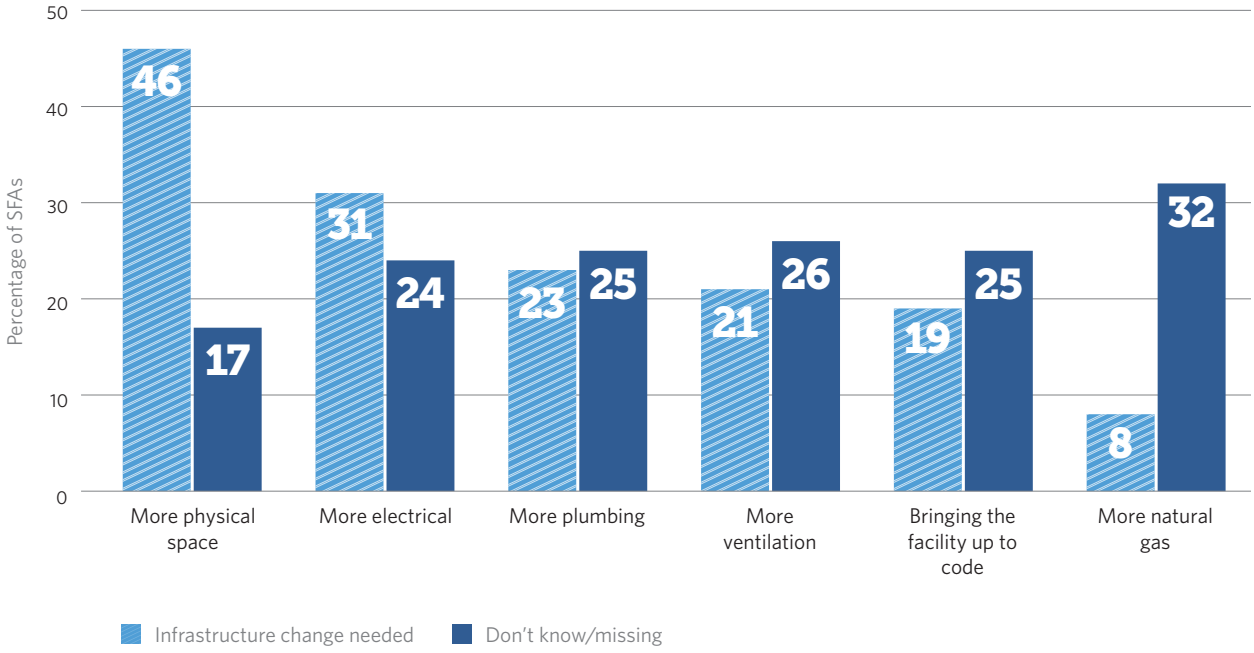
A substantial share of respondents was unable to answer the questions about the need for infrastructure changes in their facilities: 17 to 32 percent either responded "don't know" or skipped the infrastructure question. As a result, the data presented here should be viewed as lower-bound estimates.

- Approximately 55 percent of all SFA respondents reported that at least one of their school kitchens needed some type of infrastructure change to meet the updated requirements. (See Appendix Table A.17.)
- School kitchens most commonly needed more physical space. (See Figure 4.) Forty-six percent of all SFAs needed more physical space for food storage, preparation, or serving.
- The next most common needs regarding infrastructure were additional electrical capacity (31 percent of SFAs) and additional plumbing (23 percent of SFAs).

- Approximately one-fifth (21 percent) needed more ventilation, and 19 percent needed remodeling that would bring the facility up to local health department code.
- Eight percent reported needing more natural gas.

Figure 4

Infrastructure Changes Needed in School Kitchens



Notes:

The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program.

Multiple responses were allowed.

Source: Kitchen Infrastructure and Training for Schools, 2012.

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Districts with more than 2,500 students—those categorized as medium, large, and very large SFAs—were more likely to report needing infrastructure changes in school kitchens. (See Table 10.) These changes included more physical space for storage, preparation, and serving; and more electrical capacity and plumbing upgrades. (See Appendix Table A.18.) The results for other subgroups are summarized as follows:

- Very few significant differences existed in the reported need for infrastructure changes in school kitchens among SFAs in different types of communities. (See Appendix Table A.19.) However, suburban SFAs were more likely to report needing additional physical space in their school kitchens than urban and rural SFAs combined.
- SFAs in the Southeast region were more likely to report needing infrastructure changes in their school kitchens, including more physical space and electrical and plumbing upgrades. (See Appendix Table A.20.) Those in the Western region were most likely to need remodeling to bring the facility up to code.

- SFAs within the high poverty category (more than 60 percent of the students qualify for free/reduced-priced meals) were more likely to report needing increased electrical capacity and plumbing changes in their school kitchens and remodeling to bring the facility up to local health department code than those in the low and intermediate poverty groups combined (less than 60 percent free/reduced-price students). (See Appendix Table A.21.)

Table 10

Infrastructure Changes Needed in School Kitchens by SFA Size

Infrastructure change	Percentage of SFAs					All SFAs
	Very small (fewer than 1,000)	Small (1,000 to 2,499)	Medium (2,500 to 9,999)	Large (10,000 to 24,999)	Very large (25,000 or more)	
More physical space for storage, preparation or serving	36.7*	48.1	58.0*	65.4*	56.4*	45.5
More electrical, such as more amps, voltage, or locations of outlets	22.9*	33.0	43.4*	47.1*	42.6*	31.1
More plumbing, such as water supply or location of sinks and drains	18.1*	24.5	29.3*	31.5*	31.6*	22.8
More ventilation, such as exhaust hoods or fire suppression systems	16.1*	23.6	26.9*	27.7*	25.1	20.8
Remodeling that would require bringing the facility up to local health department code	15.1*	20.4	21.0	28.6*	31.3*	18.5
More natural gas, such as increased pressure or location of pipes	3.9*	9.5	13.0*	12.4*	11.1	7.6
Number of SFAs (unweighted)†	3,372					
Number of SFAs (weighted)†	13,813					

Notes:

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the α = .05 level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Infrastructure changes needed in central production facilities

Among SFAs with central production facilities, 42 percent of respondents reported that at least one central kitchen or commissary would need some type of infrastructure change to meet the updated lunch requirements. Another 16 to 24 percent were unable to determine whether an upgrade was required in any of their central kitchens. Thirty-five percent needed more physical space and 23 percent needed more electrical capacity. Between 6 and 21 percent needed at least one infrastructure change.

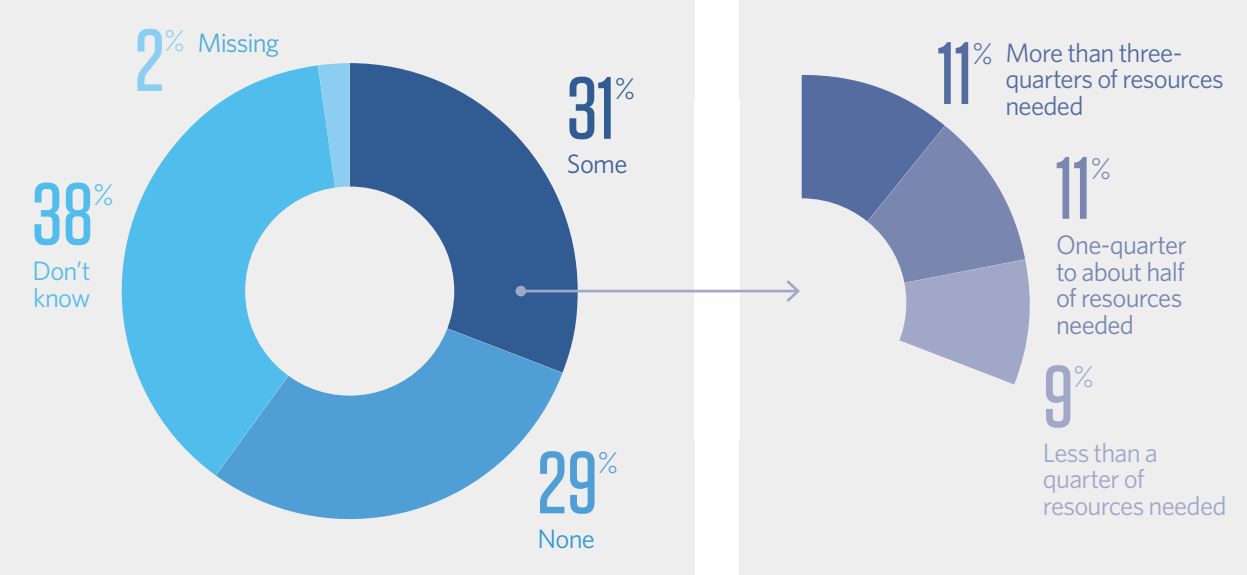
Financial resources from local education agencies for infrastructure changes

A local education agency is a school district or other governmental authority that oversees the administrative direction of public elementary schools or secondary schools in a specific area (town, district, county, etc.). They typically ensure that the functions needed to deliver educational programs are in place, from special education services to transportation to school infrastructure. Most local education agencies have long-range capital equipment improvement and building plans for school remodeling and new construction. These plans are usually projected out for five to 10 years, with priorities established for time frames and funding. Capital equipment improvement projects typically require four to 10 months of lead time for the design, bid development, solicitation of bids, and final award of the project.[15]

Respondents were asked whether they thought their local education agency has the financial resources to make infrastructure changes in school kitchens and/or central production facilities. A substantial share of respondents (38 percent) did not know and another 2 percent left this question blank, suggesting that they were unable to answer this question. (See Figure 5.) Overall, 29 percent of SFAs thought their local education agency had no financial resources to allocate to making infrastructure changes in school kitchens and/or central production facilities. About one-third (31 percent) of SFAs thought there were some financial resources to allocate to these changes.

Figure 5

Financial Resources Expected from Local Education Agency for Infrastructure Changes



Note:

The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012

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Among SFAs that believed their local education agency had financial resources to contribute to infrastructure changes, 11 percent expected that the changes could be completed during the 2012–13 school year, 28 percent thought it would take two to three years (by 2015–16), and nearly one-third (32 percent) thought the changes would be completed in four to 10 years or beyond. (See Appendix Table A.22.)

Summary of key findings

This report outlines types of equipment and costs of equipment needed by school districts across the country. The first report in this series presented findings about how quickly SFAs expected to meet the updated school lunch nutrition standards, including when districts began making changes relative to USDA's proposed and final rules. The next report in this series will describe the challenges SFAs face in the training of their personnel to meet the updated nutrition standards.

Finding 1: The vast majority of school food authorities (88 percent) needed equipment to help them meet the lunch requirements.

- The most common equipment inadequacy among school food authorities was equipment for providing more fruits and vegetable items on daily menus and offering a greater variety of fruits and vegetables.
- Equipment for receiving and storing fruits and vegetables was most often cited as inadequate (34 percent) compared with other food service functions related to increased fruits and vegetables.
- The top five pieces of equipment needed for school kitchens were utility carts for efficiently transporting food (43 percent), serving portion utensils (42 percent), knife sets with cutting boards (42 percent), food processors (40 percent), and industrial scales (39 percent). The estimated unit costs of these items ranged from $32 (for serving portion utensils) to $1,941 (for large-capacity food processors).

Finding 2: Although 42 percent of SFAs reported having a budget to purchase capital equipment, less than half of them expected the budget to be adequate to meet their equipment needs.

- One-third (33 percent) of SFAs were unsure if they had a budget for capital equipment purchases. For those that reported having a budget, only 43 percent felt that the budget was sufficient.
- The median estimated cost of equipment needed for all kitchen types combined is approximately $131,000 per SFA, or $37,000 per school.
- Most SFAs with equipment inadequacies reported that they were making do with some type of workaround, such as manually chopping or slicing fruits and vegetables; storing fruits and vegetables off site and transporting them daily; and keeping fruits and vegetables in temporary storage containers, such as milk crates or small coolers. The leading reasons why workarounds were considered inadequate included that they were expensive, inefficient, and/or unsustainable.

Finding 3: More than half of all school food authorities (55 percent) need kitchen infrastructure changes at one or more schools to meet the lunch requirements.

- The most commonly reported need in school kitchens was for more physical space for food storage, preparation, or serving (46 percent). More physical space was also the top infrastructure need reported for central kitchens or commissaries (35 percent of SFAs with central production facilities).
- Thirty-eight percent of respondents did not know whether their local education agency had financial resources to allocate to infrastructure changes in school and/or central kitchens/commissaries, and 29 percent thought their agencies had no financial resources for this purpose.

Recommendations

Additional funds are needed to assist schools in upgrading their kitchen equipment and infrastructure to serve healthy meals that students will enjoy. In light of these findings, and a series of specific suggestions discussed in the workshop proceedings, the project recommends:

Recommendation 1: School officials and local policymakers should work collaboratively with parents, teachers, students, and funders to identify and implement strategies for meeting equipment, infrastructure, and training needs.

- The majority of districts require upgrades to their equipment, infrastructure, or training, and many have found ways to address those needs. A range of models such as leveraging partnerships, cultivating sponsors, obtaining low-interest loans, and generating revenue for services outside of the school meal setting were identified and highlighted in "Serving Healthy School Meals: Financing strategies for school food service." This report should serve as a guide to districts looking to tackle these challenges.

Recommendation 2: Federal, state, and local governments should prioritize funding to help schools upgrade their kitchen equipment and infrastructure to efficiently serve healthy and appealing meals.

- Reimbursement rates are intended to cover food costs, and additional funds have historically been made available for kitchen equipment and infrastructure upgrades. However, decades of reduced budgets and lack of supplemental funding sources have resulted in nearly 9 in 10 schools needing at least one piece of kitchen equipment. It is critical that policymakers consider school nutrition a high-priority area when developing budgets so as to help schools deliver quality meals to students.

Recommendation 3: Nonprofit and for-profit organizations that have an interest in improving children's health, education, school infrastructure, and community wellness should assist schools in acquiring the necessary equipment.

- Even small amounts of funding can make a big difference to a school. While needs vary from school to school, the five most needed pieces of equipment are utility carts for efficiently transporting food, serving utensils, knife sets with cutting boards, food processors, and industrial scales. Focusing on these items or helping schools to address a common concern such as refrigeration for fruits and vegetables could have a tremendous effect on the school nutrition environment.

Conclusion

Schools play a critical role in the health of our nation's children, with more than 31 million students participating in the National School Lunch Program each day and many students consuming up to half of their daily calories at school. As school food authorities work to fully implement USDA's updated meal standards that improve the nutritional quality of school meals, menu planning will drive all other functions of the food service operation, such as purchasing and receiving food, storing food, and preparing and serving meals. Each function requires specific equipment and the physical space (and other infrastructure) needed to operate that equipment.

Nearly all school districts across the country anticipated that they would be able to serve meals that meet the updated nutrition requirements, making it evident that these standards are achievable. However, a substantial need exists for equipment and infrastructure upgrades in U.S. schools. Although fewer than half of the SFAs surveyed reported having a budget to make investments in equipment and infrastructure, several innovative options are available to help schools find ways to finance these upgrades, which are detailed in our workshop proceedings, "Serving Healthy School Meals: Financing strategies for school food service." Meeting these needs could eliminate inefficiencies and allow schools to dependably prepare and serve safe, healthy, and appealing foods.

