



Assessing Point-of-Service Systems in School Nutrition Programs  
In the United States

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# Assessing Point-of-Service Systems in School Nutrition Programs in the United States

## WRITTEN AND DEVELOPED BY

Junehee Kwon, PhD, RD  
Associate Professor  
Department of Hospitality Management  
Kansas State University

Yee Ming Lee, PhD, RD, CHE  
Assistant Professor  
Department of Nutrition, Dietetics, and Hospitality Management  
Auburn University

Eunhye Park, MS  
Graduate Research Assistant  
Department of Hospitality Management  
Kansas State University

Keith Rushing, PhD, RD  
Institute of Child Nutrition  
Applied Research Division  
The University of Southern Mississippi

## ACTING EXECUTIVE DIRECTOR

Dr. Aleshia Hall-Campbell, PhD, MPH



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**ASSESSING POINT-OF-SERVICE SYSTEMS IN SCHOOL NUTRITION PROGRAMS  
IN THE UNITED STATES**

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**EXECUTIVE SUMMARY**

The National School Lunch Program (NSLP) and the School Breakfast Program (SBP) provide nutritious and safe meals to children in the United States (U.S.) (U.S. Department of Agriculture [USDA], 2013a). Every day, more than 30 million students eat at least one meal in a school cafeteria, and the majority of NSLP (72.1%) and SBP (85.1%) participants are eligible to receive free or reduced-price (F-RP) meals (USDA, 2016a). The number of F-RP meal recipients appears to be continually increasing (USDA, 2016a), and the most recent data show a daily rate of 30.5 million meals for the NSLP and 14.1 million meals for the SBP (USDA, 2016a, 2016b). As the number of participants and the percentages of F-RP meals continue to increase, government spending has reached billions of dollars to reimburse school nutrition programs (SNPs) for F-RP and full-price meals. In 2015, the total federal reimbursement expenditure was \$11.7 billion for the NSLP and \$3.9 billion for the SBP (USDA, 2016c).

Along with the increased expenditures, there have been challenges maintaining program integrity (USDA Food and Nutrition Service [FNS], 2016). The large number of payment errors has raised concerns for many years (Improper Payments Information Act, 2002; USDA, 2015a). The second Access, Participation, Eligibility, and Certification Study (USDA, 2015a) revealed that there were numerous payment errors due to certification errors, meal-claiming errors, and aggregate errors. The total cost of erroneous payments was estimated to be 10% of the total reimbursement for the NSLP and the SBP (USDA, 2015a).

Among these errors, certification errors, which result in excessive unverified benefit pay outs, appeared to be the most significant (80%). Further, two-thirds of the certification errors in 2012-2013 were due to household reporting errors (USDA, 2015a). To prevent improper payment errors and to improve the accuracy of the certification process, the Healthy, Hunger-Free Kids Act of 2010 included additional provisions, such as increasing direct certification using Supplemental Nutrition Assistance Program data, improving parents' response rates for verification requests, and applying the Community Eligibility Provision for low-income communities (USDA, 2015a; USDA FNS, 2016). Fines and professional standards for school nutrition (SN) personnel have also been established or implemented to address these challenges (USDA, 2015a).

Point-of-service (POS) systems may play an important role in reducing these errors. Many POS systems that are commonly used in SNPs include functions to help SNPs track and aggregate the number of meals served for reporting purposes; verify student identity and whether a student receives full-price, reduced-price, or free meals; complete sales transactions and update student accounts; and generate reports for reimbursement claims. Although it is conceivable that POS systems may help SNP staff improve efficiency and reduce common errors (i.e., certification, meal-claiming, and aggregate errors) in SNPs, there has been no nationwide investigation of POS system use in the U.S. Therefore, this project was conducted to assess the current practices and challenges related to POS systems and certification practices for F-RP meals.

The specific research objectives were the following:

- to describe the sequential flow of information, activities, and personnel with POS systems and F-RP meal applications in SNPs in the U.S.;
- to identify the key personnel involved in paper and electronic POS systems;
- to explore the training provided to key personnel involved in POS systems in SNPs;
- to identify operational challenges related to POS systems and F-RP meal application procedures, and
- to evaluate the impact of school district size and demographic characteristics on different aspects of POS systems in SNPs.

To accomplish the study objectives, mixed-model methodology was developed that included qualitative interviews and a quantitative survey. Individual interviews were conducted with state child nutrition (CN) program directors ( $n = 14$ ) and district-level SNP directors ( $n = 25$ ) in 14 states (two states in each of the seven USDA food-distribution regions), followed by a national survey of district SNP directors. The individual interviews with state directors and district-level SNP directors explored a range of activities related to POS systems and certification practices in school districts. A comprehensive data collection instrument was developed, reviewed by a panel of experts, and pilot tested. It was then sent out to a stratified random sample of 1,500 district SNP directors (Dillman, Smyth, & Christian, 2014). The sample was stratified based on the number of NSLP participants in each of the 14 states. The target was to obtain 300 surveys (20% response rate) with data usable for analyses. To increase the participation of small districts where online survey access may not be available or convenient, 500 paper-based questionnaires were sent to the smallest districts in the sample. Descriptive

statistics, cross-tabulation with chi-square analyses, independent sample *t*-tests, and analysis of variance (ANOVA) were calculated using SPSS. The statistical significance was set at  $p < 0.05$ .

A total of 319 SNP directors (21.3%) across all 14 states provided usable data. The distribution of the participants across the 14 states studied was very close to the NSLP participation profiles except for the Southeastern region, which was overrepresented (15.3% in the sample, 9.7% in the population), and the Southwest region, which was underrepresented (25.0% in the sample, 29.1% in the population).

### **Point-of-Service Systems in School Nutrition Programs: Types, Challenges, and Training**

The majority of the participants ( $n = 293$ , 91.9%) used electronic POS systems. Some challenges the participants encountered included difficulty customizing reports ( $n = 29$ , 9.9%) and difficulty obtaining technical support when problems arose with software ( $n = 15$ , 5.1%). The availability of technical support ( $n = 221$ , 75.4%), ease of identifying students ( $n = 209$ , 71.3%), and ease of training ( $n = 208$ , 71.0%) affected CN professionals' selection of an electronic POS system. Of the CN professionals who used paper-based POS systems ( $n = 43$ , 13.5%), the majority reported that their school district was too small to invest in an electronic POS system ( $n = 29$ ) or that they lacked funding for electronic POS systems ( $n = 22$ ). The main challenges faced by users of paper-based POS systems were reporting accurate numbers of reimbursable meals ( $n = 28$ ), time lag in data processing ( $n = 27$ ), and handling of confidential information ( $n = 20$ ). The CN professionals perceived that the individuals who operate electronic POS systems should have good customer service skills ( $n = 187$ , 58.6%) and computer literacy ( $n = 164$ , 51.4%). The district directors ( $n = 158$ , 49.5%) or the POS system providers ( $n = 123$ , 38.6%) provided POS training when staff were newly assigned as cashiers ( $n = 225$ , 70.5%) or at

the beginning of each academic year ( $n = 166$ , 52.0%). On-the-job training was widely used but usually lasted less than two hours per session.

### **Free and Reduced-Price Meal Application and Income Verification Practices in School Nutrition Programs in the United States**

The majority of the districts ( $n = 175$ , 54.9%) accepted only paper-based F-RP meal applications; 106 (33.2%) accepted both paper-based and online applications, and 13 (4.1%) accepted online applications only. A variety of staff processed the applications, but district directors (63.6%), directors' assistants (44.2%), or bookkeepers (41.4%) processed the majority of applications. Some SNPs hired temporary employees ( $n = 23$ , 7.2%) or had cafeteria managers within the school ( $n = 65$ , 20.4%) process applications. To verify household income, directors selected 3% of applicants using electronic POS systems (71.5%) or Error Prone software (7.2%). The majority (89.1%) of the participants accepted pay stubs as acceptable documentation for income verification, and 83.1% accepted two or more forms of documentation for income verification. Although the majority (65.9%) of participants reported the current verification process was adequate when determining eligibility, 31 (9.7%) participants indicated the verification process was inadequate because parents might omit some of the income documentation ( $n = 22$ ), the parents' response rate was low ( $n = 6$ ), the verification process was too cumbersome ( $n = 5$ ), or the 3% random checking was insufficient ( $n = 5$ ).

This research identified a variety of aspects of POS system use and F-RP meal application and verification processes in the U.S. The sequence of the information flow and the challenges that CN professionals experienced with POS systems and F-RP meal application processes were identified. To overcome challenges, POS system providers may need to offer routine training and technical support to CN professionals. In addition, to improve the accuracy

of data reporting for paper-based POS systems, CN professionals in small districts may need to understand the workflow and identify ways to streamline the reporting processes. Results also revealed that the application and verification processes take significant time, number of personnel, and effort. Using more stringent application processes or alternate sources such as SNAP award letters may reduce CN professionals' resource needs. In addition, CN professionals may need to consider accepting documents on which it is hard to omit a source of income when applying for F-RP meals.

## INTRODUCTION

The National School Lunch Program (NSLP) and the School Breakfast Program (SBP) play an integral part in the strategic goals of the United States Department of Agriculture (USDA), by ensuring that all children have access to safe, nutritious, and balanced meals (USDA, 2013a). The estimated number of lunches served daily through the NSLP was 30.5 million in the 2015 academic year (USDA, 2016a). Of those lunches, 72.1% were free or reduced-price (F-RP) meals, and these percentages appear to be continually increasing (USDA, 2016a). Meanwhile, the SBP served a daily average of 14.1 million meals with a higher proportion of F-RP meals than the NSLP, reaching 85.1% (USDA, 2016b). Depending on income and the number of family members in each household, students whose household income is at or below 130% of the poverty level are eligible to receive free meals, and those whose household income is between 130% and 185% of the poverty level are eligible for reduced-price meals (USDA, 2016d).

The total federal reimbursement expenditure for the NSLP was \$11.7 billion in 2015; \$3.9 billion was spent for the SBP in the same year (USDA, 2016c). The cost of these programs continue to increase, and the percentage of F-RP meals is steadily increasing. This trend indicates the importance of these programs for the health and well-being of children. However, the large number of payment errors have raised concerns for many years (Improper Payments Information Act, 2002; USDA, 2015a). The Second Access, Participation, Eligibility, and Certification (APECII) Study (USDA, 2015a) revealed numerous payment errors for SNPs. Certification errors, meal-claiming errors, and aggregate errors were identified that cost the federal government more than \$1.16 billion (9.8%) for the NSLP and \$336 million (11.0%) for breakfast reimbursement during the 2012–2013 school year (USDA, 2015a). Although the



amount of improper payments continues to be significant, new 2015 figures for improper payment (USDA, 2015a) show some improvement in comparison to the 2013 report, which showed \$1.77 billion of improper payments for the NSLP and \$831 million for the SBP (USDA, 2013b).