Appendix A: Tables

Table A.1

Reported Adequacy of Existing Equipment in School Kitchens by SFA Size

	Percentage of SFAs															All SFAs		
	Very small (fewer than 1,000 students)			Small (1,000 to 2,499 students)			Medium (2,500 to 9,999 students)			Large (10,000 to 24,999 students)			Very large (25,000 or more students)					
	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround
More fruit and vegetable items on daily menus																		
Receiving and storage	65.5	29.3*	2.9	62.9	32.5	3.3	63.5	33.7	1.8	56.2*	40.2*	3.0	59.8	38.3*	1.9	64.0	31.6	2.7
Preparation	73.8*	20.4*	2.3	64.0*	31.7*	2.5	68.1	29.3*	1.4	66.5	31.2*	2.1	65.0*	30.4*	3.3	69.9	25.5	2.2
Holding and transportation	72.4*	18.9*	3.4	67.6	26.7	2.6	65.7*	30.2*	1.8	64.2*	32.3*	2.9	63.1*	32.7*	2.9	69.3	23.9	2.8
Meal service	73.4*	21.8*	2.0	62.2*	33.0*	2.8	62.4*	34.1*	2.1	59.7*	38.4*	1.7	58.9*	35.9*	3.3	67.6	28.0	2.2
Greater variety of fruits and vegetables																		
Receiving and storage	65.3*	27.5*	3.5	60.0	32.9	3.6	62.0	33.1	2.4	55.2*	39.1*	3.7	57.4*	36.7*	3.8	62.7	30.6	3.3
Preparation	71.1*	21.7*	2.4	61.1*	32.5*	2.8	64.0	31.3*	1.8	61.2*	33.6*	2.7	64.8	29.4	3.2	66.8	26.9	2.4
Holding and transportation	70.3*	19.8*	3.9	61.8*	30.9*	2.1	63.8	31.2*	1.9	62.4	32.4*	2.9	60.8*	31.8*	4.3	66.4	25.5	3.1
Meal service	71.4*	22.5*	1.7	60.1*	32.5*	3.8	60.8*	34.5*	1.6	57.1*	37.6*	1.3	60.3*	33.5*	4.6*	65.7	28.2	2.2
At least half of grains offered are whole grain-rich																		
Receiving and storage	77.4	15.9	2.3	77.4	17.5	2.4	79.6	16.4	1.8	77.9	19.0	1.8	81.0	15.6	2.3	78.0	16.5	2.2
Preparation	76.2	16.2	2.1	75.4	19.1	1.7	79.4	17.0	1.0	79.8	18.0	1.1	83.1*	13.5*	1.8	77.0	17.1	1.8
Holding and transportation	78.5	13.4	2.1	76.7	17.4	1.9	79.0	16.8	1.5	81.1	16.2	1.6	80.6	14.4	1.8	78.4	15.2	1.9
Meal service	79.6	12.9*	2.2	75.5	18.7	2.3	76.6	19.0*	1.1*	78.2	19.8*	0.9*	81.7	12.9	3.3	78.0	15.8	2.0

Different portion sizes for each grade group (K-5, 6-8, 9-12)																		
Receiving and storage	76.3	16.5*	2.7	71.2	22.2	2.9	75.7	20.2	1.6*	71.8	23.1*	3.5	67.5*	26.6*	2.9	74.6	19.1	2.5
Preparation	71.8	20.5*	3.3	64.2*	28.3*	2.5	70.6	25.2	1.7*	68.7	26.8	2.8	68.1	26.3	2.7	69.6	23.7	2.7
Holding and transportation	76.0	14.8*	3.2	69.3*	24.1*	2.3	74.2	21.5	1.0*	71.6	24.3*	2.4	71.1	23.0*	2.9	73.8	18.9	2.5
Meal service	70.6*	21.1*	3.2	63.7	29.2*	4.0	67.4	26.6	2.9	66.0	29.2*	3.1	63.4	26.4	7.9*	68.0	24.6	3.4
New calorie ranges, saturated fat, trans fat, and sodium targets																		
Receiving and storage	74.5	16.9*	3.9*	71.5	22.6*	2.2	76.3	19.3	2.1	77.9	18.5	2.1	79.7*	18.0	1.3*	74.5	18.8	3.0
Preparation	69.9	21.0*	4.3*	65.8	28.2*	2.2	71.4	24.2	2.1*	74.5*	21.9	2.1	76.6*	19.0*	1.8	69.7	23.3	3.2
Holding and transportation	74.2	15.4*	3.9*	71.4	21.6*	2.0	75.8	19.6	1.5*	78.2*	17.9	2.1	80.0*	15.5	1.8	74.2	17.8	2.8
Meal service	74.2	16.8*	4.0	70.2	23.8*	2.0	73.2	20.8	2.5	76.6	17.8	2.6	79.5*	14.1*	4.3	73.3	19.2	3.2
Number of SFAs (Unweighted)†	**1,021**			**681**			**1,142**			**344**			**184**			**3,372**		
Number of SFAs (Weighted) †	**6,855**			**3,107**			**2,893**			**645**			**313**			**13,813**		

Notes:

Row percentages within subgroups do not sum to 100 percent because some respondents did not answer the questions. The percentages missing range from 0 to 6.6 percent across all questions and subgroups.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.2

Adequacy of Existing Equipment in School Kitchens by Community Type

	Percentage of SFAs									All SFAs		
	Urban			Suburban			Rural					
	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround
More fruit and vegetable items on daily menus												
Receiving and storage	65.6	28.9	3.5	64.9	30.8	2.5	63.0	32.8	2.6	64.0	31.6	2.7
Preparation	69.6	25.1	2.8	70.0	26.2	1.8	70.1	25.2	2.2	69.9	25.5	2.2
Holding and transportation	69.1	23.6	3.7	71.3	23.2	2.8	68.6	24.3	2.6	69.3	23.9	2.8
Meal service	67.7	27.2	3.0	66.6	29.2	2.0	67.9	27.8	2.2	67.6	28.0	2.2
Greater variety of fruits and vegetables												
Receiving and storage	63.3	28.5	3.5	61.1	31.2	4.3	63.1	31.1	2.9	62.7	30.6	3.3
Preparation	66.1	26.0	2.9	65.6	28.3	2.4	67.5	26.4	2.3	66.8	26.9	2.4
Holding and transportation	67.0	24.3	3.5	67.6	24.9	3.0	65.8	26.1	3.0	66.4	25.5	3.1
Meal service	65.6	26.4	3.3	64.3	29.4	2.4	66.3	28.2	1.9	65.7	28.2	2.2
At least half of grains offered are whole grain-rich												
Receiving and storage	78.6	16.4	2.5	78.0	16.6	1.8	77.7	16.5	2.3	78.0	16.5	2.2
Preparation	78.3	16.2	2.4	77.1	16.6	1.7	76.7	17.5	1.6	77.0	17.1	1.8
Holding and transportation	79.6	14.6	3.2	79.1	14.5	1.5	77.8	15.6	1.8	78.4	15.2	1.9
Meal service	77.6	16.8	2.6	76.4	16.8	2.2	78.7	15.3	1.7	78.0	15.8	2.0

Different portion sizes for each grade group (K-5, 6-8, 9-12)												
Receiving and storage	77.6	16.7	2.3	74.6	18.6	3.5	73.9	19.9	2.2	74.6	19.1	2.5
Preparation	70.8	21.2	2.9	68.8	24.2	3.3	69.7	24.1	2.5	69.6	23.7	2.7
Holding and transportation	74.7	18.5	2.4	74.1	19.3	2.8	73.5	18.8	2.4	73.8	18.9	2.5
Meal service	70.2	22.4	4.0	67.6	24.2	3.6	67.9	25.0	3.2	68.0	24.6	3.4
New calorie ranges, saturated fat, trans fat, and sodium targets												
Receiving and storage	77.7	15.4	2.7	76.7	16.0	3.8	72.8*	20.7*	2.8	74.5	18.8	3.0
Preparation	72.1	20.9	2.5	70.1	22.5	3.8	69.0	24.0	3.2	69.7	23.3	3.2
Holding and transportation	75.9	16.4	2.0	77.5	14.7*	3.6	72.5*	19.3*	2.8	74.2	17.8	2.8
Meal service	77.1	15.1	3.1	74.6	17.1	3.9	71.8	21.1*	3.0	73.3	19.2	3.2
Number of SFAs (Unweighted)†	**638**			**921**			**1,803**			**3,372**		
Number of SFAs (Weighted) †	**2,181**			**3,075**			**8,507**			**13,813**		

Notes:

Row percentages within subgroups do not sum to 100 percent because some respondents did not answer the questions. The percentages missing range from 1.5 to 5.7 percent across all questions and subgroups.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.3

Adequacy of Existing Equipment in School Kitchens by Region

	Percentage of SFAs																					All SFAs		
	Northeast			Mid-Atlantic			Southeast			Midwest			Southwest			Mountain Plains			Western					
	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround	Adequate	Inadequate with a workaround	Inadequate/no workaround
More fruit and vegetable items on daily menus																								
Receiving and storage	71.5*	24.8*	0.7*	71.0*	23.1*	4.3	66.4	29.9	3.3	62.1	34.5	2.5	62.5	32.9	3.0	64.3	30.7	4.0	57.0*	38.0*	1.8	64.0	31.6	2.7
Preparation	72.1	22.4	1.2	73.9	20.6	3.6	67.8	28.8	2.6	71.3	26.3	1.5	72.1	22.2	2.3	70.3	26.1	2.3	62.4*	30.0*	2.7	69.9	25.5	2.2
Holding and transportation	75.3*	17.4*	0.9*	73.9	18.6*	5.1	68.8	27.8	1.5*	70.6	24.7	2.4	64.2	26.2	3.5	72.1	19.8*	3.7	61.9*	31.1*	2.9	69.3	23.9	2.8
Meal service	68.9	25.8	1.8	70.4	24.2	3.1	64.2	32.0	2.2	65.0	31.3	2.2	73.2	24.8	0.5*	69.6	26.0	3.1	63.4	29.5	3.0	67.6	28.0	2.2
Greater variety of fruits and vegetables																								
Receiving and storage	67.2	27.1	2.2	64.5	24.4*	4.7	61.8	32.8	3.2	60.1	32.1	4.6	65.5	32.7	0.9*	63.4	29.5	3.6	60.0	32.5	3.3	62.7	30.6	3.3
Preparation	70.4	24.6	1.0*	67.7	23.0	3.7	65.1	30.7	2.1	65.2	28.6	3.1	70.0	21.9	2.1	67.2	27.7	1.9	63.4	29.5	2.6	66.8	26.9	2.4
Holding and transportation	74.6*	18.9*	1.2*	66.0	24.3	4.1	64.3	29.7	2.0	65.6	26.8	3.4	65.4	25.9	3.1	69.8	21.6*	3.1	60.2*	31.0*	3.8	66.4	25.5	3.1
Meal service	67.9	26.6	2.0	63.4	27.0	2.9	61.5	32.8*	2.6	61.8	30.9	3.2	72.4	25.3	0.2*	67.1	26.9	2.2	66.5	27.1	2.1	65.7	28.2	2.2
At least half of grains offered are whole grain-rich																								
Receiving and storage	78.7	15.5	0.9*	77.7	14.9	4.0	79.2	17.4	0.9*	80.4	15.7	1.8	77.1	15.0	2.7	78.5	16.5	2.5	73.0*	20.1	2.6	78.0	16.5	2.2
Preparation	77.6	15.5	0.6*	80.5	11.4*	3.7	80.6	15.3	0.7*	80.1	17.5	0.6	74.1	17.0	2.7	78.0	17.0	1.9	69.1*	21.8*	3.0	77.0	17.1	1.8

Holding and transportation	78.9	12.6	1.2	81.3	11.5	3.3	80.5	14.3	1.7	81.7	14.6	0.8	74.7	16.8	2.1	79.1	14.4	2.9	72.2*	20.1*	2.3	78.4	15.2	1.9
Meal service	76.7	14.6	2.6	82.4	9.9*	3.7	81.1	14.5	1.7	79.6	15.9	1.4	79.2	14.1	0.9	77.4	17.3	2.3	71.8*	20.6*	2.2	78.0	15.8	2.0
Different portion sizes for each grade group (K-5, 6-8, 9-12)																								
Receiving and storage	73.2	19.3	2.5	80.8*	13.0*	3.8	75.6	18.9	3.3	73.9	20.3	2.7	76.6	18.2	1.1*	74.7	19.8	2.6	70.8	20.6	2.4	74.6	19.1	2.5
Preparation	66.8	25.9	2.5	70.9	22.9	3.3	70.1	24.3	2.7	68.7	25.7	2.9	71.0	19.5	3.1	71.4	23.8	1.8	68.8	22.6	3.2	69.6	23.7	2.7
Holding and transportation	73.9	16.7	2.8	77.4	15.2	3.1	75.9	20.1	1.4	74.7	19.6	3.0	69.8	22.0	1.4	77.0	17.1	2.9	68.9*	20.0	2.3	73.8	18.9	2.5
Meal service	64.9	26.0	2.7	71.7	20.9	4.7	68.0	25.2	4.4	65.9	27.4	4.1	71.0	22.1	1.7*	67.4	26.1	3.2	69.6	21.1	3.3	68.0	24.6	3.4
New calorie ranges, saturated fat, trans fat, and sodium targets																								
Receiving and storage	72.8	18.3	3.8	80.3*	10.7*	4.8	76.4	18.5	1.8	75.1	19.1	2.5	77.2	18.0	1.6*	71.7	21.4	3.4	71.0	21.0	3.5	74.5	18.8	3.0
Preparation	68.0	23.4	3.4	75.1	16.6*	5.1	72.6	21.1	2.6	69.2	24.1	3.2	72.4	21.4	3.0	67.6	26.4	2.9	66.6	25.2	2.9	69.7	23.3	3.2
Holding and transportation	76.1	12.5*	3.7	79.7	11.7*	4.0	78.5*	15.5	2.0	74.1	18.6	2.7	74.3	18.9	1.7	73.6	18.9	3.4	67.9*	22.8*	2.7	74.2	17.8	2.8
Meal service	70.8*	19.1*	3.8*	80.1*	11.5*	4.9	75.1	18.7	2.3	72.2	20.1	3.7	76.8	18.4	1.4	71.8	21.5	2.9	70.4*	20.6*	3.5	73.3	19.2	3.2
Number of SFAs (unweighted)†	**413**			**302**			**509**			**517**			**349**			**690**			**592**			**3,372**		
Number of SFAs (weighted) †	**1,572**			**1,168**			**1,232**			**3,356**			**1,975**			**2,440**			**2,071**			**13,813**		

Notes:

Row percentages within subgroups do not sum to 100 percent because some respondents did not answer the questions. The percentages missing range from 0.4 to 8.8 percent across all questions and subgroups.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.4

Adequacy of Existing Equipment in School Kitchens by Poverty Category*

	Percentage of SFAs												All SFAs			
	Low poverty (less than 40%)				Intermediate poverty (40- 60%)				High poverty (more than 60%)							
	Adequate	Inadequate with a workaround	Inadequate/no workaround	Missing	Adequate	Inadequate with a workaround	Inadequate/no workaround	Missing	Adequate	Inadequate with a workaround	Inadequate/no workaround	Missing	Adequate	Inadequate with a workaround	Inadequate/no workaround	Missing
More fruit and vegetable items on daily menus																
Receiving and storage	64.0	31.6	2.7	1.7	66.8	29.2	2.5	1.4	61.5	33.3	3.2	2.0	63.1	32.8	2.5	1.6
Preparation	69.9	25.5	2.2	2.4	70.1	25.9	1.8	2.2	67.9	27.1	2.8	2.2	71.9	23.3	2.0	2.9
Holding and transportation	69.3	23.9	2.8	3.9	72.2†	22.3	2.3	3.1	67.6	24.5	3.3	4.6	67.6	25.2	2.9	4.2
Meal service	67.6	28.0	2.2	2.2	64.3†	30.8†	3.0	1.9	67.4	28.1	1.8	2.6	71.8†	24.4†	1.8	2.0
Greater variety of fruits and vegetables																
Receiving and storage	62.7	30.6	3.3	3.3	65.5	28.4	3.1	3.0	59.0†	33.8	3.2	3.9	63.5	29.8	3.7	3.0
Preparation	66.8	26.9	2.4	3.9	67.6	26.3	3.0	3.1	64.7	28.4	2.5	4.4	68.0	25.9	1.6	4.5
Holding and transportation	66.4	25.5	3.1	5.0	69.0	25.6	1.9†	3.6	66.4	23.7	4.0	5.9	63.2	27.6	3.5	5.7
Meal service	65.7	28.2	2.2	3.9	63.1	30.2	3.2	3.5	65.0	29.7	1.0†	4.3	69.9†	24.0†	2.3	3.8
At least half of grains offered are whole grain-rich																
Receiving and storage	78.0	16.5	2.2	3.4	79.5	16.0	1.7	2.8	76.1	17.5	2.6	3.9	78.2	15.9	2.3	3.7
Preparation	77.0	17.1	1.8	4.2	78.2	16.9	1.6	3.4	77.3	16.6	1.9	4.2	75.3	17.9	1.9	5.0
Holding and transportation	78.4	15.2	1.9	4.5	80.3	14.3	1.7	3.8	78.4	15.4	1.5	4.7	76.0	16.0	2.8	5.3
Meal service	78.0	15.8	2.0	4.2	77.7	15.7	3.0†	3.5	79.5	15.8	0.6†	4.1	76.8	15.9	2.3	5.0