The majority of these payment errors (80%) were certification errors that provided higher levels of benefits than the recipients were entitled to. Further, two-thirds of the certification errors in 2012–2013 were due to household reporting errors (USDA, 2015a). In response to the large number of improper payment errors, additional legislation was established. The Healthy, Hunger-Free Kids Act (HHFKA) of 2010 includes methods for improving the accuracy of the certification process (USDA Food and Nutrition Service [FNS], 2016). Some examples include increasing direct certification for free meals using Supplemental Nutrition Assistance Program (SNAP) data; increasing parents' response rates for application verification requests; reinforcing requirements for monitoring school food authority to ensure the accuracy of F-RP meal applications, application processing, and identification of reimbursable meals; and providing an alternative system, such as the Community Eligibility Provision (CEP), for low-income communities (USDA, 2015a). Other reinforcement strategies such as imposing fines and establishing professional standards for school nutrition (SN) personnel have been discussed and implemented (USDA, 2015a).

Many point-of-service (POS) systems are commonly used in SNPs. These systems provide SNP staff and leadership with functions that can address two of the three most common errors (i.e., meal-claiming errors and aggregate errors). Common functions of POS systems include but are not limited to the following: (a) keeping track of the number of meals served each day, (b) aggregating the number of meals for reporting purposes, (c) verifying student identity

and whether each student receives full-price, reduced-price, or free meals, (d) recording sales transactions and updating student accounts, and (e) generating reports for the operation and reimbursement claims. Although it is conceivable that POS systems may help SNP staff improve efficiency and reduce common errors, no nationwide investigation of POS system use has been conducted in the United States (U.S.). Further, little is known about the overall procedures for applying for and verifying eligibility for F-RP meals.

### **Research Objectives**

Considering the large government expenditure for SNPs and high levels of erroneous charges for these programs, an assessment of how POS systems are used in SNPs and how F-RP meal applications are received and verified is needed. Therefore, this project was conducted to assess POS systems in SNPs that do not participate in the CEP for the NSLP and the SBP. In addition, the research team explored how F-RP meal applications were processed. Specific research objectives included the following:

- describe the sequential flow of information, activities, and personnel with paper and electronic POS systems and F-RP meal application procedures in SNPs throughout the U.S.
- identify the key personnel involved in paper-based and electronic POS system use, including their skill levels, roles, and responsibilities, in SNPs throughout the U.S.
- describe the training provided to key personnel involved in paper and electronic POS systems in SNPs throughout the U.S. (such as length of individual training activities, the frequency of training activities related to POS, and the content of the training activities).

- describe operational challenges with POS systems and F-RP meal application procedures.
- describe the impact of school district size and demographics on the different aspects of POS systems and F-RP meal applications in SNPs throughout the U.S. (such as paper versus electronic, flow of information/activities, personnel, and training).

## **METHODOLOGY**

The study protocol was approved by the Institutional Review Board at Kansas State University and Auburn University. This study was conducted in two phases: Phase One included individual interviews with state and district-level school nutrition program (SNP) directors, and Phase Two included a national survey of district SNP directors. Participants in both phases of the research were selected from 14 states, two states from each of the seven United States Department of Agriculture (USDA) regions, across the United States (U.S.). Researchers determined the 14 states purposefully based on population sizes. Specifically, from each of the seven USDA regions, researchers selected the two states with the largest and smallest populations. The combined population of these states reflects 47% of the total U.S. population.

### **Phase One: Individual Interviews with State and District-Level**

#### **School Nutrition Program Directors**

Individual interviews, a qualitative research method, were used in Phase One to aid in developing the survey instrument. This was done primarily because limited research has been conducted on the implementation and use of point-of-service (POS) systems and free or reduced-price (F-RP) meal application procedures across the U.S. A total of 14 state directors and 25 district-level SNP directors in 14 states were interviewed to explore a range of activities related to different types of POS systems used in SNPs. After the respondents agreed to participate in an interview, the interviews were audio-recorded, transcribed verbatim, organized, and coded independently by two graduate research assistants. The codes were compared and reconciled to reduce redundancy and used to develop common themes for the quantitative survey in Phase Two. In addition, six site visits were conducted in Alabama and Kansas to increase understanding of the processes.

## **Phase Two: National Survey of District School Nutrition Program Directors**

### **Across the United States Participant Selection**

Each state child nutrition (CN) program leader provided a list of SNP directors and their contact information for researchers to use when selecting a stratified random sample. Based on the number of National School Lunch Program (NSLP) participants in the 14 states, approximate numbers of individuals to include from each state in the sample of 1,500 were determined. From the total number of SNP directors listed in the contact information provided by the state agencies, researchers randomly selected the appropriate number of directors. Because some of the states (Alaska, Delaware, New Mexico, Vermont, and Wyoming) had a very small number of NSLP participants, these states were oversampled to ensure data from these states was represented.

### **Research Instrument Development**

A questionnaire was developed based on the results of the interviews in Phase One. Paper-based and online versions of the questionnaire were developed to reach SNP directors without the necessary computer/Internet services to complete the online survey. The questionnaire comprised multiple sections, including (a) demographic information of the participants and school districts, (b) types and functions of the POS systems, (c) challenges SNP directors face when utilizing the POS systems, (d) F-RP meal application and verification processes, (e) cash handling practices, (f) qualifications of the individuals handling the POS system, and (g) the training practices for POS system use and F-RP meal application and verification procedures. A series of branched questions were used to ensure that participants answered only relevant questions pertaining to their SNPs.

Once developed, the instrument was reviewed by CN and foodservice management experts and a project coordinator from the Institute of Child Nutrition (ICN), Applied Research Division for content validity. A pilot study was conducted with a convenience sample of 20 CN professionals who were not included in the study sample. Because of the descriptive nature of the survey questions, internal consistency (inter-item reliability) was not measured or established. The participants in the pilot test were asked to complete the survey and to rate the clarity of the instructions and questions. Revisions were made based on the feedback received. An online survey that used the Kansas State University (K-State) Qualtrics survey system was finalized, and a compatible paper-based questionnaire was developed.

### **Data Collection and Analysis**

An e-mail invitation with a link to the final questionnaire was sent to 1,500 district SNP directors in 14 states. For those whose e-mail address was not available but for whom a “contact us” link was available from the district or school websites, a graduate research assistant manually copied and pasted the e-mail invitation text using the space provided on the website. Two follow-up e-mails were sent out to maximize the response rate. To increase the participation of SNP directors in small districts and charter, private, and parochial schools in which a computer system may not be as readily available, an additional 500 printed surveys were mailed to one third of the sample, with postage-paid self-addressed envelopes, followed by a postcard reminder.

Data analyses were conducted using SPSS (version 20.0). Descriptive statistics such as frequencies, means and standard deviations, and cross-tabulation with chi-square analyses were used to summarize the data and assess associations between categorical variables. Independent sample *t*-tests and analysis of variance (ANOVA) were conducted to assess the impact of school district size and demographics on the different aspects of POS systems and F-RP meal

application procedures in SNPs throughout the U.S. Potential relationships among the variables were assessed using multi-regression analyses.

## **RESULTS AND DISCUSSION**

### **Demographics of the Respondents**

Of the 1,500 invitations to complete electronic and paper questionnaires, 319 usable questionnaires (21.3%) were returned with data acceptable for analyses. Nearly 87% of the respondents were female ( $n = 277$ ), and 40.4% of the participants were in the 50-59 year-old age group ( $n = 129$ ). A total of 104 (32.6%) held a bachelor's degree and were currently the director of a school nutrition programs (SNPs) at the district level ( $n = 220$ , 69.0%). Approximately 37% ( $n = 118$ ) of the respondents had less than 10 years of work experience in SNPs, followed by 11-20 years ( $n = 101$ , 31.6%). The average number of years of service in SNPs was  $16.3 \pm 10.0$  years (Table 1).



Table 1

*Demographic Characteristics of Participants (n=319)*

Questions	<i>n</i>	%
Gender		
Male	42	13.2
Female	277	86.8
Age		
20 – 29 years old	5	1.6
30 – 39 years old	46	14.4
40 – 49 years old	66	20.7
50 – 59 years old	129	40.4
≥ 60 years old	73	22.9
Degree of education		
High school or GED	35	11.0
Some college	78	24.5
Associate degree	25	7.8
Bachelor's degree	104	32.6
Graduate degree (Master's or doctoral degree)	71	22.3
Other	6	1.9
Current job title		
Director of Child Nutrition Program in a school district	220	69.0
Manager of a Child Nutrition Program of a single school	30	9.4
Coordinator of Child Nutrition Program over several schools	17	5.3
Other	52	16.3
Work experience ( <i>Mean ± Standard Deviation = 16.3 ± 10.0 Years</i> )		
≤ 10 years	118	36.9
11 – 20 years	101	31.6
21 – 30 years	70	21.9
≥ 31 years	30	9.4

The respondents came from 14 states across the U.S that together represented 47% of the meals served in the National School Lunch Program (NSLP). The participants in the Southwest (New Mexico and Texas) made up close to 30% of the total respondents, followed by the Western (California and Alaska, 23.8%), Midwest (Illinois and Minnesota, 12.2%), Northeast (New York and Vermont, 11.6%), Southeast (Florida and Alabama, 9.7%), Mid-Atlantic (Delaware and Pennsylvania, 8.8%), and Mountain Plains (Wyoming and Missouri, 4.7%) regions. A total of 271 respondents worked for public schools (84.3%), and an almost equal number of participants indicated they worked for charter ( $n = 22$ ,  $n = 6.9\%$ ) or private ( $n = 24$ , 7.5%) schools. More than 50% ( $n = 175$ ) of the respondents indicated they worked for small districts (up to 2,499 students) and 109 (34.2%) worked for medium-sized districts (2,500–9,999 students) (Table 2).