Different portion sizes for each grade group (K-5, 6-8, 9-12)																
Receiving and storage	74.6	19.1	2.5	3.7	75.9	18.5	2.4	3.2	71.7	21.2	2.5	4.6	76.4	17.5	2.7	3.5
Preparation	69.6	23.7	2.7	4.0	68.8	25.1	2.6	3.5	67.1	24.9	3.0	4.9	73.5†	20.5†	2.6	3.4
Holding and transportation	73.8	18.9	2.5	4.8	76.2	17.9	2.5	3.4†	71.7	19.7	1.9	6.7	73.1	19.2	3.1	4.6
Meal service	68.0	24.6	3.4	4.1	65.7	27.8†	3.7	2.7†	66.2	24.4	3.0	6.4†	72.8†	20.7†	3.4	3.1
New calorie ranges, saturated fat, trans fat, and sodium targets																
Receiving and storage	74.5	18.8	3.0	3.8	76.2	17.3	3.0	3.6	72.8	20.6	2.9	3.7	74.3	18.5	3.1	4.1
Preparation	69.7	23.3	3.2	3.9	71.0	21.9	3.7	3.4	66.1†	27.3†	2.9	3.8	72.0	20.6	3.0	4.5
Holding and transportation	74.2	17.8	2.8	5.2	76.2	16.0	2.9	4.9	73.4	19.5	2.0	5.1	72.6	18.0	3.7	5.7
Meal service	73.3	19.2	3.2	4.3	73.2	18.9	3.8	4.1	71.9	21.8	2.1†	4.2	75.0	16.7	3.6	4.6
Number of SFAs (Unweighted)‡	**3,372**				**1,211**				**1,140**				**1,021**			
Number of SFAs (Weighted) ‡	**13,813**				**5,087**				**4,611**				**4,116**			

Notes:

* Categories based on the percentage of enrolled students approved for free or reduced-price meals.

† Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

‡ The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.5

Reasons Why Workarounds Are Inadequate for Meeting the Updated Lunch Requirements Among SFAs That Reported "Making Do with a Workaround"

Reason	Percentage of all SFAs
Expensive	36.7
Inefficient	35.1
Too labor intensive	26.7
Can't meet increasing needs	23.5
Unsustainable	11.3
Other	9.1
Missing	16.8
Number of SFAs (unweighted)*	**1,124**
Number of SFAs (weighted)*	**4,706**

Notes:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Due to the late addition of this question to the survey, the table includes only 47 percent of SFAs that reported their equipment as "inadequate but making do with a workaround" for one or more key changes defined in the new lunch requirements.

Multiple responses were allowed.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.6

SFAs Needing at Least One Piece of Equipment by Kitchen Type

	Percentage of all SFAs
Full-service, production, finishing/ satellite kitchens	87.3
Central kitchens/commissaries, among SFAs with central production facilities	67.1*
All kitchens	87.9
Number of SFAs (unweighted)†	**3,372**
Number of SFAs (weighted)†	**13,813**

Notes:

* Number of SFAs with central kitchens or commissaries is 340 (unweighted; 1,244 weighted).

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.7

Distribution of Estimated Total Costs of Equipment Needed per SFA

	Percentage of SFAs†	Total number of SFAs (unweighted)*	Total number of SFAs (weighted)*
No equipment needed	12	317	1,589
Less than $10,000	8	200	1,074
$10,000 to less than $50,000	13	336	1,792
$50,000 to less than $150,000	20	579	2,803
$150,000 to less than $500,000	28	929	3,866
More than $500,000	19	986	2,602
Missing	1	25	88

Notes:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Estimated total costs per SFA are slight underestimates because some SFAs did not answer one or more questions about whether a specific piece of equipment was needed and these were treated as "no" responses.

† Includes SFAs that responded to one or more questions about the types of equipment needed, but did not report needing any equipment.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.8

Distribution of Estimated Equipment Costs per School*

	Percentage of SFAs	Total number of SFAs (unweighted)†	Total number of SFAs (weighted)†
No equipment needed	12	317	1,589
Less than $5,000	11	363	1,543
$5,000 to less than $25,000	19	689	2,617
$25,000 to less than $50,000	15	545	2,020
$50,000 to less than $100,000	21	695	2,871
More than $100,000	22	738	3,086
Missing	1	25	88

Notes:

Estimated total costs per SFA are slight underestimates because some SFAs did not answer one or more questions about whether a specific piece of equipment was needed and these were treated as "no" responses.

* Includes SFAs that responded to one or more questions about the types of equipment needed, but did not report needing any equipment.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.9

Top Five Pieces of Equipment Needed in School Kitchens by SFA Size

Equipment	Percentage of SFAs					All SFAs	Estimated unit cost (dollars)
	Very small (Fewer than 1,000 students)	Small (1,000-2,499 students)	Medium (2,500-9,999 students)	Large (10,000-24,999 students)	Very large (25,000 or more students)		
Utility cart	38.7*	44.4	48.5*	55.6*	50.3*	43.1	490
Serving portion utensils	38.9*	41.9	46.0*	50.7*	51.6*	41.9	32
Sets of knives with cutting boards	39.7	43.6	42.6	45.3	45.6	41.6	530
Large-capacity food processor	34.1*	45.1*	46.0*	48.1*	35.9	39.8	1,941
Industrial scale	35.4*	38.3	48.8*	44.4	34.5*	39.3	848
Walk-in refrigerator	30.2*	42.6	49.2*	63.3*	56.1*	39.1	29,056
Walk-in freezer	27.8*	40.8*	46.1*	55.9*	51.7*	36.4	31,500
Salad or fruit/vegetable bar (free standing, self serve)	30.9*	43.3*	36.4	32.8	33.8	35.0	10,829
Software program	38.6*	28.0*	29.9	27.2*	21.2*	33.5	750
Reach-in refrigerator	22.5*	28.0	37.0*	49.6*	50.5*	28.7	6,117
Number of SFAs (unweighted)†	**1,021**	**1,327**	**496**	**344**	**184**	**3,372**	
Number of SFAs (weighted)†	**6,855**	**5,009**	**991**	**645**	**313**	**13,813**	

Notes:

Shaded cells indicate the top five pieces of equipment needed by SFAs in each size category.

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.10

Top Five Pieces of Equipment Needed in School Kitchens by Community Type

Equipment	Percentage of SFAs			All SFAs	Estimated unit cost (dollars)
	Urban	Suburban	Rural		
Utility cart	43.2	43.5	42.6	43.1	490
Serving portion utensils	42.1	40.0	42.6	41.9	32
Sets of knives with cutting boards	38.6	39.4	43.0	41.6	530
Large-capacity food processor	31.4*	40.3	41.8*	39.8	1,941
Industrial scale	34.2	42.7	39.4	39.3	848
Walk-in refrigerator	38.5	43.2*	37.8	39.1	29,056
Walk-in freezer	34.1	40.8*	35.5	36.4	31,500
Hot holding cabinet	38.1	35.6	34.9	35.5	6,079
Software program	31.5	27.1*	36.0*	33.5	750
Mobile milk cooler	31.9	32.0	28.4	29.8	3,110
Computer	31.0	24.8*	30.2	29.2	1,007
Number of SFAs (unweighted)†	**638**	**921**	**1,803**	**3,372**	
Number of SFAs (weighted)†	**2,181**	**3,075**	**8,507**	**13,813**	

Notes:

Shaded cells indicate the top five pieces of equipment needed by SFAs in each community type.

Ten SFAs were excluded from this table because they did not provide information on community type.

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.11

Top Five Pieces of Equipment Needed in School Kitchens, by Food and Nutrition Service Region

Equipment	Percentage of SFAs							All SFAs	Estimated unit cost (dollars)
	Northeast	Mid-Atlantic	Southeast	Midwest	Southwest	Mountain Plains	Western		
Utility cart	46.3	40.1	48.9*	40.0	43.2	36.4*	51.4*	43.1	490
Serving portion utensils	45.5	40.3	48.1*	43.4	35.5	37.1*	45.6	41.9	32
Sets of knives with cutting boards	40.2	38.0	46.9*	40.1	43.8	37.8	46.1*	41.6	530
Large-capacity food processors	41.4	34.7	42.4	40.9	35.0	40.2	42.0	39.8	1,941
Industrial scale	47.6*	40.7	41.5	35.9	37.7	36.6	40.8	39.3	848
Walk-in refrigerator	38.1	37.7	43.4	37.0	40.6	37.5	42.0	39.1	29,056
Walk-in freezer	35.1	33.3	42.1*	35.3	33.1	34.4	43.1*	36.4	31,500
Hot holding cabinet	33.4	38.6	42.5*	33.5	39.0	29.1*	38.6	35.5	6,079
Salad or fruit/vegetable bar (free-standing, self serve)	34.9	33.3	25.1*	37.5	30.5	37.8	38.7	35.0	10,829
Software programs	36.3	28.2	29.9	36.5	25.0*	37.1	35.2	33.5	750
Sectionizers	27.4	21.5*	45.2*	35.8*	27.1	27.4*	32.3	31.2	290
Mobile milk cooler	27.4	29.7	33.5	29.1	26.4	22.8*	42.1*	29.8	3,110
Combi oven	23.1	34.2*	47.4*	26.0	25.9	17.2*	22.5	26.2	23,736
Total Number of SFAs (unweighted)†	**413**	**302**	**509**	**517**	**349**	**690**	**592**	**3,372**	
Total Number of SFAs (weighted) †	**1,572**	**1,168**	**1,232**	**3,356**	**1,975**	**2,440**	**2,071**	**13,813**	

Notes:

Shaded cells indicate the top five pieces of equipment needed by SFAs in each region.

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.12

Top Five Pieces of Equipment Needed in School Kitchens by Poverty Level*

Equipment	Percentage of SFAs			All SFAs	Estimated unit cost (dollars)
	Low poverty (less than 40%)	Intermediate poverty (40 to 60%)	High poverty (more than 60%)		
Utility cart	40.3	43.9	45.5	43.1	490
Serving portion utensils	42.3	39.7	43.8	41.9	32
Sets of knives with cutting boards	39.1	42.2	43.9	41.6	530
Large-capacity food processor	41.7	40.2	36.8	39.8	1,941
Industrial scale	42.3	38.9	35.9	39.3	848
Walk-in refrigerator	37.3	37.5	43.1†	39.1	29,056
Walk-in freezer	34.8	35.9	39.0	36.4	31,500
Total Number of SFAs (unweighted)‡	**1,211**	**1,140**	**1,021**	**3,372**	
Total Number of SFAs (weighted)‡	**5,087**	**4,611**	**4,116**	**13,813**	

Notes:

Shaded cells indicate the top five pieces of equipment needed by SFAs in each poverty category.

Multiple responses were allowed.

* Categories based on the percentage of enrolled students approved for free or reduced-price meals.

† Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

‡ The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.13

SFAs with Equipment Replacement and Upgrade Plans and Line Item for Capital Equipment Purchases in Annual Budget

	Percentage of SFAs
Equipment replacement and upgrade plan	
Yes	25.8
No	49.0
Don't know	24.2
Missing	1.0
Budget for capital equipment	
Yes	42.2
No	22.5
Don't know	32.8
Missing	2.5
Among SFAs with a budget for capital equipment purchases (n=1,775)	
Adequate budget	42.8
Inadequate budget	44.3
Don't know	11.6
Missing	1.3
Number of SFAs (unweighted)*	**3,372**
Number of SFAs (weighted)*	**13,813**

Note:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.14

SFAs with Equipment Replacement and Upgrade Plans and Budget for Capital Equipment by Community Type

	Percentage of SFAs				All SFAs
	Urban	Suburban	Rural	Missing	
Equipment replacement and upgrade plan					
Yes	34.3*	34.3*	20.6*	29.1	25.8
No	39.0*	49.0	51.6*	43.5	49.0
Don't know	25.8	15.8*	26.8*	27.5	24.2
Missing	0.9	0.9	1.0	0.0	1.0
Line item for capital equipment purchases in annual budget					
Yes	47.5	52.4*	37.0*	68.4	42.2
No	14.4*	25.0	23.8	3.8	22.5
Don't know	36.2	20.2*	36.5*	24.2	32.8
Missing	1.9	2.5	2.7	3.6	2.5
Number of SFAs (unweighted)†	**638**	**921**	**1,803**	**10**	**3,372**
Number of SFAs (weighted) †	**2,181**	**3,075**	**8,507**	**50**	**13,813**

Note:

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.15

SFAs with Equipment Replacement and Upgrade Plans and Budget for Capital Equipment by Region

	Percentage of SFAs							All SFAs
	Northeast	Mid-Atlantic	Southeast	Midwest	Southwest	Mountain Plains	Western	
Equipment replacement and upgrade plan								
Yes	28.0	29.6	36.9*	24.9	23.2	20.1*	26.1	25.8
No	51.1	43.1	53.1	48.0	45.8	48.2	54.0	49.0
Don't know	18.7	26.0	9.1*	26.5	30.0	30.9*	19.2*	24.2
Missing	2.2	1.3	0.9	0.5	1.0	0.8	0.7	1.0
Line item for capital equipment purchases in annual budget								
Yes	33.5*	42.8	70.7*	39.7	42.4	33.4*	45.7	42.2
No	37.4*	21.0	13.2*	22.2	15.4*	23.1	24.1	22.5
Don't know	25.6*	35.1	12.8*	36.2	36.8	42.2*	28.4*	32.8
Missing	3.5	1.1	3.2	2.0	5.4	1.3	1.8	2.5
Number of SFAs (unweighted)†	**413**	**302**	**509**	**517**	**349**	**690**	**592**	**3,372**
Number of SFAs (weighted)†	**1,572**	**1,168**	**1,232**	**3,356**	**1,975**	**2,440**	**2,071**	**13,813**

Note:

* Difference between the subgroup and all other SFAs is significantly different from zero at the α = .05 level

† The data are weighted to be representative of all public school food authorities (SFAs) offering the National School Lunch Program.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.16

SFAs with Equipment Replacement and Upgrade Plans and Budget for Capital Equipment by Poverty Category*

	Percentage of SFAs			All SFAs
	Low poverty (less than 40%)	Intermediate poverty (40 to 60%)	High poverty (more than 60%)	
Equipment replacement and upgrade plan				
Yes	28.0	23.4	25.9	25.8
No	47.3	53.5†	46.1	49.0
Don't know	23.9	22.3	26.7	24.2
Missing	0.8	0.9	1.2	1.0
Line item for capital equipment purchases in annual budget				
Yes	39.2	42.3	45.7	42.2
No	25.3†	22.0	19.6	22.5
Don't know	32.7	33.0	32.6	32.8
Missing	2.7	2.7	2.1	2.5
Number of SFAs (unweighted)‡	**1,211**	**1,140**	**1,021**	**3,372**
Number of SFAs (weighted) ‡	**5,087**	**4,611**	**4,116**	**13,813**

Note:

* Categories based on the percentage of enrolled students approved for free or reduced-price meals.

† Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level

‡ The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.17

Infrastructure Changes Needed in School Kitchens to Meet Updated Lunch Requirements and the Number of Schools Needing Upgrade

Infrastructure change	Percentage of SFAs				Number of schools needing upgrade (weighted)
	Yes	No	Don't know	Missing	
More physical space for storage, preparation, or serving	45.5	38.0	5.1	11.4	20,400
More electrical, such as more amps, voltage, or locations of outlets	31.1	44.7	10.9	13.3	16,865
More plumbing, such as water supply or location of sinks and drains	22.8	52.1	9.8	15.3	10,946
More ventilation, such as exhaust hoods or fire suppression systems	20.8	53.7	9.6	15.9	9,012
Remodeling that would require bringing the facility up to local health department code	18.5	56.4	8.3	16.8	7,716
More natural gas, such as increased pressure or location of pipes	7.6	60.3	14.1	18.0	4,282
Number of SFAs (unweighted)*	3,372				
Number of SFAs (weighted)*	13,813				

Notes:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Fifty-five percent of SFAs reported that at least one of their school kitchens needs some type of infrastructure change. Twenty-eight percent of SFAs did not indicate that they needed infrastructure changes in their school kitchens.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.18

Infrastructure Changes Needed in School Kitchens and Number of Schools Needing Upgrade by SFA Size

Infrastructure change	Very small (Fewer than 1,000 students)		Small (1,000-2,499 students)		Medium (2,500-9,999 students)		Large (10,000-24,999 students)		Very large (25,000 or more students)		All SFAs
	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	
More physical space for storage, preparation, or serving	36.7*	3,161	48.1	2,935	58.0*	6,387	65.4*	3,824	56.4*	4,094	45.5
More electrical, such as more amps, voltage, or locations of outlets	22.9*	2,715	33.0	2,472	43.4*	5,322	47.1*	2,827	42.6*	3,529	31.1
More plumbing, such as water supply or location of sinks and drains	18.1*	1,764	24.5	1,642	29.3*	3,483	31.5*	2,026	31.6*	2,031	22.8
More ventilation, such as exhaust hoods or fire suppression systems	16.1*	1,726	23.6	1,525	26.9*	2,840	27.7*	1,464	25.1	1,458	20.8
Remodeling that would require bringing the facility up to local health department code	15.1*	1,155	20.4	1,371	21.0	1,985	28.6*	1,420	31.3*	1,784	18.5
More natural gas, such as increased pressure or location of pipes	3.9*	625	9.5	749	13.0*	1,403	12.4*	751	11.1	755	7.6
Number of SFAs (unweighted)†	3,372										
Number of SFAs (weighted)†	13,813										

Notes:

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the α = .05 level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.19

Infrastructure Changes Needed in School Kitchens and Number of Schools Needing Upgrade by Community Type

Infrastructure change	Urban		Suburban		Rural		Missing		All SFAs
	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	
More physical space for storage, preparation, or serving	45.9	5,469	52.9*	7,558	42.6*	7,263	64.8	111	45.5
More electrical, such as more amps, voltage, or locations of outlets	33.0	5,504	34.7	5,539	29.3	5,769	18.0	53	31.1
More plumbing, such as water supply or location of sinks and drains	27.7*	3,408	23.1	3,665	21.5	3,838	14.4	36	22.8
More ventilation, such as exhaust hoods or fire suppression systems	24.3	3,076	22.3	2,650	19.4	3,259	3.6	27	20.8
Remodeling that would require bringing the facility up to local health department code	21.2	2,279	19.7	2,549	17.4	2,869	11.0	20	18.5
More natural gas, such as increased pressure or location of pipes	10.0	1,680	9.5	1,313	6.4*	1,289	0.0	0	7.6
Number of SFAs (unweighted)†	3,372								
Number of SFAs (weighted)†	13,813								

Notes:

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the α = .05 level.

† The data are weighted to be representative of all public school food authorities (SFAs) offering the National School Lunch Program.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.20

Infrastructure Changes Needed in School Kitchens and Number of Schools Needing Upgrade by Region

Infrastructure change	Northeast		Mid-Atlantic		Southeast		Midwest		Southwest		Mountain Plains		Western		All SFAs
	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	
More physical space for storage, preparation, or serving	42.6	1,596	40.8	1,966	52.9*	2,801	47.4	3,965	41.6	2,721	42.6	2,545	50.1	4,807	45.5
More electrical, such as more amps, voltage, or locations of outlets	22.7*	1,159	23.9	1,465	39.5*	2,270	33.0	3,651	36.1	2,504	27.9	2,024	32.0	3,792	31.1
More plumbing, such as water supply or location of sinks and drains	18.9	709	15.3*	969	29.5*	1,502	22.2	2,300	22.1	1,451	23.5	1,427	26.9	2,589	22.8
More ventilation, such as exhaust hoods or fire suppression systems	20.4	742	15.9	867	22.9	1,021	23.0	2,101	17.7	1,051	19.8	1,326	23.2	1,903	20.8
Remodeling that would require bringing the facility up to local health department code	13.7	501	14.0	676	20.0	1,091	18.9	1,404	21.5	1,044	14.1*	996	25.5*	2,005	18.5
More natural gas, such as increased pressure or location of pipes	5.0*	176	7.9	507	9.5	392	8.4	1,081	8.7	611	4.6*	409	9.6	1,106	7.6
Number of SFAs (unweighted)†	3,372														
Number of SFAs (weighted) †	13,813														

Notes:

Multiple responses were allowed.

* Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

† The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.21

Infrastructure Changes Needed in School Kitchens and Number of Schools Needing Upgrade by Poverty Category*

Infrastructure change	Low poverty (less than 40%)		Intermediate poverty (40-60%)		High poverty (more than 60%)		All SFAs
	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	Percent of SFAs	Number of schools	
More physical space for storage, preparation, or serving	47.5	6,893	46.1	7,692	42.4	5,816	45.5
More electrical, such as more amps, voltage, or locations of outlets	28.2†	4,904	30.8	5,980	34.9†	5,982	31.1
More plumbing, such as water supply or location of sinks and drains	22.5	3,525	20.8	3,540	25.4†	3,881	22.8
More ventilation, such as exhaust hoods or fire suppression systems	21.4	2,983	19.1	2,790	21.9	3,239	20.8
Remodeling that would require bringing the facility up to local health department code	18.2	2,669	15.5	2,288	22.3†	2,760	18.5
More natural gas, such as increased pressure or location of pipes	7.6	1,228	7.0	1,174	8.4	1,880	7.6
Number of SFAs (unweighted)‡	3,372						
Number of SFAs (weighted)‡	13,813						

Notes:

Multiple responses were allowed.

* Categories based on the percentage of enrolled students approved for free or reduced-price meals.

† Difference between the subgroup and all other SFAs is significantly different from zero at the $\alpha = .05$ level.

‡ The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Table A.22

Financial Resources Expected from Local Education Agency (LEA) and Estimated Time Frame for Completion of Infrastructure Changes

	Percentage of SFAs
Financial resources SFA expects LEA to allocate for infrastructure changes	
All or nearly all resources needed	9.4
About three-fourths of resources needed	2.2
About half of resources needed	6.2
About a quarter of resources needed	5.0
Less than a quarter of resources needed	8.7
None	28.6
Don't know	38.1
Missing	1.7
Estimated time frame for completion of infrastructure changes among SFAs expecting any financial resources from LEA (n = 1,186)	
During the 2012-2013 school year	10.9
In the next 2 to 3 years	27.3
In the next 4 to 10 years	23.8
More than 10 years from now	7.9
Don't know	29.1
Missing (but not logically skipped)	1.0
Number of SFAs (unweighted)*	**3,372**
Number of SFAs (weighted)*	**13,813**

Note:

* The data are weighted to be representative of all public school food authorities participating in the National School Lunch Program. For further information about weighting, refer to the report methodology in Appendix C.

Source: Kitchen Infrastructure and Training for Schools Survey, 2012.

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Appendix B: Characteristics of school food authorities

To provide context for the study findings, Table B.1 presents data on key characteristics of public SFAs, including size (number of students enrolled), number of schools, community type, region, and poverty category. Using data from the sample frame, SFAs were grouped into five categories based on the number of enrolled students: very small (fewer than 1,000), small (1,000 to 2,499), medium (2,500 to 9,999), large (10,000 to 24,999), and very large (25,000 or more). Half of all public SFAs have fewer than 1,000 enrolled students and can be characterized as very small. Another 44 percent are either small or medium (roughly equal proportions of each). Large and very large SFAs (10,000 or more students) are much less common, accounting for only 7 percent of all SFAs.

The size of an SFA can also be measured by the number of individual schools operating the lunch program. The smallest have 1 to 3 schools (55 percent). About one-third (34 percent) have 4 to 11 schools, and the remaining 11 percent have 12 or more schools.

Respondents were asked to characterize the location* of the majority of schools in their SFAs as urban, suburban, or rural. More than 6 in 10 (62 percent) reported that most of their schools are in rural areas. Less than one-quarter (22 percent) said most of their schools are in suburban communities, and 16 percent described their schools as mainly urban.

USDA's Food and Nutrition Services administers the National School Lunch Program through seven regional offices. The largest proportion of SFAs is in the Midwest region (24 percent); 14 to 18 percent are in the Southwest, Western, and Mountain Plains regions; and 8 to 9 percent are in the mid-Atlantic and Southeast regions.

To measure socioeconomic status, we used data from the sample frame on the percentage of enrolled students approved for free or reduced-price meals.† Three poverty categories were created: low (fewer than 40 percent of students approved for free or reduced-price meals), intermediate (40 to 60 percent approved for free/reduced-price meals), and high (greater than 60 percent approved for free/reduced-price meals).‡ Thirty-seven percent of all SFAs fall within the low poverty category. Another one-third fall within the intermediate poverty category, and nearly one-third (30 percent) are within the high poverty category.

Production Systems Used by SFAs

School food authorities may use one type of meal production system or a combination of systems to meet the needs of all their schools. The KITS survey asked about four main types of production systems (or kitchen types), defined as follows:

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* To distinguish the relative urbanicity of an SFA's location based on geographic region, we refer to urban, suburban, and rural areas as "community types" for the remainder of the report.

† In the NSLP and SBP, children from families with household incomes at or below 130 percent of the federal poverty threshold are eligible to receive free meals; those from households with incomes between 131 and 185 percent of the federal poverty threshold level are eligible to receive meals at a reduced price. (From July 1, 2012, to June 30, 2013, 130 percent of the poverty level was $29,965 for a family of four; 185 percent was $42,643.)

‡ Schools that serve 40 percent or more of their lunches free or at a reduced price are considered "severe need" and are eligible for a higher rate of federal reimbursement for breakfasts. (Source: U.S. Department of Agriculture, Food and Nutrition Service. 2012. "National School Lunch Program Fact Sheet." http://www.fns.usda.gov/cnd/Lunch/AboutLunch/NSLPFactSheet.pdf. Accessed May 13, 2013.)

Schools with more than 60 percent of students approved for free or reduced-price meals are reimbursed at a slightly higher rate than other SFAs (2 cents more per lunch served in SY 2012-13). (Source: U.S. Department of Agriculture, Food and Nutrition Service. 2012. "School Breakfast Program Fact Sheet." http://www.fns.usda.gov/cnd/breakfast/AboutBFast/SBPFactSheet.pdf. Accessed May 13, 2013.

Table B.1

Characteristics of School Food Authorities

Characteristic	Number of sample SFAs (unweighted)	Number of SFAs (weighted)*	Percentage of SFAs (weighted)*
Size (numtber of students)			
Very small (fewer than 1,000)	1,021	6,855	49.6
Small (1,000 to 2,499)	681	3,107	22.5
Medium (2,500 to 9,999)	1,142	2,893	20.9
Large (10,000 to 24,999)	344	645	4.7
Very large (25,000 or more)	184	313	2.3
Number of schools			
1 to 3	1,074	7,601	55.0
4 to 11	1,486	4,640	33.6
12 to 24	477	887	6.5
25 to 99	294	541	3.9
100 or more	41	144	1.0
Community type			
Urban	638	2,181	15.8
Suburban	921	3,075	22.3
Rural	1,803	8,507	61.6
Missing	10	50	0.4
Food and Nutrition Service region			
Northeast	413	1,572	11.4
Mid-Atlantic	302	1,168	8.5
Southeast	509	1,232	8.9
Midwest	517	3,356	24.3
Southwest	349	1,975	14.3
Mountain Plains	690	2,440	17.7
Western	592	2,071	15.0
Poverty level (percentage of students approved for free or reduced-price meals)			
Low (fewer than 40%)	1,211	5,087	36.8
Intermediate (40% to 60%)	1,140	4,611	33.4
High (more than 60%)	1,021	4,116	29.8
Number of SFAs	**3,372**	**13,813**	**100**

Note:

* Weighted data are representative of all SFAs offering the National School Lunch Program.

Source: School Food Authority Verification Summary Report (Form FNS-742). 2010-2011.

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- Full-service kitchens, which prepare and serve meals at the schools in which they are located.*
- On-site production kitchens, which prepare and serve meals at the schools where they are located but also send food or meals to other schools in the SFA.
- Central production kitchens or commissaries, which are typically stand-alone facilities that prepare food and ship it to multiple schools, either in bulk or as pre-portioned meals.
- Finishing or satellite kitchens, which receive food or meals from central production facilities, production kitchens, or commercial vendors. The food arrives ready to serve or requiring only minimal preparation.

The most common production system, used in 88 percent of all SFAs, is a full-service kitchen that prepares and serves meals on-site (Table B.2). Nearly one-quarter (23 percent) use production kitchens that prepare meals on-site and send them to other schools. Centralized production facilities that prepare food off-site and ship it to multiple schools are used in 9 percent of SFAs. Those with production kitchens or central facilities, by definition, also have finishing or satellite kitchens to receive and serve food or meals. All SFAs reported having one or more schools with some type of on-site kitchen.

Table B.2

Types of Production Systems Used by SFAs

Kitchen type	Percentage of SFAs	Missing
Full-service kitchens	87.8	3.9
Finishing or satellite kitchens	31.2	15.5
On-site production kitchens	22.7	11.1
Central production kitchens or commissaries	9.0	14.7
Number of SFAs (unweighted)*	3,372	
Number of SFAs (weighted)*	13,813	

Notes:

* The data are weighted to be representative of all school food authorities offering the National School Lunch Program.

Multiple responses were allowed.

Source: Kitchen Infrastructure and Training for Schools, 2012.

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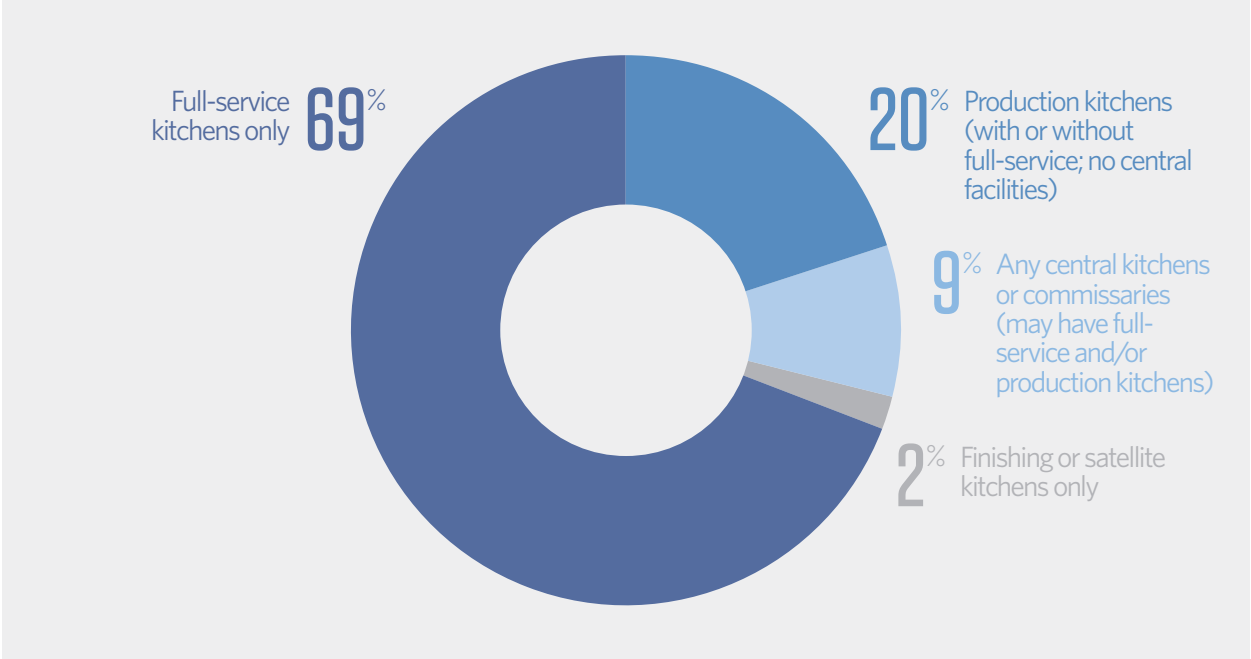
* These facilities include kitchens that prepare food items from scratch and those that mainly heat and serve food items they have purchased fully or partly prepared.

Figure B.1 illustrates the combinations of production systems reported by SFAs. Sixty-nine percent use full-service kitchens exclusively and 19 percent use them in combination with at least one other production system. Some SFAs with production kitchens also use full-service kitchens but rarely have central production facilities. The few SFAs that reported using finishing or satellite kitchens but not central facilities or production kitchens may receive meals from outside vendors, caterers, or other SFAs (see Table B.1)

The type of meal-production system used by an SFA or individual school has implications for its equipment, infrastructure, and staffing requirements.[16] Differences between on-site school kitchens and central production facilities are the most notable. Therefore, respondents from SFAs with central kitchens or commissaries were asked to answer several survey questions separately for their central facilities, and these findings are discussed separately in the text.

Figure B.1

Combinations of Production Systems Used by School Food Authorities



Note:

The data are weighted to be representative of all school food authorities offering the National School Lunch Program.

Source: Kitchen Infrastructure and Training for Schools, 2012.

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Appendix C: Study design and methodology

This appendix describes the design and methodological processes involved in conducting the Kitchen Infrastructure and Training for Schools study. Information is provided on questionnaire development and testing, sampling, data collection, response rates, weighting, and data analysis.

Questionnaire development and pilot testing

The KITS questionnaire was developed collaboratively by the study teams at Mathematica Policy Research and The Pew Charitable Trusts, with assistance from a consultant and input from an expert panel (see Appendix E). The consultant, Mary Jo Tuckwell, provided important substantive expertise in implementing the updated meal requirements, issues facing school food authority (SFA) directors, training of SFA and school food service staff, and sources of financial support. She helped guide the expert panel discussion, drafted survey questions, and reviewed the final questionnaire. Tuckwell is the former director of food and nutrition for the Eau Claire Area School District, and nutrition education and training coordinator for the Wisconsin Department of Public Instruction. She also served as a member of the Institute of Medicine Committee on Nutrition Standards for National School Lunch and School Breakfast Program, which developed recommendations for the updated requirements. As technical director for consulting services at inTEAM, a firm specializing in business intelligence for school food service, she works with SFAs across the country to enhance the nutritional quality of school meals and meet operational goals.

Expert panel input

Eight individuals with expertise in child nutrition and school food service served on the expert panel. The panel helped identify the key issues to be measured and determine critical survey questions, and provided feedback on the draft questionnaire. The panel members, each of whom received an honorarium for their participation, included:

- Kate Adamick, chef and co-founder of Cook for America®
- Pamela Lambert, director of student nutrition services for Escondido (CA) Union High School District
- Dr. Robert Lewis, director of nutrition services for El Monte (CA) City School District
- Steven W. Marshall, president of the Marshall Associates, Inc., a company specializing in food service design
- Jean Ronnei, director of nutrition and custodial services for Saint Paul (MN) Public Schools
- Dr. Keith Rushing, research scientist for the National Food Service Management Institute at the University of Southern Mississippi
- Margie Seidel, vice president of nutrition and sustainability at Chartwells School Dining Services
- Donna West, child nutrition manager, Brownwood (Scottsboro, AL) Elementary School

In early April 2012, the expert panel met via webinar with Mathematica project staff and representatives from Pew and the Robert Wood Johnson Foundation. The panel discussed the proposed framework for the study, the main topics to be covered, and potential groupings of questions. At this point, project staff and Tuckwell drafted the questionnaire. After the draft was completed, panel members reviewed the questionnaire and participated in another webinar in early May 2012 to provide more feedback. The resulting survey covered four main areas, each focused on SFAs' perceptions of their needs relative to meeting the updated meal requirements for school lunches: (1) readiness and perceived barriers to full implementation, (2) adequacy of existing kitchen equipment

and need for new equipment, (3) needed changes or upgrades in kitchen infrastructure, and (4) staff training needs.

Pilot testing

The draft questionnaire underwent two rounds of pilot testing. For the first round, five respondents (including a kitchen manager, a retired SFA director, two active SFA directors, and an area supervisor) completed a paper copy of the draft questionnaire. Respondents generally provided positive feedback on the questionnaire design and topics covered. However, because the administration times were longer than anticipated, the survey was revised and shortened. The second draft of the questionnaire was then pilot-tested by three SFA directors. This second version averaged 20 minutes to complete. Pew approved the final version of the survey in early June 2012.

The KITS survey was designed to be self-administered and completed online. Programming for the web-based questionnaire began in June and internal testing was completed in early August 2012. The questionnaire was finalized and released online by mid-August 2012.

Overview of study design

The KITS study was designed to provide national and state estimates, allowing it to develop and disseminate individual state profiles in addition to the national report. To produce reliable estimates from the survey data at both levels, it was necessary to draw a sufficiently large initial sample of SFAs and meet target completion rates within each state. Because not all SFAs that were selected to participate were eligible for the study or completed a survey, sampling weights were applied so that the study findings would be representative of SFAs across the nation and within states.

To accomplish the goals of the KITS sample design, maximize response rates, and increase the likelihood of meeting sample size requirements for reliable estimates, a stratified random sampling approach was employed, target completion rates for each state were set, the initial sample was augmented with a second sample release, and the data collection period was extended by two weeks. These strategies are summarized below and discussed in the sample design, response rates, and weighting sections that follow.

The sampling frame was all public SFAs in the 50 states and District of Columbia participating in the National School Lunch Program in school year 2010–2011. To select the sample, the SFAs within each state were divided into one to four strata based on size (number of schools). Mathematica statisticians then determined the target number of completed questionnaires required in each state to obtain the desired precision level for survey estimates.* To avoid releasing a larger initial sample than might be needed, the number of SFAs selected across the size strata for each state was based on a completion rate of 75 percent. After tracking the response rates in each state over several months of data collection, an additional sample of SFAs was selected based on the number of completed surveys needed in states where the targets had not yet been met.

The final KITS national sample was defined as the 3,372 eligible SFAs that completed questionnaires as of Nov. 20, 2012. Although this sample size was more than adequate for national estimates, the field period was kept open longer because a few states had not met their sample size requirements. By December 7, 2012, all states had reached the targeted number of completes needed for the state and CA regional analyses. The final weighted

* It was not necessary to establish a separate target completion rate for the national sample because the sum of the state-level targets was larger than that needed to provide precise national estimates. In some of the smaller states, it was necessary to include all SFAs in the sample.

response rate for the national sample was 54.3 percent (Table C.1).* More details on the national sample and the state sample sizes and response rates are provided in Tables C.2 through C.4.

Table C.1

Sample Sizes and Response Rates for KITS National Report

	Number of sample SFAs released	Number of sample SFAs eligible	Number of sample SFAs completed	Response rates (%)	
				Unweighted	Weighted
KITS national sample	5,999	3,825	3,372	57.1	54.3

Source: Kitchen Infrastructure and Training for Schools, 2012
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Mathematica's statisticians computed sampling weights to make the samples of respondents more representative of the target populations: all public SFAs and SFAs in each state. Applying weights to the data helps to reduce the potential for bias that sometimes occurs when subgroups of SFAs (such as those of different sizes) are over- or undersampled relative to their actual population proportion, or when sample members do not respond to the survey. An analysis determined whether characteristics associated with non-response were also related to survey responses, and the weights were adjusted accordingly. The final weights used for analysis accounted for unequal selection probabilities, the two rounds of sample release, and potential nonresponse bias.

Sample design

KITS was designed to be representative of public SFAs at the national and state levels. The target population for the KITS study included public SFAs in all 50 states and the District of Columbia. The sampling frame was a file of all public SFAs participating in the National School Lunch Program derived from the school year 2010–2011 School Food Authority Verification Summary Report (Form Food and Nutrition Service-742). There were 14,837 public SFAs included in the sample frame.

Stratification

This study employed a stratified random sampling approach. SFAs with equal probability within strata (or levels), defined based on geography and size, were selected. The first level of stratification was the state. Within a state, we defined up to four strata, including: (1) first-level certainty (1-cert), (2) second-level certainty (2-cert),† and either (3) large and small,‡ or (4) non-certainty (noncert). The noncert stratum combined SFAs that would have fallen into the large and small stratum, except that the number of SFAs allocated to the large and small stratum would have been fewer than nine. Overall, we formed 161 sampling strata nationwide.

* Unweighted response rates measure the proportion of the sample that resulted in useable information for analysis and are useful in gauging the results of the interviewing effort. Weighted response rates, on the other hand, are used to estimate a survey's sample coverage (the proportion of the population covered by the responding sample).

† The first-level certainty stratum included SFAs with an MOS large enough that, if we were using probability proportional to size (PPS) sampling, would be certain to be sampled given a sample size and release based on the most optimistic assumptions about response rates. The second-level certainty stratum included those that would be selected with certainty using PPS sampling if all reserve sample was released.

‡ The large and small stratum was defined based on the MOS. The definition varied from state to state.

Sample Allocation and Selection

To allocate the sample across the states, the study team first determined the target number of completed questionnaires—that is, the number needed in each state to obtain a 10 percent margin of error at the 95 percent confidence level for estimates presented in the reports.* The state-specific targets were based on a reasonable assumption of the design effects. The total sample size to be selected for a state was calculated by dividing the target number of completes by a conservative completion rate (50 percent). This state-level sample size was allocated to strata in that state/region such that: (1) all SFAs in the 1-cert and 2-cert strata were included, and (2) the remaining sample was allocated to the other strata (large and small, noncertainty) in proportion to its share of the total measure of size (MOS)† for the state. Seven of the smaller states had only one stratum (1-cert); thus, all public SFAs in those states were included in the sample.

To ensure that the sampling process was as efficient as possible, the total sample size for each state was adjusted using a less conservative completion rate. Thus, the initial sample sizes were calculated by dividing the target number of completes by a completion rate of 75 percent. Then, the state-level sample size was distributed across each stratum within that state such that SFAs in the 1-cert stratum were all released, and the remaining sample size was allocated in proportion to the initial sample sizes of other strata. Using this approach, the total size of the initial sample release (release 1) across all states was set at 4,635 SFAs. SFAs were randomly sampled from the total sample to be part of this first release for obtaining contact information and data collection. Those SFAs were flagged as "main" sample, while the SFAs not sampled for the first release were flagged as the "alternate" sample.

About halfway through the data collection period, after tracking response rates in each state, additional sample was released in states at risk of not meeting (or coming close to) their targets. Alternates were selected randomly within each stratum to meet the target number of completes in each state.‡ A total of 1,364 additional SFAs from the alternate sample were included in the second sample release (release 2). The total sample size across all states and the two sample releases was 5,999 SFAs.

Data collection

Several advance activities were conducted to notify Food and Nutrition Service's regional offices about the study, engage state child nutrition, or CN, directors, and gain access to SFA directors. In May 2012, project staff emailed regional office liaisons to introduce the study and request their support for gathering SFA directors' contact information from state CN directors. One week later, emails were sent to the state CN directors to introduce the study, request contact information for the sampled SFAs in their state, and ask that they inform these SFAs about the study and encourage them to participate.

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* Alternatively, this can be stated as a two-sided 95 percent confidence interval of plus or minus 10 percentage points.

† In most instances, we used the number of schools provided in the food and nutrition service-742 file as the MOS. However, we found that some of the data were not reasonable. For example, for some SFAs, the number of students per school was 1. Therefore, we either obtained a MOS from the National Center for Education Statistics (NCES) 2009-2010 Common Core of Data (CCD), or imputed the MOS, for 51 SFAs where the number of students per school was considered too small (less than 11) and for 63 SFAs where the ratio of students per school was considered too large (greater than 1,600).

‡ This was done by (1) assigning a random number to each alternate, uniformly between 0 and 1; (2) sorting the SFAs in each stratum by those random numbers, from smallest to largest; and (3) releasing SFAs in order starting from the one with the smallest number until we obtained the desired size of the release (number of SFAs) in that stratum.

Reminder emails were sent to nonresponding CN directors at the end of May 2012, and SFA contact information was received from all 50 states and the District of Columbia by August. Project staff reviewed and edited contact information as needed, and noted SFA closures, merges, and other anomalies to prepare a complete sample contact list to use for the initial mailing to SFAs. Twenty-one SFAs that had closed or merged were replaced with SFAs from the alternate sample.

Data for the KITS study were collected between August and December 2012 (total of 17 weeks). The initial survey materials were mailed to SFA directors (or another staff member who had primary responsibility for making decisions about the types of equipment and training needed to implement the updated meal requirements). The mailing included a letter inviting the SFA director to participate in the study, a colorful flyer with the Web address and instructions for accessing the online questionnaire, a study fact sheet, and an endorsement letter from the School Nutrition Association.

Both email and telephone reminders were used to encourage participation and maximize response rates. Up to eight email reminders, each containing a link to the online survey, were sent weekly to nonrespondents after the initial mailing. Potential respondents had been identified by CN directors using state databases that did not always have the most up-to-date contact information; therefore, telephone follow up was needed. Several rounds of follow-up calls were made to nonresponding SFAs by trained telephone interviewers, both to identify the most appropriate respondent and to obtain or verify email addresses.* Because the questionnaire was designed for self-administration, telephone interviewers first encouraged respondents to complete it online rather than over the telephone. However, if a respondent requested or if it appeared that telephone administration was necessary to ensure completion, telephone interviewers used this mode. A total of 133 questionnaires (4 percent of responses) were completed over the telephone.

To keep to the schedule for the KITS national report, and because the sample size was more than adequate to produce national estimates, the final national sample was defined as the 3,372 eligible† SFAs that completed questionnaires as of Nov. 20, 2012. We extended the field period by about two weeks because a few states had not met their sample size targets. As state targets were met, email reminders were stopped and telephone interviewers ceased calls to SFAs in those states. By Dec. 7, 2012 all states had reached the targeted number of completes needed for state and CA regional analysis. Questionnaires completed by an additional 87 SFAs between Nov. 21 and Dec. 7, 2012, were included in their respective state samples.‡

Response rates

Two sets of response rates (unweighted and weighted) were computed for the KITS study:

- Response rates for the national sample of 3,372 SFAs (data presented in this report)
- Response rates for each of the 50 states and the District of Columbia

To compute the response rates, we defined four terms.

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* Throughout the field period, we contacted approximately 1,000 potential respondents, sending survey materials electronically to both new SFA directors and respondents with corrected email addresses.

† A sampled SFA was eligible for the study if it (1) had a food service operation, (2) participated in the NSLP in SY 2012-2013, (3) had at least one public school, and (4) was not a stand-alone Pre-Kindergarten or Head Start program; a jail, prison, or juvenile detention center; or merged with another SFA.

‡ The additional two weeks of data collection yielded completed surveys from 1 to 13 SFAs across 35 states; these cases would have had little effect on the national estimates if they were included in the national sample.