Table 2

*Demographic Characteristics of Participants (n=319)*

<b>Questions</b>	<b><i>n</i></b>	<b>%</b>
<b>State</b>		
Texas	90	28.2
California	75	23.5
New York	34	10.7
Illinois	28	8.8
Pennsylvania	26	8.2
Florida	23	7.2
Missouri	12	3.8
Minnesota	11	3.4
Alabama	8	2.5
New Mexico	3	0.9
Vermont	3	0.9
Wyoming	3	0.9
Delaware	2	0.6
Alaska	1	0.3
<b>School type</b>		
Public school	271	84.3
Private school	24	7.5
Charter school	22	6.9
Public-Charter	4	1.3
<b>School size</b>		
Small (<2,500)	175	54.9
Medium (2,500-19,999)	109	34.2
Large (20,000-39,999)	18	5.6
Mega ( $\geq$ 40,000 students)	17	5.3
<b>Type of lunch operation</b>		
Self-Operated	280	87.8
Contract	39	12.2

The sample included school districts with varying numbers of schools. Table 3 shows that the range of the number of elementary, middle, and high schools varied greatly. The overall participation rate for the NSLP was 61.1%. As shown in Table 4, most school districts requested parents to pre-pay for meal service ( $n = 275$ , 86.5%) and accepted cash ( $n = 268$ , 84.0%) and checks ( $n = 266$ , 83.4%). A significant number of districts also allowed parents to pay through an online payment system ( $n = 221$ , 69.3%). Only a limited number of districts ( $n = 58$ , 18.2%) accepted credit card payments for school meal payments.

Table 3

*Demographic Characteristics of Participants (n=319)*

	<b>Range</b>	<b>M</b>	<b>SD</b>	<b>Sample Total</b>
Number of schools in the district				
Elementary schools	0-112	6.24	11.03	1,953
Middle schools	0-35	1.95	3.18	610
High schools	0-30	1.83	2.80	580
Charter schools	0-27	0.48	2.39	154
The rate of F-RP meals	0.0-100.0%	49.57	24.17	-
The participation rate of the NSLP	0.0-100.0%	61.06	21.22	-

<sup>a</sup> Total number of schools = 3,297

Table 4

*Payment Method (n=319)*

Questions	<i>n</i>	% <sup>a</sup>
How does district receive full and reduced-price meal payment?		
We request to pre-pay or pay at the cafeteria for children’s meals.	275	86.5
We send bills to parents occasionally (i.e., weekly or monthly) after service is rendered.	104	32.6
District and/or local government pay for all others. No payment is received from students.	23	7.2
For pre-pay options only (n=275):		
How do parents pay for children’s meals?		
Cash	268	84.0
Check	266	83.4
Online payment system	221	69.3
Credit cards	58	18.2
Other	2	0.6

<sup>a</sup>This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

These findings are consistent with the study by May, Standing, Chu, Gasper, and Riley (2014), which showed 92.9% of SNPs accept cash or personal checks. Although Internet payment has become more popular in recent years (41.4%), nearly 80% of the SNPs also accepted cash at the POS (May et al., 2014). These findings signify the importance of the integrity of the cashiers and POS operators in schools, as the majority of SNPs accepted cash or check payment before service was rendered, and students received credit from the prepaid amount. Therefore, employee qualifications related to ethics and the ability to handle cash should be considered important. Later in this report, staff criteria will be discussed in detail (Table 17).

**Point-of-Service Systems**

*Electronic Point-of-Service Systems*

Of the 319 respondents, 293 directors (91.8%) used an electronic POS system (Table 5). Results of the chi-square analysis showed that the types of POS systems used differed significantly based on the size of the school district ( $\chi^2 = 23.78, p < .001$ ). Small school districts with fewer than 2,500 students were significantly less likely to use an electronic POS system than large school districts with more than 2,500 students (Table 6). Some of the most commonly used electronic POS software programs were Nutrikids ( $n = 95, 32.4%$ ), WebSmart ( $n = 20, 6.8%$ ), Skyward ( $n = 20, 6.8%$ ), System Design ( $n = 20, 6.8%$ ), PCS Revenue Management ( $n = 19, 6.5%$ ), and PrimeroEdge ( $n = 14, 4.8%$ ) (Table 7).

Table 5

*Point-of-Service System Used (n=315)*

	<i>n</i>	% <sup>a</sup>
Use of electronic POS system only	272	85.3
Use of paper-based POS system only	22	6.9
Use of both electronic and paper-based POS system	21	6.6

<sup>a</sup> Percentages were calculated based on total number of respondents ( $n=319$ ). Due to missing data, the sum of percentages may not be 100%.

Table 6

*Type of Point-of-Service System Used Between Small (n=171) and Large (n=144) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Use of electronic POS system only	134	78.4	138	95.8	23.78***
Use of paper-based POS system only	22	12.9	0	0.0	
Use of both electronic and paper-based POS system	15	8.8	6	4.2	

\*\*\*  $p < .001$

Table 7

*Point-of-Service Systems Used by Respondents (n=293)*

	<i>n</i>	% <sup>a,b</sup>
Type of the electronic POS system		
Nutrikids	95	32.4
WebSmart	20	6.8
Skyward	20	6.8
Systems design	20	6.8
PCS Revenue Control Systems	19	6.5
PrimeroEdge	14	4.8
eTriton	13	4.4
Mealtime	11	3.8
Powerschool	9	3.1
Tyler SIS	8	2.7
Horizon International Software – OneSource Program	7	2.4
Mealplus	7	2.4
MCS	6	2.0
Others	38	13.2
Did not answer	6	2.0

<sup>a</sup> Percentages were calculated based on 293 directors who use electronic POS systems.

<sup>b</sup> Due to missing data, the sum of percentages may not be 100%.

Respondents who selected “other” also provided the names of the POS software they used, and these included Aquitas, Café Enterprise, Infinite Campus, and PowerSchool among others. Results of the chi-square analysis further showed that there was a significant association between the size of the school district and the POS software used ( $\chi^2 = 254.53, p < .001$ ). For instance, large school districts were more likely to use PCS Revenue Control Systems and PrimeroEdge, while small districts used PowerSchool and Systems Design (Table 8).



Table 8

*Type of the Point-of-Service System Used Between Small (n=145) and Large (n=142) Sized Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Nutrikids	40	27.6	55	38.7	254.53***
WebSmart	8	5.5	12	8.5	
Skyward	10	6.9	10	7.0	
Systems design	16	11.0	4	2.8	
PCS Revenue Control Systems	4	2.8	15	10.6	
PrimeroEdge	1	0.7	13	9.2	
eTritition	8	5.5	5	3.5	
Mealtime	6	4.1	5	3.5	
Powerschool	9	6.2	0	0	
Tyler SIS	5	3.4	3	2.1	
Horizon International Software - OneSource Program	2	1.4	5	3.5	
Mealplus	3	2.1	4	2.8	
MCS	2	1.4	4	2.8	
Others	31	21.4	7	4.9	

The majority of the respondents used an electronic POS system, indicating the increased popularity of this system in the school nutrition (SN) environment. A previous study conducted in 2009 showed that approximately 84% of schools had an electronic POS system in the cafeteria

(Kavanagh, 2009). Our results showed a much higher percentage (91.8%) reporting use of electronic POS systems. This could be due to continued advances in computer and Internet technology; more SNPs have also invested in automated systems to increase efficiency and reduce errors over the last six years. The electronic POS system has been shown to be effective in organizing, controlling, and analyzing various components of the operations (Expert Market, 2016). In the SN setting, POS systems are used when receiving and processing applications and identifying students' eligibility status, as well as for generating reports for sales and summary of meals served.

The functions of electronic POS systems most frequently used in SN operations are listed in Table 9. Most participants relied on the electronic POS system to generate a summary of meals served ( $n = 277$ , 94.5%), manage student account balances and transactions ( $n = 276$ , 94.2%), identify an applicant's eligibility status ( $n = 248$ , 84.6%), interface with district student data management system ( $n = 233$ , 79.5%), transmit sales reports to the district foodservice office ( $n = 225$ , 76.8%), and generate a detailed summary of each food item sold ( $n = 223$ , 76.1%). Other commonly used electronic POS functions were randomly selecting 3% of the applications for verification ( $n = 214$ , 73.0%) and processing mobile/online payments ( $n = 192$ , 65.5%).

Table 9

*Frequently Used Functions of Current Point-of-Service Systems (n = 293)*

	<i>n</i>	% <sup>a,b</sup>
Generate summary of meals served	277	94.5
Manage students account balances and transactions	276	94.2
Identify eligibility status of an applicant	248	84.6
Interface with district student data management system	233	79.5
Transmit sales reports to district foodservice office	225	76.8
Generate detailed summary of each food item sold	223	76.1
Select 3% applications randomly for verification	214	73.0
Process online or mobile payment	192	65.5
Review transactions before finalizing the report	191	65.2
Generate sales reports to the state agency	167	57.0
Verify whether student's meal selection is reimbursable	161	54.9
Process online application of free/reduce meals	150	51.2
Track in-progress sessions	104	35.5
No answer	6	2.0
Other	3	1.0

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on 293 directors who use electronic POS systems.

Table 10 shows the self-reported degree of satisfaction with their current POS system by electronic POS system users. Of the 287 respondents who indicated their satisfaction level, the majority indicated that they were *very satisfied* ( $n = 119, 41.5\%$ ) or *satisfied* ( $n = 101, 35.2\%$ ). Less than 12% of the respondents indicated that they were *dissatisfied* ( $n = 12$ ) or *very dissatisfied* ( $n = 22$ ) with their current system.

Table 10

*Degree of Satisfaction with Current Electronic Point-of-Service Systems Identified by Users of Electronic Point-of-Service Systems (n=287)*

<i>(Mean ± Standard Deviation = 4.0 ± 1.2)<sup>c</sup></i>	<i>n</i>	<i>%<sup>a,b</sup></i>
Very Satisfied	119	41.5
Satisfied	101	35.2
Neither Satisfied nor Dissatisfied	33	11.5
Dissatisfied	12	4.2
Very Dissatisfied	22	7.7

<sup>a</sup> Percentages were calculated based on 287 directors who responded to this question.

<sup>b</sup> Due to missing data, the sum of percentages may not be 100%.

<sup>c</sup> The rating scale was a 5-point Likert-type ranging from 1 (very Dissatisfied) to 5 (Very Satisfied).

The mean satisfaction scores were compared between respondents whose POS system had or did not have certain functions (Table 11) to assess whether certain functions increase participant satisfaction about the system. There were no significant differences between mean satisfaction scores of SNP director groups with or without most of the POS functions. The only function that made a difference in directors' satisfaction scores was the ability to *review transactions before finalizing the report*. Directors who had this function in their POS system

rated their satisfaction with the current system higher than those who did not have this function ( $t = 3.646, p < .001$ ).

Table 11

*Differences in Satisfaction with Current Electronic Point-of-Service Systems Between Groups That Had or Did Not Have the Following Point-of-Service Functions (n= 287)*

Variable	With Function		Without Function		t
	M	D	M	D	
Review transactions before finalizing the report	.16	.15	.64	.16	3.646***
Track in-progress sessions	.13	.14	.91	.20	1.508
Verify whether student's meal selection is reimbursable	.09	.18	.85	.17	1.745
Process online application of free/reduce meals	.08	.10	.88	.26	1.414
Process online or mobile payment	.06	.23	.83	.07	1.565
Select 3% applications randomly for verification	.04	.18	.82	.18	1.379
Generate detailed summary of each food item sold	.03	.18	.83	.19	1.216
Transmit sales reports to district foodservice office	.01	.22	.89	.04	0.746
Identify eligibility status of an applicant	.01	.18	.85	.16	0.796
Manage students account balances and transactions	.98	.19	.09	.94	-0.300
Generate summary of meals served	.96	.19	.70	.48	1.958
Generate sales reports to the state agency	.96	.23	.03	.11	0.473

\*\*\*  $p < .001$

When deciding which electronic POS system to select, respondents indicated that they had considered the availability of technical support by the vendors ( $n = 221, 75.4\%$ ), ease of identifying students ( $n = 209, 71.3\%$ ), and ease of training employees ( $n = 208, 71.0\%$ ). Other factors, such as affordability ( $n = 197, 67.2\%$ ), ease of reporting meal counts to the state agency ( $n = 192, 65.5\%$ ), and the ability to interface with the district student data management system ( $n = 192, 65.5\%$ ), were also key to selecting POS systems (Table 12).

Table 12

*Factors That Influence the Decision to Select the Point-of-Service System (n=287)*

	<i>n</i>	<i>% a,b</i>
Technical support from the vendor	221	75.4
Ease of identifying students	209	71.3
Ease of training employees	208	71.0
Ease of charging to student accounts	199	67.9
Affordability (i.e., cost of systems)	197	67.2
Ease of reporting the meal counts to the state agency	192	65.5
Ability to interface with district student data management system	192	65.5
Ability to customize	144	49.1
Previous positive experience or relationships	126	43.0
Cloud-based data storage and transport system	63	21.5

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on 293 directors who use electronic POS systems.

As described above, the results showed that the respondents used a wide variety of electronic POS systems provided by many different companies. Several interviews with state directors indicated that the states were not allowed to advocate for or recommend particular POS systems to the school districts, and therefore, the district directors worked with POS providers and made decisions based on the district directors' particular situations. The respondents reflected that they learned about different brands of POS systems by attending an expo at a national conference, where vendors showcased their products, and by talking with colleagues (i.e., word of mouth).

Written responses from SNP directors about the challenges of using their current system are summarized in Table 13. "Unable to customize functions" was identified by participants as one of the main challenges ( $n = 35$ , 11.9%). However, many POS software companies claim that their software allows customization and offers add-on functions based on users' needs (Heartland Payment System, Inc., 2016; PCS Revenue Control System, 2016; PrimeroEdge, 2016). These findings suggest that POS companies should understand their customers' needs and provide functions that best fit those needs. SNP directors should be educated on how to select POS systems that meet the directors' needs based on different criteria such as price, quality, user friendliness, software and hardware capabilities and compatibility, and availability of technical support (Parpal, 2015).

Table 13

*Challenges of Using the Current Electronic Point-of-Service System (n = 122)*

	<i>n</i>	% a,b
Unable to customize reports	35	11.9
Unable to interface with district student data management system	21	7.2
Lack of technical support	14	4.8
Internet (electricity) connection	14	4.8
Lack of important functions	12	4.1
Software update issues	11	3.8
Complicated to use	9	3.1
System glitches	7	2.4
Unable to save information/Not cloud based	7	2.4
Student identification	5	1.7
Payment and price adjustment	5	1.7
F-RP application	4	1.4
Employee training	4	1.4
Inaccurate data	2	0.7
Other	4	1.4

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on 293 directors who use electronic POS systems.



Other challenges with the current electronic POS system voiced by the respondents in this study included being unable to interface with district student data management system ( $n = 21, 7.2\%$ ), challenges with internet connectivity ( $n = 14, 4.8\%$ ), and inability to customize functions ( $n = 14, 4.8\%$ ). Lack of important functions ( $n = 12, 4.1\%$ ) and the software update issues ( $n = 11, 3.8\%$ ) were addressed by several respondents. Respondents provided various comments via the text entry portion of the survey to address challenges related to language (i.e., “NutriKids can only handle letters in two languages”), data not being transferred to the following year (i.e., “Data isn’t stored at the end of the year for the next year start up”), and lack of communication with parents (i.e., “Cannot send out calls directly to parents for notification of students’ low balances”) (Table 13).

Although many respondents also addressed other challenges with their current POS providers and systems, such as lack of technical support, many of these POS companies have live support/chat functions that provide instant technical support (Heartland Payment System, Inc., 2016; Horizon Software International, 2016). Some of the communication difficulties may be due to limited time for system support, especially when the companies are located in different time zones from the school districts, which may make real-time support difficult. In some of the school districts, the student data management system and the electronic POS system were provided by different companies, and thus, some data may have had to be entered multiple times into different systems. This type of requirement is not only time-consuming but also prone to human error.

One respondent also raised a concern about POS providers’ lack of understanding of the SBP and NSLP guidelines, which might cause mistakes in the status of the reimbursable meals.

These findings present opportunities for POS providers to improve and develop products. POS providers need to consider concerns raised by users and find solutions to those concerns.

More SNP directors in large school districts selected electronic POS systems that interfaced with district student data management systems than the SNP directors in small school districts ( $\chi^2 = 25.50, p < .001$ ) (Table 14). Although the research team did not ask specific reasons for this, it was postulated that this may be because large districts have more funding available that allows SNP directors and other school officials to purchase “the total package” for a large student management system with related components. Although the total cost may be larger for such a system, SNP staff may be able to work more efficiently if student information is made available to SNP directors.

Table 14

*Selection of Point-of-Service Systems with the Ability of Interfacing with District Student Data Management System Between Small (n=145) and Large (n=142) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Yes	101	69.7	132	93.0	25.50***
No	44	30.3	10	7.0	

\*\*\* $p < .001$

### ***Paper-Based Point-of-Service Systems***

Forty-three child nutrition (CN) professional respondents (13.5%) indicated that they used a paper-based POS system in their school districts. The reasons behind this selection included that the district was too small to invest in an electronic system ( $n = 29, 67.4\%$ ), lack of funding ( $n = 22, 51.2\%$ ), and employees’ lack of knowledge and skills to operate an electronic POS system ( $n = 20, 46.5\%$ ). Furthermore, one respondent indicated that a paper-based POS

system was used simply because the “district does not want to change”. Another participant stated that a paper-based system was used only for tracking meals served during breakfast and when the electronic POS system was down (Table 15).

Table 15

*Reasons for Not Using an Electronic Point-of-Service System Identified by Users of Paper-Based Point-of-Service Systems (n=43)*

	<i>n</i>	<i>% a,b</i>
School or district is too small to invest in an electronic POS system	29	67.4
Lack of funding	22	51.2
Employee’s lack of knowledge and skills	20	46.5
Lack of technical support	16	37.2
Lack of internet connectivity	15	34.9
Other	6	14.0

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on 43 directors who use paper-based POS systems.

From Table 16, results related to paper-based POS system user responses are summarized. Even though the research team called these methods “paper-based” POS systems, users of paper-based POS systems included directors who used computer software such as Microsoft Excel to keep track of transactions. Users of paper-based POS systems faced three of their biggest challenges as follows: reporting an accurate reimbursable meal count ( $n = 28$ , 66.7%), time lag in data processing ( $n = 27$ , 64.3%), and handling of students’ confidential

information ( $n = 20, 47.6\%$ ). In addition, one respondent commented, “The paper-based POS system is not able to produce the financial reports as needed” (see Table 16).

Table 16

*Challenges Identified by Users of Paper-Based Point-of-Service Systems (n=43)*

	<i>N</i>	<i>%<sup>a,b</sup></i>
Reporting accurate number of reimbursable meal counts	28	66.7
Time lag in processing the information/data	27	64.3
Handling confidential information	20	47.6
Systems (POS, district student data management system, state reporting system, etc.) not communicating with one another	15	35.7
Other	5	11.9

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on 43 directors who use paper-based POS systems.

Results indicated that paper-based POS systems were still used at the time of this study although these systems are far less common than electronic POS systems or previously reported in 2009 (Kavanagh, 2009). A paper-based POS system was either used as the only method to handle transactions or used as an additional method for keeping track of transactions with an electronic system in charter, private, and satellite schools as those schools tend not to be “wired” or connected to other schools. Methods were classified as paper-based when common functions of electronic POS systems were not found even though SNP staff members were utilizing computers.

**Key Personnel Involved in Electronic and Paper-Based Point-of-Service Systems:  
Skill Levels, Roles, and Responsibilities**

School nutrition directors who used an electronic POS system were asked to identify which personnel were able to operate the POS system. The majority of participants ( $n = 192$ , 60.2%) indicated that the cafeteria managers and supervisors were able to do so. Nearly half of the participants ( $n = 148$ , 46.4%) indicated that all cafeteria employees were able to operate a POS system, by use of job rotation systems. A total of 108 respondents (33.9%) indicated that only cashiers were able to operate the POS system. In the event that the employees who handle the POS system were absent, respondents indicated that another trained foodservice employee ( $n = 255$ , 79.9%) or cafeteria managers or supervisors ( $n = 180$ , 56.4%) were available to substitute (Table 17).