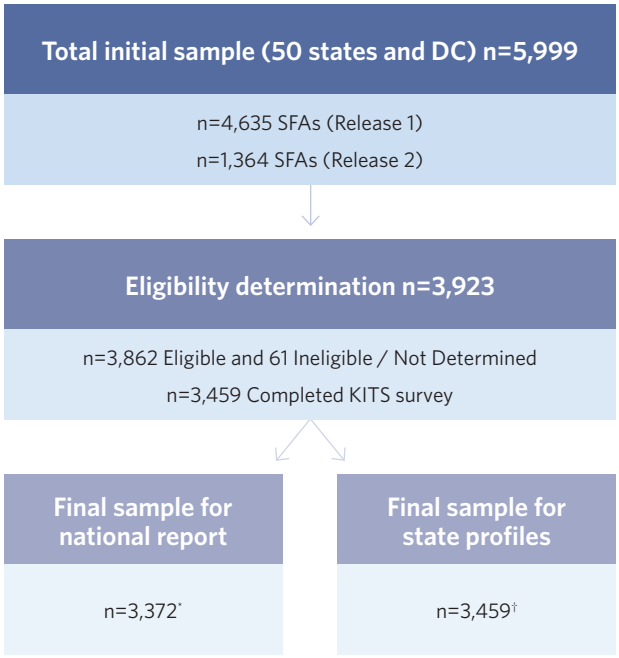
1. Total number of sample SFAs released
2. Number for which eligibility was determined
3. Number found to be eligible to complete the survey
4. Number of eligible SFAs that completed the survey

By the end of the data-collection period (Dec. 7, 2012), we had released 5,999 SFAs. Among them, 3,923 had their eligibility status determined. Of the 3,923 SFAs for which we determined eligibility status, 3,862 were eligible for the study, and 3,459 completed the survey. For the national sample (as of Nov. 20, 2012), 3,372 of the 3,862 eligible SFAs completed the survey.

Figure C.1 summarizes sample selection, eligibility determination, and final samples available for the national and state reports.

Figure C.1

KITS Sample Sizes for National Report and State Profiles (Unweighted)



Notes:

* Completed KITS survey by Nov. 20, 2012

† Completed KITS survey by Dec. 7, 2012.

Source: Kitchen Infrastructure and Training for Schools, 2012.
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The unweighted response rate (for the nation or any state) was defined as the product of the eligibility determination rate (b/a) and the completion rate (d/c):

$$\text{Unweighted Response Rate} = \text{Eligibility Determination Rate} \times \text{Completion Rate} = \frac{b}{a} \times \frac{d}{c}.$$

The final unweighted response rate for the national sample was 57.1 percent (Table C.2). The unweighted response rates for each state were computed similarly and ranged from 42.5 to 83.0 percent (see Table C.3).

Table C.2

Sample Sizes and Response Rates for National Report

(a) Released for contact	(b) Eligibility status determined	(c) Eligible	(d) Completed survey	Eligibility determination rate (%) (EDR = b/a)	Completion rate (%) (CR = d/c)	Response rate (%) (EDR*CR)
Unweighted national response rate						
5,999	3,825	3,763	3,372	63.8	89.6	57.1
Weighted national response rate						
14,816	8,953	8,778	7,885	60.4	89.8	54.3

Source: Kitchen Infrastructure and Training for Schools, 2012.
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The weighted response rates were calculated by using the numbers of SFAs defined in (a), (b), (c) and (d) above and unadjusted sampling weights (the inverse of the probability of selection, as discussed in the next section).

$$\text{Weighted Response Rate} = \frac{\text{Weighted } b}{\text{Weighted } a} \times \frac{\text{Weighted } d}{\text{Weighted } c} .$$

The final weighted response rate for the national sample was 54.3 percent. The weighted response rates for the states ranged from 36.9 to 83.0 percent and are reported in Table C.4.

Table C.3

Unweighted Sample Sizes and Response Rates by State

State	(a) Released for contact	(b) Eligibility status determined	(c) Eligible	(d) Completed survey	Eligibility determination rate (%) (EDR = b/a)	Completion rate (%) (CR = d/c)	Response rate (%) (EDR*CR)
AK	61	47	43	40	77.0	93.0	71.7
AL	105	59	58	52	56.2	89.7	50.4
AR	131	75	75	66	57.3	88.0	50.4
AZ	157	96	95	83	61.1	87.4	53.4
CA	391	276	265	238	70.6	89.8	63.4
CO	106	75	74	71	70.8	95.9	67.9
CT	107	73	73	67	68.2	91.8	62.6
DC	49	34	30	26	69.4	86.7	60.1
DE	30	24	24	20	80.0	83.3	66.7
FL	93	70	69	69	75.3	100.0	75.3
GA	112	73	73	68	65.2	93.2	60.7
HI	26	25	22	19	96.2	86.4	83.0
IA	142	94	94	90	66.2	95.7	63.4
ID	98	76	75	64	77.6	85.3	66.2
IL	192	118	116	100	61.5	86.2	53.0
IN	124	84	81	75	67.7	92.6	62.7
KS	115	83	83	75	72.2	90.4	65.2
KY	121	81	81	71	66.9	87.7	58.7
LA	88	56	56	52	63.6	92.9	59.1
MA	162	105	105	91	64.8	86.7	56.2
MD	26	21	20	18	80.8	90.0	72.7
ME	122	78	73	66	63.9	90.4	57.8
MI	177	98	97	86	55.4	88.7	49.1
MN	153	102	101	89	66.7	88.1	58.7
MO	145	92	92	88	63.4	95.7	60.7
MS	105	72	71	71	68.6	100.0	68.6
MT	117	90	90	80	76.9	88.9	68.4
NC	108	76	75	67	70.4	89.3	62.9
ND	133	84	83	60	63.2	72.3	45.7
NE	101	86	86	82	85.1	95.3	81.2
NH	87	49	49	41	56.3	83.7	47.1
NJ	180	102	100	75	56.7	75.0	42.5
NM	100	65	64	60	65.0	93.8	60.9
NV	28	23	23	19	82.1	82.6	67.9
NY	171	89	89	81	52.0	91.0	47.4
OH	173	103	102	95	59.5	93.1	55.5
OK	167	98	97	83	58.7	85.6	50.2
OR	138	79	79	63	57.2	79.7	45.7
PA	169	95	95	82	56.2	86.3	48.5
RI	44	30	29	22	68.2	75.9	51.7
SC	86	55	51	51	64.0	100.0	64.0
SD	117	83	82	71	70.9	86.6	61.4
TN	83	67	67	67	80.7	100.0	80.7
TX	157	103	103	92	65.6	89.3	58.6
UT	75	57	55	49	76.0	89.1	67.7
VA	97	68	68	61	70.1	89.7	62.9
VT	134	72	68	65	53.7	95.6	51.4
WA	152	95	95	80	62.5	84.2	52.6
WI	141	92	92	88	65.2	95.7	62.4
WV	56	42	41	39	75.0	95.1	71.3
WY	47	33	33	31	70.2	93.9	66.0

Source: Kitchen Infrastructure and Training for Schools, 2012.

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Table C.4

Weighted Sample Sizes and Response Rates by State

State	(a) Released for contact	(b) Eligibility status determined	(c) Weighted eligible	(d) Weighted completed survey	Weighted eligibility determination rate (%) (EDR = b/a)	Weighted completion rate (%) (CR = d/c)	Weighted response rate (%) (EDR*CR)
AK	61	47	43	40	77.0	93.0	71.7
AL	132	72	70	63	54.7	90.5	49.5
AR	252	134	134	118	53.0	88.0	46.7
AZ	369	216	209	181	58.5	86.2	50.4
CA	1,005	682	652	603	67.9	92.5	62.8
CO	181	119	118	115	65.7	97.5	64.0
CT	163	109	109	103	66.5	94.5	62.9
DC	49	34	30	26	69.4	86.7	60.1
DE	30	24	24	20	80.0	83.3	66.7
FL	141	100	96	96	70.9	100.0	70.9
GA	218	122	122	107	55.9	87.8	49.1
HI	26	25	22	19	96.2	86.4	83.0
IA	368	239	239	225	64.9	94.2	61.1
ID	126	98	96	82	77.8	85.4	66.4
IL	851	554	534	453	65.0	84.8	55.2
IN	334	220	197	180	65.9	91.6	60.4
KS	286	205	205	185	71.9	90.3	64.9
KY	174	113	113	97	65.1	85.4	55.6
LA	88	56	56	52	63.6	92.9	59.1
MA	367	245	245	213	66.6	86.9	57.9
MD	26	21	20	18	80.8	90.0	72.7
ME	172	105	96	85	60.9	88.6	54.0
MI	720	349	338	318	48.4	94.1	45.6
MN	475	309	302	265	65.1	87.8	57.1
MO	590	329	329	313	55.7	95.3	53.1
MS	154	103	100	100	66.9	100.0	66.9
MT	222	169	169	149	75.9	88.4	67.2
NC	158	103	101	91	65.2	90.7	59.2
ND	176	111	109	78	62.7	71.5	44.8
NE	247	206	206	194	83.3	94.6	78.8
NH	87	49	49	41	56.3	83.7	47.1
NJ	562	282	265	195	50.2	73.6	36.9
NM	120	77	75	70	64.2	92.3	59.3
NV	28	23	23	19	82.1	82.6	67.9
NY	700	319	319	298	45.6	93.5	42.6
OH	928	522	511	490	56.2	95.9	53.9
OK	541	295	292	244	54.5	83.6	45.6
OR	190	112	112	92	58.8	82.2	48.4
PA	624	353	353	294	56.6	83.3	47.1
RI	44	30	29	22	68.2	75.9	51.7
SC	86	55	51	51	64.0	100.0	64.0
SD	178	120	119	103	67.4	86.5	58.3
TN	143	121	121	121	84.8	100.0	84.8
TX	1,177	771	771	681	65.5	88.3	57.9
UT	79	60	58	52	76.3	89.0	67.9
VA	138	89	89	80	64.6	89.2	57.6
VT	203	109	103	99	53.8	96.2	51.7
WA	285	193	193	172	67.7	89.2	60.3
WI	437	280	280	263	64.0	93.9	60.1
WV	56	42	41	39	75.0	95.1	71.3
WY	47	33	33	31	70.2	93.9	66.0

Source: Kitchen Infrastructure and Training for Schools, 2012.

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Data cleaning and coding

Data were cleaned to check for out-of-range values, valid identification numbers, duplicate entries, and inconsistent responses within questionnaire. For example, in answering the equipment questions some respondents said they needed a certain type of equipment but then typed "0" as the number of pieces needed. In this case, the cleaning rule resulted in recoding the "yes" response to a "no," assuming that the zero was correct and the respondent did not need that particular piece of equipment. Trained staff coded open-ended responses. Project staff reviewed coded responses for accuracy.

Data analysis

Sampling weights were used to adjust all estimates for unequal selection probabilities and nonresponse associated with known characteristics of the SFAs. Thus, the data presented in this report can be generalized to all public SFAs. Likewise, the KITS data for individual states (reported separately) can be generalized to all public SFAs in those states and regions, respectively.

Descriptive analyses of all data collected in the KITS survey were conducted. The focus was on the proportions of SFAs that reported their perceived readiness for and barriers to meeting the updated lunch requirements, need to replace or add new equipment or upgrade kitchen infrastructures, and need to train staff. Analyses of the estimated costs of reported equipment needs included tabulations of total costs; the median, range, and distribution of costs per SFA; and the distribution and mean costs per school. Data on distributions of SFA characteristics from the sample frame were also tabulated.

Subgroup Analysis

Key findings were examined for statistically significant differences among subgroups of SFAs defined as follows:

- **SFA size.** SFAs were grouped into five categories based on data from the Food and Nutrition Service-742 file on the number of enrolled students: very small (fewer than 1,000), small (1,000 to 2,499), medium (2,500 to 9,999), large (10,000 to 24,999), and very large (25,000 or more).
- **Community type.** Survey respondents were asked to characterize the location of "the majority of schools" in their SFAs as urban, suburban, or rural.
- **Food and Nutrition Service region.** Food and Nutrition Service administers the National School Lunch Program through seven regions across the United States: Northeast, Mid-Atlantic, Southeast, Midwest, Southwest, Mountain Plains, and Western region. SFAs were grouped accordingly.
- **Poverty category.** SFAs were categorized into three groups based on data from the Food and Nutrition Service-742 on the percentage of enrolled students approved for free or reduced-price meals:* low (less than 40 percent approved for free/reduced-price meals), intermediate (40 to 60 percent approved for free/reduced-price meals), and high (greater than 60 percent approved for free/reduced-price meals).

We used t tests to determine whether there were statistically significant differences in estimates within subgroups of SFAs. Each group of SFAs was compared with all other SFAs combined. For example, SFAs within

* In the NSLP and School Breakfast Program, children from families with household incomes at or below 130 percent of the federal poverty threshold are eligible to receive free meals; those from households with incomes between 131 and 185 percent of the federal poverty level are eligible to receive meals at a reduced price.

the high poverty category were compared with low and intermediate poverty SFAs combined.* Differences were considered statistically significant at the $\alpha = .05$ level.

All statistical procedures were conducted using Stata Statistical Software (Release 12, StataCorp LP, College Station, TX, 2011). In estimating the standard errors of the estimates for subgroups, we accounted for the complex sample design (stratification), the use of sampling weights, and the finite population correction factor, or FPC. We applied the FPC to account for the fact that a large proportion of the target population was sampled (to allow for representative estimates in individual states). Standard errors were computed by taking a weighted sum of the variances from each sampling stratum.

Estimating Equipment Costs

To estimate the costs associated with SFAs' reported equipment needs, we linked survey data on the types and amounts of equipment needed to estimated unit costs. Respondents were presented with lists of equipment (49 items for school kitchens and 27 items for central production kitchens) but the survey did not disclose estimated unit costs. The unit cost estimates were compiled using AutoQuotes, a proprietary database commonly used in the food service industry for pricing equipment and supplies.† Estimated unit costs were based on national averages. Estimates were derived by reducing manufacturers' list prices by the standard dealer discount to generate a dealer net cost, then adding estimated costs for the following routine additional expenses: over-the-road freight, delivery, unpacking and installation, sales tax, and overhead and profit for a food service equipment dealer. After the original estimates were generated, unit costs were independently reviewed by external industry consultants.

We encountered two types of missing data on SFAs' reported equipment needs: some respondents reported that they needed a specific type of equipment but did not report the number of pieces needed, and some respondents did not answer one or more questions about whether a specific piece of equipment was needed. In computing estimates of total equipment costs at the national, state, and SFA levels, we first used modeling to impute the value of an equipment need for SFAs that reported needing equipment but did not quantify this need for one or more types of equipment. The modeling was done within state, by specific piece of equipment, using SFA size (number of schools and number of enrolled students) as the predictors. For the national sample, equipment costs were imputed in this way for one or more pieces of equipment needed by 990 SFAs (29 percent). Approximately two-thirds of these SFAs (64 percent) had equipment costs imputed for no more than three pieces of equipment.

In developing national- and state-level estimates of total equipment costs, we also used an estimation procedure to adjust for SFAs that did not respond to one or more questions about whether a specific piece of equipment was needed, including 21 that did not answer any questions on equipment needs. In these cases, we estimated total costs for each piece of equipment based on the weighted mean costs among SFAs that responded to the question (including zero dollars for SFAs that reported that they did not need the specific piece of equipment) and then multiplied this mean by the estimated number of public SFAs in the national or state population.

For all other estimates of equipment costs, such as estimated total costs per SFA and mean costs per school, we treated missing responses on whether a specific piece of equipment is needed as a "no" (zero dollars). Thus, estimated equipment costs per SFA and per school should be considered slight underestimates of true costs.

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* Similarly, for the individual state reports, the state was compared with all other states combined.

† Information about AutoQuotes is available at: http://www.aqnet.com/community.html. The database is used by food service consulting firms, equipment dealers, manufacturing firms, and equipment manufacturers' representatives throughout the United States and the world. AutoQuotes is updated in real time so it included the latest models and pricing of food service equipment as of November 1, 2012.

The 21 SFAs that did not answer any questions on equipment needs, three that reported needing only "other" equipment for which no unit cost was available, and one determined to be an outlier were excluded from these estimates.

For all estimates of equipment costs presented in this report, zeros were included for 317 SFAs (12 percent) that answered at least one question about specific equipment needs but did not provide a "yes" response to any questions on specific pieces of equipment needed.