Table 17

*Practices Related To Point-of-Service Training (n=298)*

<b>Questions</b>	<b><i>n</i></b>	<b>%<sup>a,b</sup></b>
The person(s) who is(are) able to operate the POS system		
Cafeteria managers or other supervisors	192	60.2
Any cafeteria employees (job rotation)	148	46.4
Cashiers only	108	33.9
Other	29	9.1
Administrative support	12	3.8
Experienced/trained individual	6	1.9
Aide	4	1.3
Tech support	2	0.6
Paraprofessional	1	0.3
No specific answer	4	1.3
What happens if the employees who handle the POS systems in your school district nutrition program are absent		
Another trained foodservice employee is available to substitute	255	79.9
A school foodservice manager or supervisor is available to substitute.	180	56.4
Other	10	3.1
Educational assistant	3	0.9
Agency	2	0.6
Tech support	1	0.3
No specific answers	4	1.3

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on total number of respondents ( $n=319$ ). Due to missing data, the sum of percentages may not be 100%.

The respondents were asked to identify the top three most important qualifications and/or skills for individuals who operate the electronic POS system. Nearly 60% ( $n = 187$ , 58.6%) of the respondents identified good customer service skills followed by computer proficiency

( $n = 164$ , 51.4%) and knowledge about NSLP payment and reimbursement ( $n = 154$ , 48.3%).

Two aspects of cash handling experiences, though not ranked as the top three, but also identified as important for SNP employees who use POS systems were the ability to count cash accurately ( $n = 144$ , 45.1%) and demonstration of high ethics ( $n = 92$ , 28.8%).

The skills and qualifications indicated in the data show that a variety of skills are needed for staff in contact with students in SNPs. SNP directors rated customer service skills as an important qualification for POS operators more often than computer proficiency. Fewer than 50% stated that cash handling accuracy (45.1%) and ethics (28.8%) were important skills. This finding was somewhat concerning because the great majority ( $n = 268$ , 84%; Table 4) of SNPs handle cash transactions in their operations. Cash handling skills may be recognized as less important than other skills because cash handling is performed by cafeteria managers ( $n = 185$ , 58.0%), cashiers ( $n = 139$ , 43.6%), or assistant managers ( $n = 46$ , 14.4%) (Table 18).

Table 18

*Point-of-Service Training Needs (n=298)*

Questions	<i>n</i>	% <sup>a, b</sup>
The top three most important qualifications and/or skills for individuals who operate the POS system		
Customer service skill	187	58.6
Computer proficiency	164	51.4
Knowledge about the NSLP payment and reimbursement system	154	48.3
Cash handling experience – accuracy	144	45.1
Cash handling experience – ethics	92	28.8
Previous experience in SN programs	89	27.9
Language skill (English)	28	8.8
Bookkeeping skill	17	5.3
Spanish or other language skill	9	2.8
For schools with cash transactions only ( <i>n</i> =255):		
The person(s) in charge of counting the cash received at the end of the day		
Cafeteria manager	185	58.0
Cashier	139	43.6
Assistant manager	46	14.4
Other	29	9.1
Administration	15	4.7
Bookkeeper	4	1.3
Accountant	3	0.9
District supervisor	2	0.6
No specific answers	5	1.6

<sup>a</sup>This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on total number of respondents (*n*=319).

Decades ago, technical skills relevant to the job content itself were considered the main criteria for employment, but soft skills (i.e., interpersonal and communication skills) have become increasingly important in today's society and are closely related to job performance



(Robles, 2014). It is not surprising that customer service was identified as the most important qualification for individuals who operate electronic POS systems to meet or exceed customer expectations.

Results also showed that employees who have good computer proficiency were desirable for operating the electronic POS system. Computer literacy is defined as the ability to understand and use software applications and share information. Thus, employees who are computer literate will be able to master the POS system within a shorter period of time (Sousa & Oz, 2009). Other qualifications identified, for instance, that knowledge about the NSLP and reimbursement were also critical, and participants indicated that employees were trained on POS systems during staff development training. Although language was not identified as a key skill for POS operators, in states with a diverse population, especially a large Spanish-speaking population, CN professionals commented that the ability to communicate in Spanish was important. Although less than 30% of the participants (28.8%) stated that ethics was an important qualification, as the majority (79.9%) of the SNPs handle cash or check payments at the POS (May et al., 2014), ethics should be considered an important quality for POS operators.

### **Training Provided to Key Personnel Involved in Paper-Based and Electronic Point-of-Service Systems**

The respondents were asked a series of questions to gain insight into the POS training environment in their school districts. The results showed that the district directors ( $n = 158$ , 49.5%) mainly provided the training themselves. In addition, POS system providers ( $n = 123$ , 38.6%) or another employee who had previously handled the POS system ( $n = 111$ , 34.8%) provided such training (Table 19).

Table 19

*Point-of-Service Training in School Nutrition Programs (n=298)*

	<i>n</i>	% <sup>a</sup>
Person who provided the POS training to employees <sup>b</sup>		
School nutrition director	158	49.5
The POS system provider	123	38.6
Another employee in the same position who has handled POS systems before	111	34.8
Another child nutrition management staff member (e.g., area coordinator) in our district	107	33.5
Staff or consultant from the state agency	9	2.8
Other	13	4.1
The frequency of training staff who are assigned to POS system operation <sup>b</sup>		
When the staff is newly assigned to be a cashier	225	70.5
At the beginning of each academic year	166	52.0
When switching to a new system	98	30.7
At the beginning of each semester	30	9.4
Other	24	7.5
As needed	14	4.4
Depends on review or process	2	0.6
Monthly	1	0.3
Requested by staff	1	0.3
No answer given	6	1.9
The form(s) of POS training employees receive <sup>b</sup>		
On-the-job training	286	89.7
Off-the-job, stand-alone training	105	32.9
Off-the-job, part of other training (such as state agency sponsored training)	27	8.5
Estimated length of POS training <sup>c</sup>		
Less than 1 hour	84	26.3
1 hour to <2 hours	84	26.3
2 hours to <3 hours	56	17.6
3 hours or longer	74	23.2

<sup>a</sup> Percentages were calculated based on total number of respondents (*n*=319).

<sup>b</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>c</sup> Due to missing data, the sum of percentages may not be 100%.

Most of the employees were trained on the POS system upon assignment as a cashier ( $n = 225$ , 70.5%) or at the beginning of each academic year ( $n = 166$ , 52.0%). A few CN professionals also indicated that training was provided “as needed” ( $n = 14$ , 4.4%), “as requested by the staff” ( $n = 1$ , 0.3%), or “depends on the review/process” ( $n = 2$ , 0.6%). On-the-job training was widely used ( $n = 286$ , 89.7%), followed by off-the-job, standalone training ( $n = 105$ , 32.9%). The length of training varied but was generally less than one hour ( $n = 84$ , 26.3%) or between one and two hours ( $n = 84$ , 26.3%). Close to 25% of the respondents indicated that their POS system training took three hours or longer ( $n = 74$ , 23.2%) (Table 19).

Results of the chi-square analysis showed that there was an association between the format of the training, training frequency, and training providers based on the number of students enrolled in the school districts. Off-the-job and standalone training was more likely to be conducted in large school districts compared to small school districts ( $\chi^2 = 14.62$ ,  $p < .001$ ) (Table 20). Large school districts were also more likely than small districts to train their staff when they were newly assigned as cashiers ( $\chi^2 = 13.58$ ,  $p < .001$ ) (Table 21), and another CN management staff member (e.g., area coordinator) in the district was more likely to get involved in providing training in a large school district than in a small district ( $\chi^2 = 66.60$ ,  $p < .001$ ) (Table 22).

Table 20

*The Format of Point-of-Service Training Compared Between Small (n=159) and Large (n=138) School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
On-the-job training	151	95.0	134	97.1	0.87
Off-the-job, stand-alone training	40	25.2	64	46.4	14.62***
Off-the-job, part of other training	15	9.4	12	8.7	0.05

\*\*\*  
 $p < .001$

Table 21

*The Occasions of Point-of-Service System Operation Training Compared Between Small (n=159) and Large (n=138) School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
When switching to a new system	45	28.5	52	37.7	2.83
At the beginning of each semester	11	7.0	18	13.0	3.08
At the beginning of each academic year	82	51.9	83	60.1	2.03
When the staff is newly assigned to be a cashier	106	67.1	118	85.5	13.58***

\*\*\*  
 $p < .001$

Table 22

*Person in Charge of Point-of-Service Training between Small (n=158) and Large (n=138) Sized Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
School nutrition director	89	56.3	69	50.0	1.19
The POS system provider	65	41.1	57	41.3	0.00
Another employee in the same position who has handled POS systems before	45	28.5	65	47.1	10.94**
Another child nutrition management staff member (e.g., area coordinator) in our district	23	14.6	83	60.1	66.60***
Staff or consultant from the state agency	7	4.4	2	1.4	2.0

Table 23

*Free and Reduced-Price Meal Application (n=294)*

	<i>n</i>	% a,b
Use of only paper-based F-RP meal application	175	54.9
Use of both paper-based and online F-RP meal application	106	33.2
Use of only online F-RP meal application	13	4.1

<sup>a</sup> Percentages were calculated based on total number of respondents (n=319). Due to missing data, the sum of percentages may not be 100%.

<sup>b</sup> Percentages were calculated based on total number of respondents (n=319).

Based on the results, POS training seems to be more prevalent and common compared to other types of training (e.g., food safety and food allergies) in SNPs (Lee, Kwon, & Sauer, 2014; School Nutrition Association [SNA], 2011), which reflects the importance of the POS system in SNP operations. The frequency of training related to the POS system varied based on the school district, but generally, staff who handled POS systems were trained when they were newly hired as cashiers and at the beginning of each school year. On-the-job training appeared to be the most common training method, which was consistent with other training-related research conducted in SNP settings (Lee et al., 2014).

Results showed that the size of the school district affected various aspects of POS systems in SNPs. For instance, the large school districts (>2,500 students) were more likely to have an electronic POS system, provide off-the-job and stand-alone training, and have other CN management staff (e.g., area coordinators) in the district who were in charge of training the new cashiers compared to small districts. These results may indicate that CN professionals in large districts have more funding to purchase an electronic POS system. In addition, they may also have more sources and expertise to conduct training.

### **Free and Reduced-Price Meal Application and Income Verification Practices in School Nutrition Programs in the United States**

After the section on the questionnaire that asked about detailed practices concerning POS systems, respondents were asked about F-RP and verification processes because a large proportion of errors were due to certification errors and mistakes in reported parent income (United States Department of Agriculture [USDA], 2015a). The overall summary and flow of information regarding the F-RP meal application process is described in Figure 1 for paper-based and online application and verification procedures. The majority ( $n = 281$ , 88.1%) of the school

districts used paper-based F-RP meal applications. Of those districts, 175 (54.9%) accepted only paper-based F-RP meal applications, and 106 (33.2%) used paper-based and online applications. Thirteen SNPs (4.1%) accepted only online F-RP meal applications (Table 23).

Figure 1

*Process of Paper-Based Free and Reduced-Price Meal Applications*

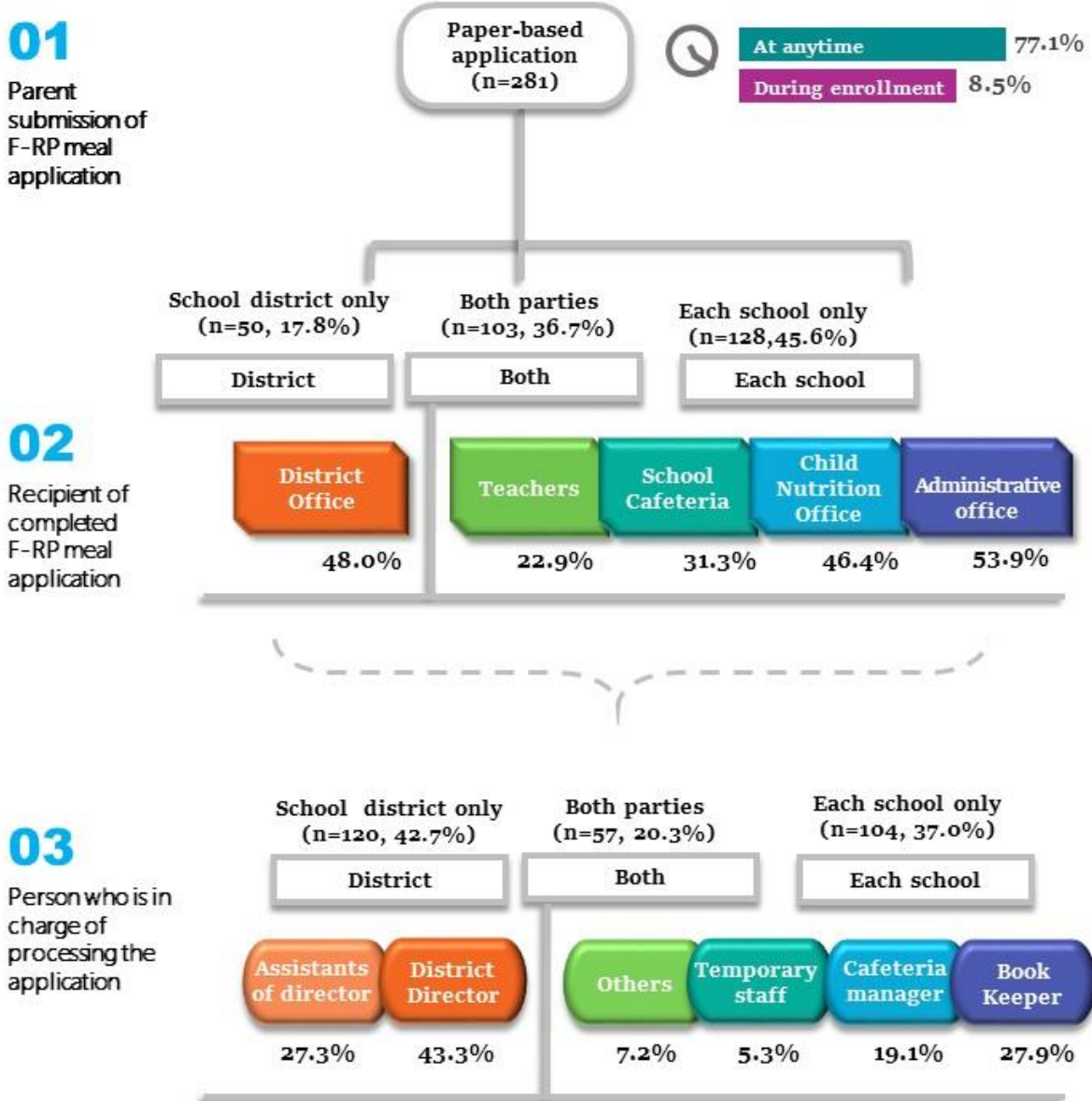
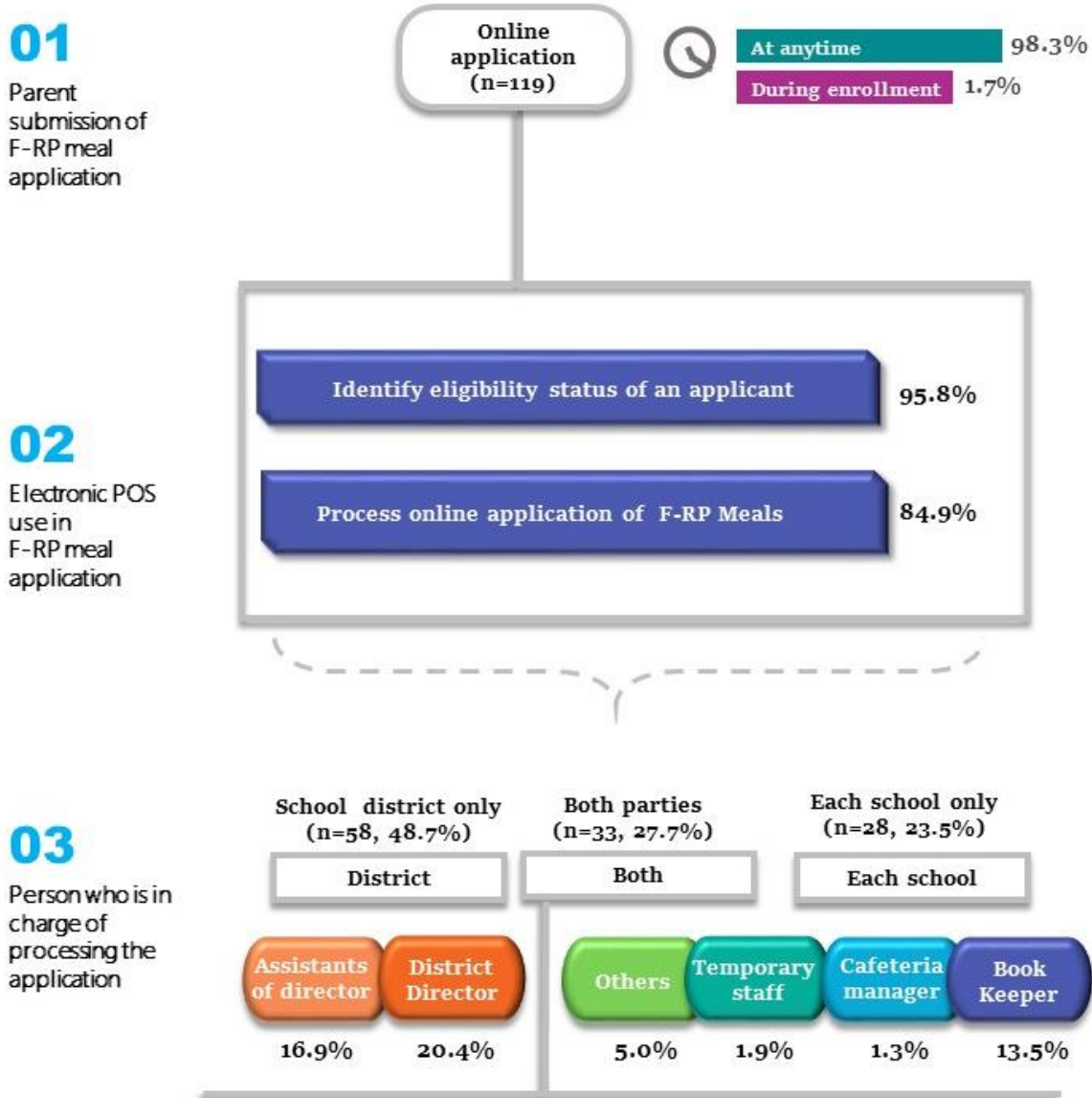




Figure 2

*Process of Online Free and Reduced-Price Meal Applications*



**Free and Reduced-Price Meal Application Submission**

School districts with more than 2,500 enrolled students were more likely to offer an online F-RP meal application platform (Table 24). Although the great majority of small districts (82.7%) accepted only paper-based F-RP meal applications, only 33.3% of the large school districts did. The majority of the large school districts (59.4%) allowed parents to submit either paper-based or online F-RP meal applications. Chi-square analysis showed a significant difference in the distribution of responses between small and large school districts ( $\chi^2 = 254.53, p < .001$ ).

Table 24

*Types of Free and Reduced-Price Meal Applications Used in Small (n=156) and Large (n=138) Sized Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Use of paper-based F-RP meal application only	129	82.7	46	3.3	254.53***
Use of both paper-based and online F-RP meal application	24	15.4	82	9.4	
Use of online F-RP meal application only	3	1.9	10	.2	

\*\*\*  $p < .001$

It is plausible that an online platform for F-RP meal applications provides parents with convenience for submitting the meal application and SNP staff with efficient data entry and record keeping without double handling of information. However, such a system requires financial resources and human resources to maintain. This may partially explain why more large school districts used online F-RP meal application systems. Large school districts may also be

inclined to invest resources in an online application system because they have to process many more applications each year or semester than do small school districts.

Details about the F-RP meal application processes are included in Table 25. Once applications are completed, parents may bring the form to the administrative office at each school ( $n = 172$ , 53.9%), the district office ( $n = 153$ , 48.0%), or the CN office at each school ( $n = 148$ , 46.4%). Some school districts allowed parents or students to submit the application to cafeteria employees ( $n = 100$ , 31.3%) or to teachers ( $n = 73$ , 22.9%). Although teachers and foodservice employees may be convenient options for parents or students to submit the application, it is concerning that confidential information is being handled by multiple individuals.

Table 25

*Application Process Identified by Users of Paper-Based Free and Reduced-Price Meal Applications (n=281)*

Questions	<i>n</i>	% <sup>a</sup>
Place/person(s) where the completed paper F-RP meal application forms could be submitted <sup>b</sup>		
Administrative office at each school	172	53.9
District office	153	48.0
Child nutrition office at each school	148	46.4
The cafeteria employees	100	31.3
Teachers	73	22.9
Person(s) who is(are) in charge of processing the paper-based application forms <sup>b</sup>		
District director	138	43.3
Book keeper or secretary	89	27.9
Assistants of the district SNP director	87	27.3
Cafeteria managers at school	61	19.1
Temporary staff only hired during enrollment time	17	5.3
Other	23	7.2
Foodservice clerk	10	3.1
Administration/HR/Education Dept.	8	2.5
Principal	2	0.6
No specific answer	3	0.9
Period when a parent submits a paper-based F-RP meal application		
At anytime	246	77.1
During enrollment	27	8.5
Other	8	2.5

<sup>a</sup> Percentages were calculated based on total number of respondents (*n*=319).