Appendix D: Strengths and limitations of the study

In drawing conclusions from the KITS study, both its strengths and limitations should be considered. The major strengths of this study lie in its large representative sample of SFAs, the techniques the study team employed to create a robust survey, and the timeliness of the findings. KITS was designed to be representative of public SFAs at both the national and state levels.* The state-level samples allowed the study to develop and disseminate individual state profiles. Efforts were made during data collection to ensure that the targeted number of SFA directors (or their designees) responded from all 50 states and the District of Columbia. Although the overall response rate for the national sample was 54 percent (57 percent unweighted), the sample was weighted to make it characteristic of the full population and to account for potential non-response bias associated with known characteristics of the SFAs. The weighted estimates presented in this report can thus be generalized to all public SFAs.† The sample was larger than needed to provide precise national estimates.

The KITS survey was developed with the assistance of a consultant who provided important substantive expertise. She is a former SFA director, was a member of the Institute of Medicine committee that developed recommendations for the updated meal patterns and nutrient standards, and consults with SFAs across the country on creating action plans to enhance the nutritional quality of school meals as well as meet operational goals. In addition, the study team assembled an eight-person panel with expertise in child nutrition and school food service to help define the essential equipment, infrastructure, and types of staff training that SFAs might need to meet the updated meal requirements and to frame the questions appropriately. Two versions of the questionnaire were pilot-tested with SFA directors to help ensure that the questions were clear and that the survey would not be overly burdensome to complete.

The relevance and timeliness of the findings are also major strengths of the KITS study. It provides policymakers, school food service operators, and other stakeholders with concrete feedback on SFAs' experiences implementing the updated meal requirements at the time initial changes were being made. Information about SFAs' needs for equipment, infrastructure, and training is directly relevant to current and future endeavors to identify additional funding for the SFAs and schools that most need it. Moreover, the study makes a unique contribution to our understanding of SFAs' needs as they implement the updated requirements so that USDA, Congress, and others can address them.

One limitation of the study is that findings related to equipment needs are based on respondents' perceptions and projected average costs, rather than a standardized needs assessment. The questionnaire asked respondents to review a list of equipment and to indicate the items needed as well as their "best estimates" of the number of pieces needed across all kitchens in their SFA. Some SFAs may have over- or underestimated their actual needs. In addition, because the equipment list did not include detailed specifications (such as size or capacity), and because costs vary due to factors such as state taxes, delivery costs, and discounts, professional judgment was used to determine representative costs. Although it is difficult to predict the direction of any resulting bias in the cost estimates, the estimates could be high if, despite instructions to the contrary, SFAs identified some equipment that "would be nice to have" but was not essential to meeting the updated meal requirements.

A second limitation relates to the timing of the data collection period. The survey was fielded shortly after the start of SY 2012–2013, when the updated requirements for school lunches first went into effect. This was an

* The study also drew a special sample within the state of California to be able to report KITS findings for each of the three CA regions: Central, North, and South.

† Assumes that the weights corrected for potential bias and the survey data provided unbiased estimates.

extremely busy time for SFA directors and, to avoid the added burden of completing a survey, some directors might have delegated the survey to less-knowledgeable staff. This could explain, in part, the relatively large proportion of respondents who did not identify themselves as SFA directors (about 30 percent) and some of the "don't know" responses to questions about equipment and training budgets and missing data on infrastructure needs. On the other hand, the subject matter of the KITS survey might have been perceived as particularly salient to SFA directors once they had begun to implement the updated requirements; the timing of the study could have led to a higher response rate than might have been realized if the survey had been fielded earlier.

Nearly all SFAs had started making changes to meet the updated meal requirements by the time they completed the survey. However, there was a great deal of variability on when SFAs started to make these changes. More than half of all SFAs (54 percent) began making changes prior to January 2012 when the final rule was published. Respondents from these SFAs may have been in a better position to assess their equipment, infrastructure, and training needs than those that made changes after the final rule was published or at the start of SY 2012–2013. If the study is replicated at a later time, results may differ from those reported here because SFAs will be further along in implementing changes to meet the requirements.

Appendix E: KITS questionnaire

Mathematica Policy Research

Kitchen Characteristics

1. Please indicate the number of schools (by level and total) served by your school nutrition program. Please use the same definitions for level of school as registered with the State Child Nutrition agency for the National School Lunch Program. Do not include any stand-alone Pre-Kindergarten or Head Start programs. Count each school in one category only.

	Number of
a. Elementary schools	
a. Middle or junior high schools	
a. High schools	
TOTAL NUMBER OF SCHOOLS SERVED BY YOUR SCHOOL NUTRITION PROGRAM	

2. Thinking about all the schools in your School Food Authority (SFA) or district, would you say the **majority** of your schools are ...

   Select one only

   1 ❍ Located in urban areas,
   2 ❍ Located in suburban areas, or
   3 ❍ Located in rural areas?

3. Which of the following best describes your food service management approach?

   Select one only

   1 ❍ A self-operated program, or
   2 ❍ A program contracted (all or part) to a food service management company

4. Please indicate the types of food production systems in use in your SFA/district and the number of each. (Your best estimate at the number is fine.) *Select one per row*

Type of production systems used in your SFA/district	Present in SFA/ district		Number of each within SFA/district
	Yes	No	
a. Central production facility or commissary Meals are prepared in central facility (not a school) and shipped to schools, either pre-portioned or in bulk	1 ❍	0 ❍	
b. On-site production kitchen Meals are prepared at a school and sent to other schools in the district as well as served at own school	1 ❍	0 ❍	
c. Finishing or satellite kitchens Meals are prepared in a different location and sent to the school kitchen where meals are served. Meals may or may not need to be heated or portioned	1 ❍	0 ❍	
d. Full-service kitchens Meals are prepared and served in the school kitchen. Do not include production kitchen(s) already counted in 4b	1 ❍	0 ❍	

5. IF ANY FINISHING/SATELLITE KITCHENS: How many of your finishing or satellite kitchens are served by central production facilities/commissaries and how many by on-site production kitchens at other schools?

	Number
a. Number of finishing/satellite kitchens served by central production facilities/ commissaries	
b. Number of finishing/satellite kitchens served by on-site production kitchens at other schools	

Menu Planning

6. Who planned your menus for the 2012-13 school year? *Select all that apply*

1 ❍ You
2 ❍ Someone else on your staff, such as a dietitian, kitchen manager, lead cook, or an area supervisor
3 ❍ Someone at the food service management company
4 ❍ An outside consultant
5 ❍ A food vendor
6 ❍ Other (PLEASE SPECIFY) _____

7. Have any of your schools participated in or been recognized by any of the following health and nutrition award programs? *Select one per row*

	Yes	No
a. Alliance for a Healthier Generation	1 ❍	0 ❍
b. Team Nutrition	1 ❍	0 ❍
c. Healthier US School Challenge (HUSSC) award winner	1 ❍	0 ❍
d. State-based nutrition or health promotion award program	1 ❍	0 ❍
e. School Nutrition Association's (SNA) District of Excellence	1 ❍	0 ❍
f. Other (PLEASE SPECIFY) _____	1 ❍	0 ❍

Planning for New Meal Requirements

As you are aware, new meal pattern and nutrient requirements go into effect starting in the 201213 school year. SFAs/districts certified as meeting the new meal requirements for lunches are eligible to receive an additional 6-cent meal reimbursement. Some people started planning for the changes a while ago, while others may just now be starting to think about what needs to be done to meet and implement the new requirements.

8. Which of the following best describes how close you feel your SFA/district is to being able to meet the new meal pattern and nutrient requirements **as specified for lunch** in the 2012-13 school year? *Select one only*

   1 ❍ We will be able to meet all or nearly all of the lunch requirements by the start of the 2012-13 school year

   2 ❍ We expect to be able to meet the lunch requirements by the end of the 2012-13 school year

   3 ❍ It will likely take us until the 2013-14 school year or beyond to meet the lunch requirements

   4 ❍ I am not sure when we'll be able to meet the lunch requirements

9. Which of the following best describes when you began making changes in preparation for implementing the new meal requirements for lunch? *Select one only*

   1 ❍ Started making changes prior to proposed regulations (before January 2011)

   2 ❍ Started making changes when regulations were first proposed (between January 2011 and January 2012)

   3 ❍ Started making changes after final regulations were published (after January 2012)

   4 ❍ Have not yet made changes

10. Which of the following do you consider to be barriers to being able to fully implement the new meal requirements for lunch by the start of the 2012-13 school year? *Select one per row*

Barrier to fully implementing by start of 2012-13 school year	Yes	No
a. Understanding new meal requirements	1 ❍	0 ❍
b. Purchasing foods to meet the new meal requirements (cost and availability)	1 ❍	0 ❍
c. Needing additional staff or labor hours	1 ❍	0 ❍
d. Training of staff	1 ❍	0 ❍
e. Needing additional equipment	1 ❍	0 ❍
f. Training of staff	1 ❍	0 ❍
g. Other (PLEASE SPECIFY) _____	1 ❍	0 ❍

11. DISPLAY BARRIERS SELECTED IN Q.10.

And how would you rank each of the barriers? Please enter a "1" next to what you consider the biggest barrier to your SFA/district being able to fully implement the new meal requirements for lunch. Enter a "2" next to what you consider to be second greatest barrier, and continue until all barriers are assigned a ranking.

Barrier to fully implementing by start of 2012-13 school year	Ranking
a. Understanding new meal requirements	
b. Purchasing foods to meet the new meal requirements (cost and availability)	
c. Needing additional staff or labor hours	
d. Training of staff	
e. Needing additional equipment	
f. Needing to remodel or upgrade kitchens	
g. Other (PLEASE SPECIFY) _____	

12. There are a number of different ways that SFAs/districts might change their production approach to meet the new meal requirements. For each of the following, please indicate if this is a change your SFA/district made or expects to make in order to implement the new meal requirements for lunch.

	Yes	No
a. Move to central facility/commissary or production kitchen(s)	1 ❍	0 ❍
b. Implement standard recipes and/or work methods	1 ❍	0 ❍
c. Move to more cooking from scratch	1 ❍	0 ❍
d. Move to buying ready to eat foods from vendors	1 ❍	0 ❍
e. Other (PLEASE SPECIFY) _____	1 ❍	0 ❍

Training

13. Which of the following types of training do you feel are essential for food service staff, including yourself, in order to successfully operate your school nutrition program, including implementing the new meal requirements? *Select all staff that apply for each row*

Types of training	Training needed for ...			Training not needed in this area
	Director or food service management team	Kitchen or cafeteria managers	Cooks or front-line servers	
a. Developing or modifying menus	1 ❍	2 ❍	3 ❍	4 ❍
b. Modifying and/or standardizing recipes	1 ❍	2 ❍	3 ❍	4 ❍
c. Revising food purchasing specifications	1 ❍	2 ❍	3 ❍	4 ❍
d. Assessing equipment and infrastructure needs	1 ❍	2 ❍	3 ❍	4 ❍
e. Purchasing new equipment	1 ❍	2 ❍	3 ❍	4 ❍
f. Using/operating new equipment	1 ❍	2 ❍	3 ❍	4 ❍
g. Understanding compliance with meal pattern and nutrient requirements	1 ❍	2 ❍	3 ❍	4 ❍
h. Basic cooking skills, including hands-on training and standardized work methods	1 ❍	2 ❍	3 ❍	4 ❍
i. Basic nutrition training	1 ❍	2 ❍	3 ❍	4 ❍
j. Basic food safety/ServSafe training	1 ❍	2 ❍	3 ❍	4 ❍
k. Completing applications/paperwork for additional reimbursement and Coordinated Review Effort (CRE) reviews	1 ❍	2 ❍	3 ❍	4 ❍
l. Completing production records	1 ❍	2 ❍	3 ❍	4 ❍
m. Marketing and promoting the new meal requirements	1 ❍	2 ❍	3 ❍	4 ❍
n. Other (PLEASE SPECIFY) _____	1 ❍	2 ❍	3 ❍	4 ❍

14. Does your SFA/district have a budget for staff development and training?

1 ❍ Yes

0 ❍ No

d ❍ Don't know

GO TO Q.16

15. IF TRAINING BUDGET: Thinking about your budget allocated for staff development and training and the amount of training needed for your staff to be able to implement the new meal requirements, would you say your training budget should be sufficient to meet …

Select one only

1 ❍ All your training needs,

2 ❍ Some of your training needs,

3 ❍ Only a few of your training needs, or

4 ❍ None of your training needs?

16. How much of the new meal requirements training do you expect the state will provide (or has already provided)?

Select one only

1 ❍ All your training needs,

2 ❍ Some of your training needs,

3 ❍ Only a few of your training needs, or

4 ❍ None of your training needs?

Preparing Meals

As you are aware, there are a number of changes in the new meal requirements that may have an impact on your SFA's/district's equipment needs. For each of the following changes in the meal pattern and nutrient requirements for lunch, please indicate the adequacy of your equipment in terms of receiving and storage, production, holding and transporting, and the meal service area.

IF CENTRAL PRODUCTION FACILITY/COMMISSARY, PLEASE ANSWER Q.17 AND Q.18.

17. First thinking only about your **central production facility/commissary**, how would you characterize your SFA's/district's equipment needs as they relate to …

Select one per row

	Adequate: either as is or using a workaround	Inadequate: but making do with a workaround	Inadequate: and no workaround
More fruit and vegetable items on daily menus			
a. Receiving and storage	1 ❍	2 ❍	0 ❍
b. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
c. Holding and transportation	1 ❍	2 ❍	0 ❍
d. Meal service area	1 ❍	2 ❍	0 ❍
Greater variety and forms of fruits and vegetables			
e. Receiving and storage	1 ❍	2 ❍	0 ❍
f. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
g. Holding and transportation	1 ❍	2 ❍	0 ❍
h. Meal service area	1 ❍	2 ❍	0 ❍
At least half of grains to be whole grain rich across the week			
i. Receiving and storage	1 ❍	2 ❍	0 ❍
j. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
k. Holding and transportation	1 ❍	2 ❍	0 ❍
l. Meal service area	1 ❍	2 ❍	0 ❍
Differing portion sizes by grade groups			
m. Receiving and storage	1 ❍	2 ❍	0 ❍
n. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
o. Holding and transportation	1 ❍	2 ❍	0 ❍
p. Meal service area	1 ❍	2 ❍	0 ❍
New calorie ranges, saturated fat, trans fat, and sodium targets			
q. Receiving and storage	1 ❍	2 ❍	0 ❍
r. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
s. Holding and transportation	1 ❍	2 ❍	0 ❍
t. Meal service area	1 ❍	2 ❍	0 ❍

18. Thinking now about specific pieces of equipment, please indicate whether or not you would need a new or additional piece of this equipment **at any central production facility/commissary** to meet the new meal requirements for lunch and, if so, how many pieces of the equipment are required. Please think only about what you really need, as opposed to what would be nice to have.