<sup>b</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

Once the paper-based F-RP meal applications were accepted, district directors ( $n = 138, 43.3\%$ ), bookkeepers or secretaries ( $n = 89, 27.9\%$ ), or assistants to district SNP directors ( $n = 87, 27.3\%$ ) processed the paper-based applications (Table 25). In some cases, temporary staff members were hired to process F-RP meal applications during the enrollment period ( $n = 17, 5.3\%$ ). Many directors who participated in the interviews or site visits voiced how labor intensive this processing was at the beginning of each school year. The fact that almost three out of every four students receive F-RP lunches (72.1% F-RP meal NSLP participants) (USDA, 2016a) contributes to the massive amount of paperwork that must be completed each year.

Completed paper-based applications were accepted either at any time ( $n = 246, 77.1\%$ ) or during the enrollment period ( $n = 27, 8.5\%$ ). As school district size increased, schools that accepted paper-based F-RP meal applications at any time increased significantly, whereas a greater number of small districts accepted meal applications only during the enrollment period ( $\chi^2 = 9.03, p < .05$ ); see Table 26. In large school districts, more diverse groups of employees accepted the completed paper-based F-RP meal applications, such as employees in the district office, teachers, cafeteria employees, and employees in the administrative office at each school, compared to small districts (Table 27). Further, SNPs in large school districts were significantly more likely to hire temporary staff to help with paper-based enrollment compared to small districts ( $\chi^2 = 21.32, p < .001$ ) (Table 28).

Table 26

*Paper-Based Free and Reduced-Price Meal Application Period Between Small (n=152) and Large (n=129) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
At anytime	126	82.9	120	93.0	9.03*
During enrollment	22	14.5	5	3.9	
Other	4	2.6	4	3.1	

\*  $p < .05$

Table 27

*Person Who Receives the Completed Paper-Based Free and Reduced-Price Meal Application Forms Between Small (n=152) and Large (n=129) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Child nutrition office at each school	79	52.0	69	53.5	0.06
District office	58	38.2	95	73.6	35.43***
Teachers	27	17.8	46	35.7	11.62**
The cafeteria employees	39	25.7	61	47.3	14.24***
Administrative office at each school	83	54.6	89	69.0	6.08*

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 28

*Person Who Is in Charge of Processing the Completed Paper-Based Free and Reduced-Price Meal Applications Between Small (n=152) and Large (n=129) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	n	%	n	%	
District director	66	43.4	72	55.8	4.29*
Bookkeeper or secretary	37	24.3	52	40.3	8.22**
Assistants of the district director	22	14.5	65	50.4	42.11***
Cafeteria managers at school	42	27.6	19	14.7	6.84**
Temporary staff only hired during enrollment time	0	0.0	17	13.2	21.32***

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

As previously addressed, the SNP budgets in large districts tend to be greater as the SNP budget often depends on the students enrolled and who participate in the NSLP. Proportional to the number of students enrolled, a large school district has a larger total amount of work including paperwork and documentation. As May et al. (2014) reported, only 48.2% of the directors in small districts (i.e., enrollment of 999 or fewer students) and 75.4% of the directors in medium-sized districts (i.e., enrollment of 1,000–4,999 students) had full-time appointments. Many of these directors have multiple responsibilities beyond administrative roles. Data from the current study somewhat reflect how these “seasonal tasks” (i.e., processing F-RP meal applications) are handled in SNPs with different sizes.

The responses to *online* F-RP meal applications are shown in Table 29. Of the 119 respondents who used online F-RP meal applications, the majority (117, 98.3%) of the schools

indicated that online F-RP meal applications were accepted and processed at any time. Similar to the process for paper-based applications, district directors ( $n = 65, 54.6\%$ ) and assistants to school directors ( $n = 54, 45.4\%$ ) were in charge of meal applications. In the majority ( $n = 96, 80.7\%$ ) of these schools, letters or e-mails were generated to inform parents about the status of online F-RP meal applications.

Table 29

*Application Process Identified by Users of Online Free and Reduced-Price Meal Applications (n=119)*

Questions	<i>n</i>	<i>%<sup>a, b</sup></i>
How F-RP meal applications are being received and processed online		
Parents complete the online application form at any time	117	98.3
Parents complete the online application form during enrollment	2	1.7
The person(s) in charge of F-RP meal application		
District director	65	54.6
Assistants of the district director	54	45.4
Bookkeeper or secretary	43	36.1
Temporary staff only hired during enrollment time	6	5.0
Cafeteria managers at school	4	3.4
Other	16	13.4
Software/network technician	2	1.7
No specific answer	14	11.8
How parents receive the status of online F-RP meal application		
Letters or e-mails are generated to inform parents of eligibility status	96	80.7
Parents receive mailed-in notification	44	37.0
Parents receive e-mail notification	30	25.2

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on total number of respondents ( $n=119$ ).



As Table 30 shows, there was no difference in the period for accepting *online* F-RP meal applications by school district size. In addition, no significant difference was found in employees who were in charge of processing completed online F-RP meal applications by school district size (Table 31). The method for notifying parents about the status of online F-RP meal applications did not significantly differ by school district size (Table 32). These findings indicate that it is not the size of the student enrollment but the platform of the F-RP meal application system (e.g., online or paper-based applications) that influence personnel, the timing of F-RP meal applications accepted, and how the personnel communicate the results of applications to parents. In the case of paper-based F-RP meal applications, significant differences were found between small and large school districts in the application period, staff who received the form, and the persons who processed the completed form.

Table 30

*The Period of Online Free and Reduced-Price Meal Applications Received Between Small (n=26) and Large (n=93) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )	
	<i>n</i>	%	<i>n</i>	%
Parents complete the online application form at any time	24	92.3	93	100.0
Parents complete the online application form during enrollment	2	7.7	0	0.0

Table 31

*Person Who Is in Charge of Processing the Completed Online Free and Reduced-Price Meal Application Forms Between Small (n=26) and Large (n=93) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
District director	14	53.8	51	54.8	3.52
Assistants of the district director	9	34.6	45	48.4	1.56
Bookkeeper or secretary	6	23.1	37	39.8	2.46
Temporary staff only hired during enrollment time	0	0	6	6.5	1.77
Cafeteria managers at school	2	7.7	2	2.2	1.92

Table 32

*How Parents Receive the Status of Online Free and Reduced-Price Meal Applications Between Small (n=26) and Large (n=93) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Letters or e-mails are generated to inform parents of eligibility status	14	53.8	51	54.8	1.23
Parents receive e-mail notification	9	34.6	45	48.4	1.70
Parents receive mailed-in notification	2	7.7	2	2.2	0.41

### **Free and Reduced-Price Meal Application Verification**

Table 33 shows that in order to select the required 3% sample for F-RP meal application verification, the majority ( $n = 228, 71.5\%$ ) of participants used electronic point-of-service systems and Error Prone software ( $n = 23, 7.2\%$ ). The majority ( $n = 210, 65.9\%$ ) of the participants indicated the current verification process was adequate for determining eligibility. However, 9.7% of participants perceived the current verification system as inadequate, because parents might omit some of the income documentation ( $n = 22, 6.9\%$ ), the parents' response rate is low ( $n = 6, 1.9\%$ ), the verification process is too cumbersome ( $n = 5, 1.6\%$ ), and the 3% random checking is insufficient ( $n = 5, 1.6\%$ ). There was no significant difference in the perception regarding the current verification process between small and large school district schools. However, compared to SNP directors in small school districts who reported that the current verification system was inadequate, the more SNP directors in large school districts indicated that the current verification is too cumbersome.

Table 33

*Income Eligibility Verification (n=301)*

	<i>n</i>	% <sup>a</sup>
How to select the required 3% sample for verification for the F-RP meal application		
POS system	228	71.5
Error prone	23	7.2
State	3	0.9
Student database	3	0.9
Another party	2	0.6
The perception regarding the current verification process for identifying students' eligibility ( <i>Mean ± Standard Deviation = 3.81 ± 1.04</i> ) <sup>b</sup>		
Very inadequate	14	4.4
Inadequate	17	5.3
Neither/undecided	60	18.8
Adequate	130	40.8
Very adequate	80	25.1
For people who reply current verification process is very inadequate or inadequate only ( <i>n=31</i> ): Reason why verification process is inadequate <sup>c</sup>		
Parents might omit some of the income documentation	22	6.9
Parents' response rate is low	6	1.9
The verification process is too cumbersome	5	1.6
3% random checking is insufficient	5	1.6
Which of the following do you ask to be submitted for income eligibility verification <sup>c</sup>		
Pay stubs	280	87.8
Award letters from other agencies (SNAP) indicating their eligibility to receive services	236	74.0
Support payment decrees from courts	195	61.1
Tax report	194	60.8
Other	42	13.2

<sup>a</sup> Percentages were calculated based on total number of respondents (*n=319*).

<sup>b</sup> The rating scale was a 5-point Likert-type ranging from 1 (very inadequate) to 5 (very adequate).

<sup>c</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

In response to certification process errors in the NSLP and the SBP, the CN and WIC Reauthorization Act of 2004 (P.L. 108-265) strengthened the rules for processing certification and eligibility verification (USDA, 2015a). Examples of these actions included increasing household response to requests for application verification, developing methods for strengthening program compliance, and establishing professional standards for SNP employees.

Participants were asked to choose the type of documents they accepted to verify income eligibility. As Table 33 indicates, the majority (87.8%) of participants reported that they accepted pay stubs as acceptable documentation for income verification, followed by award letters from other agencies such as SNAP (74.0%), and support payment decrees from courts (61.1%). In large districts, a larger variety of documents were accepted whereas in small districts, 30 (18.6%) participants accepted only a single type of verification document (12.4%) or did not ask for verification documents (6.2%;  $\chi^2 = 21.08, p < .01$ ); Table 34. Of the 17 respondents who indicated they accept pay stubs only for income verification, 15 SNPs were small districts, and two were large districts (Table 35). An independent sample *t*-test also revealed that the total number of verification documents accepted was significantly different between small ( $2.87 \pm 1.29$ ) and large ( $3.44 \pm 0.99$ ) districts ( $t = 4.31, p < 0.001$ ).