	Piece of equipment needed		Number of this equipment required *(Your best estimate is fine)*
	Yes	No	
Receiving and storage			
a. Central production facility or commissary	1 ❍	0 ❍	
b. Scales, large or floor	1 ❍	0 ❍	
c. Dry storage shelving units	1 ❍	0 ❍	
d. Walk-in refrigerators	1 ❍	0 ❍	
e. Walk-in freezers	1 ❍	0 ❍	
Production			
f. Fruit and vegetable preparation sinks	1 ❍	0 ❍	
g. Stainless steel work tables	1 ❍	0 ❍	
h. Slicers	1 ❍	0 ❍	
i. Automatic can openers	1 ❍	0 ❍	
j. Food processors	1 ❍	0 ❍	
k. Vertical cutters	1 ❍	0 ❍	
l. Mixers	1 ❍	0 ❍	
m. Sets of knives with cutting boards	1 ❍	0 ❍	
n. Roll-in convection oven	1 ❍	0 ❍	
o. Rolling sheet pan and steam table racks	1 ❍	0 ❍	
p. Steam jacketed kettles with pumps/filler	1 ❍	0 ❍	
q. Blast or tumble chillers	1 ❍	0 ❍	
r. Conveyor/Wrapper system with containers configured to menu	1 ❍	0 ❍	
s. De-nester and fillers	1 ❍	0 ❍	
t. Meal baskets and dollies	1 ❍	0 ❍	
Holding and transportation			
u. Walk-in cooler (separate from Receiving/Storage walk-in refrigerators)	1 ❍	0 ❍	
v. Hot holding mobile carts	1 ❍	0 ❍	
w. Non-refrigerated trucks	1 ❍	0 ❍	
x. Refrigerated trucks	1 ❍	0 ❍	
Administrative			
y. Computer	1 ❍	0 ❍	
z. Software programs	1 ❍	0 ❍	
aa. Other (PLEASE SPECIFY) _____	1 ❍	0 ❍	

ASK ALL: [INSERT (other) IF SFA HAS CENTRAL FACILITY]

19. Focusing on all your (other) production systems and kitchen types combined, that is any production kitchens that prepare meals for other schools, finishing or satellite kitchens, and full service kitchens that prepare their own meals, how would you characterize your SFA's/district's equipment needs as they relate to …

Select one per row

	Adequate: either as is or using a workaround	Inadequate: but making do with a workaround	Inadequate: and no workaround
More fruit and vegetable items on daily menus			
a. Receiving and storage	1 ❍	2 ❍	0 ❍
b. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
c. Holding and transportation	1 ❍	2 ❍	0 ❍
d. Meal service area	1 ❍	2 ❍	0 ❍
Greater variety and forms of fruits and vegetables			
e. Receiving and storage	1 ❍	2 ❍	0 ❍
f. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
g. Holding and transportation	1 ❍	2 ❍	0 ❍
h. Meal service area	1 ❍	2 ❍	0 ❍
At least half of grains to be whole grain rich across the week			
i. Receiving and storage	1 ❍	2 ❍	0 ❍
j. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
k. Holding and transportation	1 ❍	2 ❍	0 ❍
l. Meal service area	1 ❍	2 ❍	0 ❍
Differing portion sizes by grade groups			
m. Receiving and storage	1 ❍	2 ❍	0 ❍
n. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
o. Holding and transportation	1 ❍	2 ❍	0 ❍
p. Meal service area	1 ❍	2 ❍	0 ❍
New calorie ranges, saturated fat, trans fat, and sodium targets			
q. Receiving and storage	1 ❍	2 ❍	0 ❍
r. Preparation (including assembly and packaging)	1 ❍	2 ❍	0 ❍
s. Holding and transportation	1 ❍	2 ❍	0 ❍
t. Meal service area	1 ❍	2 ❍	0 ❍

20. Thinking now about specific pieces of equipment, please indicate whether or not you would need a new or additional piece of this equipment in any **production kitchens, satellite or finishing kitchens, or full service kitchens** to meet the new meal requirements for lunch and, if so, how many pieces of the equipment are required. Please think only about what you really need, as opposed to what would be nice to have.

	Piece of equipment needed		Number of this equipment required *(Your best estimate is fine)*
	Yes	No	
Receiving and storage			
a. Platform and hand trucks	1 ❍	0 ❍	
b. Scales	1 ❍	0 ❍	
c. Dry storage shelving units	1 ❍	0 ❍	
d. Dunnage racks	1 ❍	0 ❍	
e. Basket dollies	1 ❍	0 ❍	
f. Walk-in refrigerators	1 ❍	0 ❍	
g. Walk-in freezers	1 ❍	0 ❍	
Production			
h. Fruit and vegetable preparation sinks	1 ❍	0 ❍	
i. Stainless steel work tables	1 ❍	0 ❍	
j. Utility sinks	1 ❍	0 ❍	
k. Slicers	1 ❍	0 ❍	
l. Can openers	1 ❍	0 ❍	
m. Food processors	1 ❍	0 ❍	
n. Mixers	1 ❍	0 ❍	
o. Sectionizers	1 ❍	0 ❍	
p. Sets of knives with cutting boards	1 ❍	0 ❍	
q. Rolling (mobile) sheet pan or steam table pan racks	1 ❍	0 ❍	
r. Utility carts	1 ❍	0 ❍	
s. Convection ovens (double deck)	1 ❍	0 ❍	
t. Steam-jacketed kettles	1 ❍	0 ❍	
u. Tilting skillet	1 ❍	0 ❍	
v. Combi ovens	1 ❍	0 ❍	
w. Convection (pressureless) steamer	1 ❍	0 ❍	
x. Pressure steamer	1 ❍	0 ❍	

	Piece of equipment needed		Number of this equipment required *(Your best estimate is fine)*
	Yes	No	
y. Re-thermalization and holding ovens	1 ❍	0 ❍	
z. Commercial microwave	1 ❍	0 ❍	
aa. Blast chillers	1 ❍	0 ❍	
bb. Reach-in freezers	1 ❍	0 ❍	
cc. Reach-in refrigerators	1 ❍	0 ❍	
dd. Hot holding cabinets	1 ❍	0 ❍	
ee. Conveyor/Wrapper system with containers configured to menu	1 ❍	0 ❍	
ff. Meal baskets and dollies	1 ❍	0 ❍	
Holding and transportation			
gg. Walk-in cooler (separate from Receiving/Storage walk-in refrigerator)	1 ❍	0 ❍	
hh. Hot and/or cold transport containers or carts	1 ❍	0 ❍	
ii. Non-refrigerated trucks	1 ❍	0 ❍	
jj. Refrigerated trucks	1 ❍	0 ❍	
Meal serving area			
kk. Cold food merchandisers	1 ❍	0 ❍	
ll Utility serving counters (5-foot length)	1 ❍	0 ❍	
mm. Mobile milk coolers	1 ❍	0 ❍	
nn. Mobile utility serving counter (5-foot length)	1 ❍	0 ❍	
oo. Hot food serving line counters (4-5 wells)	1 ❍	0 ❍	
pp. Cold food serving line counters (5-foot pan)	1 ❍	0 ❍	
qq. Salad or fruit/vegetable bar (free standing, self serve)	1 ❍	0 ❍	
rr. Student meal trays	1 ❍	0 ❍	
ss. Steam table pans (stainless steel or plastic)	1 ❍	0 ❍	
tt. Serving portion utensils	1 ❍	0 ❍	
Administrative			
uu. Computer	1 ❍	0 ❍	
vv. Software programs	1 ❍	0 ❍	
ww. Other (PLEASE SPECIFY) _____	1 ❍	0 ❍	

21. Does your school nutrition program have an equipment replacement and upgrade plan?

1 ❍ Yes
0 ❍ No
d ❍ Don't know

22. Do you have a line item for capital equipment purchases in your annual budget? By capital we mean purchases of equipment, usually at least $1,000, that can be depreciated over time.

1 ❍ Yes
0 ❍ No
d ❍ Don't know

GO TO Q.16

23. IF YES: Is the budgeted amount for capital purchases adequate to purchase the equipment required to implement the new meal requirements for lunch?

1 ❍ Yes
0 ❍ No
d ❍ Don't know

Infrastructure

ASK Q.24 ONLY IF SFA HAS CENTRAL PRODUCTION FACILITY. IF NO CENTRAL PRODUCTION FACILITY, GO TO Q.25.

24. Thinking about the changes needed to implement the new meal requirements for school lunch, which of the following infrastructure changes are essential at your central production facility/commissary? Please only think about what is critical as opposed to items that would be nice to have, but are not essential to meet the new meal requirements.

Does your central production facility/commissary need ... *Select one per row*

	Yes	No	Don't know
More fruit and vegetable items on daily menus			
a. More physical space for storage, preparation, or serving?	1 ❍	2 ❍	d ❍
b. More electrical, such as more amps, voltage, or locations of outlets?	1 ❍	2 ❍	d ❍
c. More natural gas, such as increased pressure or location of pipes?	1 ❍	2 ❍	d ❍
d. More plumbing, such as water supply or location of sinks and drains?	1 ❍	2 ❍	d ❍
e. More ventilation, such as exhaust hoods or fire suppression systems?	1 ❍	2 ❍	d ❍
f. Remodeling that would require bringing the facility up to local health department code?	1 ❍	2 ❍	d ❍

IF CENTRAL KITCHEN, USE 25.1 WORDING, ALL OTHERS USE 25.2.

25.1 Are the following kitchen infrastructure changes needed at any of your schools? And if so, at how many schools would the infrastructure changes be needed? Please only think about what is essential as opposed to items that would be nice to have but are not essential to meet the new meal requirements for lunch.

25.2 Thinking about the changes needed to implement the new meal requirements, are the following kitchen infrastructure changes needed at any of your schools? And if so, at how many schools would the infrastructure changes be needed? Please only think about what is essential as opposed to items that would be nice to have but are not essential to meet the new meal requirements for lunch.

Are infrastructure changes needed at any school kitchens in the area of ...

	Yes	No	Don't know	Number of schools requiring infrastructure upgrade
a. More physical space for storage, preparation, or serving?	1 ❍	0 ❍	d ❍	
b. More electrical, such as more amps, voltage, or locations of outlets?	1 ❍	0 ❍	d ❍	
c. More natural gas, such as increased pressure or location of pipes?	1 ❍	0 ❍	d ❍	
d. More plumbing, such as water supply or location of sinks and drains?	1 ❍	0 ❍	d ❍	
e. More ventilation, such as exhaust hoods or fire suppression systems?	1 ❍	0 ❍	d ❍	
f. Remodeling that would require bringing the facility up to local health department code?	1 ❍	0 ❍	d ❍	

26. What level of financial resources do you think your local education agency (LEA) is able to allocate to make the kitchen infrastructure and remodeling changes you believe are necessary to implement the new meal requirements for school lunch? *Select one only*

1 ❍ All or nearly all the resources needed to upgrade kitchen infrastructure
2 ❍ About three-fourths of the resources needed
3 ❍ About half
4 ❍ About a quarter
5 ❍ Less than a quarter
0 ❍ None
d ❍ Don't know

GO TO Q.28

27. IF GETTING ANY RESOURCES IN Q.26: What is your best estimate of the time frame for when kitchen remodeling would be completed? *Select one only*

1 ❍ During this school year (2012-2013)
2 ❍ In the next 2 to 3 years
3 ❍ In the next 4 to 10 years
4 ❍ More than 10 years from now
d ❍ Don't know

Background Questions

28. What is the title of your position within the local education agency? (If you have multiple titles and one is Director, please select Director.) *Select all that apply*

1 ❍ School Food Service Director or School Nutrition Director
2 ❍ Area Supervisor, Area Manager, or Area Coordinator
3 ❍ Contract company's Food Service Manager
4 ❍ Kitchen/Cafeteria/Food Service Manager or Lead Cook
5 ❍ Business Manager
6 ❍ Dietitian or Nutritionist
99 ❍ Other (PLEASE SPECIFY) _____

29a. IF DIRECTOR, ASK: How long have you been a School Food Service or School Nutrition Director?

_____ YEARS and/or _____ MONTHS **GO TO Q.30**

29b. IF NOT DIRECTOR, ASK: How long have you been a [FILL FROM Q.28]?

_____ YEARS and/or _____ MONTHS

30. Do you work for the local education agency (LEA) or a food service management company? *Select one only*

1 ❍ LEA
2 ❍ Food Service Management Company
99 ❍ Other (PLEASE SPECIFY) _____

31. Which of the following credentials do you hold? *Select all that apply*

1 ❍ Associate's degree in consumer science, food service management, baking/culinary arts, etc.
2 ❍ Bachelor's degree in consumer science, nutrition, food service management, hotel/restaurant management, baking/culinary arts, etc.
3 ❍ Advanced degree in business, foods and nutrition, public health
4 ❍ On-the-job training
5 ❍ Registered dietitian
6 ❍ School Nutrition Specialist (SNA certified)
7 ❍ SNA Certified Level I
8 ❍ SNA Certified Level II
9 ❍ SNA Certified Level III
10 ❍ State food service certificate
99 ❍ Other (PLEASE SPECIFY) _____

ANSWER Q.32a AND Q.32b IF MIDDLE RESPONSE "INADEQUATE BUT MAKING DO" TO ANY ITEM IN Q.17 OR Q.19

32a. Earlier in the survey we asked about adequacy of equipment to meet the new meal standards and you indicated that in some areas your equipment was inadequate to meet standards, but that you were making do with a workaround ...

Could you give some examples of workarounds that you are using, that while helping you make do, are still inadequate to meet the new meal standards?

(PLEASE SPECIFY) _____

32b. Which of the following are reasons you feel your workarounds are inadequate to meet the new meal standards? *Select all that apply*

1 ❍ Expensive

2 ❍ Inefficient

3 ❍ Unsustainable

4 ❍ Can't meet increasing needs

5 ❍ Too labor intensive

99 ❍ Other (PLEASE SPECIFY) _____

If you used this PDF version of the KITS Study questionnaire as a worksheet to collect and/or organize information about your school food authority/school district, please go to the website https://www.kitsstudy.com and enter your answers.

Or you can fax or mail the completed questionnaire to Jennifer McGovern at:

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Please complete the following information:

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We will contact you only if we have questions about your responses.

If you have any questions about the survey or the KITS Study, please call our toll-free study hotline at 1-855-528-4550 or send an email to the study mailbox KITSStudy@mathematica-mpr.com.

Thank you for your interest in the KITS Study!

Appendix F: Equipment descriptions

Equipment descriptions:

- **Dunnage racks:** a shelf-like board for placing food in freezers or in a kitchen. It has solid or slotted tops that ensure maximum air is circulated around perishable substances. It may be used in coolers or freezers where these substances are kept.
- **Sectionizers:** used to quickly slice high volumes of fresh fruits and vegetables.
- **Steam-jacketed kettles (with pumps/filler):** similar to a double boiler, a steam-jacketed kettle cooks large quantities of food by using steam heat. It is designed with both an inner and outer steel wall that cooks the contents inside by releasing steam into the space between the walls. These devices are often used to cook foods like stock, gravy, sauce, or soup. Because it offers a uniform cooking surface it may cook more evenly than a traditional stock pot. It also tends to warm contents more quickly than a traditional pan that is heated from the bottom. Often, a steam-jacketed kettle is used for industrial cooking purposes, like hotels, and schools and on military ships and bases. This kind of kettle can cook large amounts of stew, pasta, or chili and can also be used to braise meat, cook dessert, or reheat various foods. Steam-jacketed kettles tend to be popular for institutional use because they require less stirring, can simmer longer-cooking recipes, and are less apt to burn food.
- **Tilting skillet:** Tilting skillets are used to cook a large quantity of food including scrambled eggs, braised meats, soups, stews, and pasta dishes. A tilting skillet can be used for a variety of purposes including: grilling, frying, simmering, and braising. Many chefs refer to a tilting skillet as a braising pan and use it for braising meats. Tilting skillets are popular among schools, hotels, hospitals, and governmental organizations for their ability to evenly cook and hold a large amount food in a short period of time. A tilting skillet reduces cooking time, maintains flavor and nutrients, the large capacity allows for preparation of large amounts of food, and the design allows for more convenient transfer of foods to serving pans and storage containers.
- **Combi oven:** a professional cooking appliance that combines the functionality of a convection oven and a steam cooker. That is, it can produce dry heat, moist heat or a combination of the two at various temperatures. The appliance is therefore fit for many culinary applications, including baking, roasting, grilling, steaming, braising, blanching and poaching. The advantages of this technology are short cooking times and a gentle preparation method, both of which lead to enhanced vitamin and nutritional preservation when compared to traditional cooking methods.
- **Blast chiller or tumble chiller:** used to cool food quickly to a low temperature that is relatively safe from bacterial growth. It works using a horizontally mounted, perforated stainless steel drum that rotates inside a tank of cold water.
- **Conveyor/wrapper system:** automated system that provides packaging for foods meeting the FDA sanitation requirements.
- **Cold food merchandizers:** refrigerated display cases for serving cold foods such as fruits, vegetables, and dairy items.
- **De-nester and fillers:** a machine that separates trays or containers, fills container with food product, closes container lid and applies label to container.

Endnotes

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