Table 34

*Sum of Verification Documents Each School District Accepts Between Small (n=161) and Large (n=139) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
0	10	6.2	3	2.2	21.08**
1	20	12.4	2	1.4	
2	22	13.7	16	11.5	
3	42	26.1	38	27.3	
4	63	39.1	70	50.4	
5	4	2.5	10	7.2	

\*\* $p < .01$

Table 35

*Type of Verification Documents Accepted by Small (n=30) and Large (n=5) Sized School Districts Where One or No Document Is Received*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )	
	<i>n</i>	%	<i>n</i>	%
Nothing	10	33.3	3	60.0
Paystub only	15	50.0	2	40.0
Award letter only	3	10.0	0	0.0
Tax report only	2	6.7	0	0.0

\*\* $p < .01$

When using one form of documentation for verification purposes, directors of SNPs may need to choose a type of document that is inclusive of all income sources of households (i.e., SNAP award letter or tax reports). If pay stubs are the only form that is accepted, there may be more possibility for parents to omit a part of the household income, resulting in over-certification. Further, 10 directors from small SNPs and three from large SNPs reported that they did not require any income verification documents. Some of the directors indicated that they use an “honor system.” While researchers cannot confirm that these SNPs truly do not follow verification requirements set by the USDA, this finding is of concern if, in fact, this is representative of practice in any district.

Only 74% of directors who responded to the survey indicated that they used direct certification through SNAP. The USDA Food and Nutrition Service (2015) reported that 87% of school-age SNAP participants were directly certified. Although data in the current study seem to indicate a lower rate than 87%, percentages of students who were directly certified among all

eligible students were not measured. Instead, the percentage of directors who utilized direct certification was measured. Therefore, data from the current study cannot be compared with previously published data in this regard.

### **Identification of Reimbursable Meals**

Respondents were asked to indicate how students were identified in their school districts and also how staff members identify whether students receive F-RP or full-price meals (Table 36). Multiple methods of student identification were used in each district. The majority of schools ( $n = 2,743$ , 87.2% of 3,144 schools represented by our 319 respondents) used number pads using which students entered their school identification number or personal identification number at the POS.



Table 36

*Methods of Identifying Students at Point-of-Service of All Schools Represented (n<sup>a</sup> = 3,144)*

<b>Student Identification Methods</b>	<b><i>n</i></b>	<b><i>%</i><sup>b</sup></b>
Students enter ID or PIN numbers	2,743	87.2
Staff scans the barcode	1,771	56.3
Students tell the cashier their names	1,299	41.3
Students tell the cashier their ID or PIN numbers	737	23.4
Staff checks off the roster	438	13.9
Students touch the finger print reader	88	2.8
Other	93	3.0

<sup>a</sup> The total number of schools represented in the data is 3,144 schools.

<sup>b</sup> Percentages were calculated based on total number of schools represented in the data ( $n = 3,144$ ).

Approximately two thirds of SNP directors ( $n = 185$ , 58.0%) indicated that their employees who handle the POS systems were aware of which students received F-RP versus full-price meals. In most cases ( $n = 125$ , 39.2%), the meal type was displayed as a code number on the screen of the POS system. An additional 38 (11.9%) directors reported that their employees recognized students who receive benefits by the POS system that displayed details about student status (Table 37).

Table 37

*Methods of Identifying Free and Reduced-Price Meal Recipients at the Point-of-Service (n = 185)*

<b>Free and Reduced-Price Meal Recipient Recognition</b>	<b><i>n</i><sup>a</sup></b>	<b>%<sup>b</sup></b>
The cashier’s screen displays a code number for each meal type	125	39.2
The cashier’s screen indicates the details	38	11.9
We have a small number of students, and our staff members are aware who received F-RP meals	12	3.8
The student roster indicates the details	8	2.5
Other	1	0.3

<sup>a</sup> Represents number of respondents who indicated that their POS operators knew whether students receive free or reduced-price meals.

<sup>b</sup> Percentages were calculated based on the total number of respondents (n=319).

As shown in Table 38, the majority of CN professionals indicated that all employees are trained to identify reimbursable meals (*n* = 228, 71.5%). Directors of SNPs (*n* = 238, 74.6%) and other management staff members in the district (*n* = 122, 38.2%) provided reimbursable meal training. More than 80% of schools (*n* = 267, 83.7%) delivered on-the-job training for recognizing reimbursable meals at the beginning of each academic year (*n* = 210, 65.8%). These results are displayed in Table 39.

Table 38

*People Who Are Trained to Identify Reimbursable Meals (n=294)*

	<i>n</i>	<i>%<sup>a</sup></i>
All employees	228	71.5
Cashier who will use the POS system only	50	15.7
Other	16	5.0
Manager	5	1.6
Director/coordinator	5	1.6
Lead cook	1	0.3
Student worker	1	0.3
No specific answer	4	1.3

<sup>a</sup> Percentages were calculated based on total number of respondents (*n*=319). Due to missing data, the sum of percent may not be 100%.

Table 39

*Reimbursable Meal Training (n=294)*

Questions	<i>n</i>	% <sup>a</sup>
Person who provides the training		
School nutrition director	238	74.6
Another management staff member (e.g., area coordinator) in our district	122	38.2
Another employee in the same position	68	21.3
State consultants	55	17.2
Other	23	7.2
Workshops/class at ESC	7	2.2
Service center	3	0.9
Web site	2	0.6
No specific answer	11	3.4
The format of the training on reimbursable meal delivered		
On-the-job training	267	83.7
Off-the-job, stand-alone training	151	47.3
Off-the-job, part of other training (such as state agency sponsored training)	100	31.3
Frequency of reimbursable meal training for SN staff		
Monthly	3	0.9
Each semester	50	15.7
Each year	210	65.8
When the staff is newly assigned to be a cashier	188	58.9
When switching to a new POS system	41	12.9
Other	41	12.9
As needed	23	7.2
During designed training session	4	1.3
As requested by staff	2	0.6
Based on reviews and process	2	0.6
After new legislation	2	0.6
No specific answer	8	2.5

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on total number of respondents (*n*=319).

When the personnel who were trained to identify reimbursable meals were evaluated, significantly more directors in large SNPs indicated that all employees are trained to identify reimbursable meals ( $n = 119$  of 137, 86.9%) compared to small districts ( $n = 108$  of 156, 69.2%;  $\chi^2 = 13.61, p < .01$ ); see Table 40. Although the number of staff was expected to be smaller in small districts compared to large districts, this finding was a bit unexpected. Cross-training of employees in any foodservice organization extends coverage during staff shortages, and therefore, the directors of small SNPs may need to be encouraged to cross-train their employees. If more employees are trained to identify reimbursable meals, more employees may monitor SNP operations for potential mistakes.

Table 40

*Personnel Who Are Trained to Identify Reimbursable Meals Between Small ( $n=156$ ) and Large ( $n=137$ ) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
All employees	108	69.2	119	86.9	13.61**
Cashier who will use the POS system only	35	22.4	15	10.9	
Other	13	8.3	3	2.2	

\*\* $p < .01$ .

Table 41 also shows differences between small and large school districts regarding who provides reimbursable meal training. It was expected that small districts depend more on state consultants (25.0% in small districts vs. 11.7% in large districts) and large districts on other district management staff such as area coordinators (22.4% in small districts vs. 62.8% in large districts). However, a bit counterintuitively, the results showed that 33.6% of the large district

SNP directors reported that the training was conducted by other employees who hold the same position as the trainees, while only 14.1% of small district directors reported the same. This may be partially due to the greater number of employees in large SNPs where more senior members may provide training. Nonetheless, directors in small SNPs and state agencies may need to monitor training content to ensure that it is up to date and accurate, especially if the training is provided by SN employees.

Table 41

*Personnel Who Provide the Reimbursable Meal Training Between Small (n=156) and Large (n=137) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
School nutrition director	125	80.1	113	82.5	0.27
Another management staff member (e.g., area coordinator) in our district	35	22.4	86	62.8	48.96 <sup>***</sup>
Another employee in the same position	22	14.1	46	33.6	15.52 <sup>***</sup>
State consultants	39	25.0	16	11.7	8.49 <sup>**</sup>

<sup>\*\*</sup> $p < .01$ , <sup>\*\*\*</sup> $p < .001$

Table 42 shows that the format of training for reimbursable meals differed significantly depending on the size of the school district ( $\chi^2 = 21.38, p < .001$ ). For reimbursable meal training, offering only on-the-job training reached almost 40% in small school districts but was only 21.9% in large school districts. The majority (73.0%) of the CN professionals in large school districts delivered training on reimbursable meals using both on-the-job and off-the-job formats.

Findings from a previous study (Lee et al., 2014) revealed a lack of consistency in training, especially in small schools, because these schools may opt for only “on-the-job training.” In the current study, most schools in small districts used both on-the-job and off-the-job training formats (49.4%). However, small schools were more likely to provide only on-the-job training (38.5%) compared to large districts, 73% of which provided both on-the-job and off-the-job training.

One of the major causes of improper payments in the NSLP and the SBP is meal-claiming errors that happen when employees inaccurately recognize non-reimbursable meals as reimbursable (USDA, 2015a). The School Nutrition Specialist credential program contains human resource management guidance that enables SN managers to train SN staff (SNA, 2015). The results of this study further confirm the need for ongoing, inclusive training for SNP staff on reimbursement meal identification and counting. The new Healthy, Hunger-Free Kids Act of 2010 specifically indicated the consequences of incorrect meal counts and incorrect certification of F-RP meal recipients.

Table 42

*The Format of Training on Reimbursable Meals Delivered Between Small (n=156) and Large (n=137) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Only on-the-job training	60	38.5	30	21.9	21.38***
Only off-the-job, stand-alone training	10	6.4	7	5.1	
Only off-the-job, part of other training	9	5.8	0	0.0	
Both on-the-job and off-the job training	77	49.4	100	73.0	

\*\*\* $p < .001$

Table 43 indicates that the majority of small and large school districts provide *training* once a year. Respondents indicated all occasions when reimbursable meal training was provided. A significant difference was found if the school districts provided reimbursement meal training “when the staff is newly assigned to be a cashier.” Although 77.2% of the directors of large SNPs indicated that they provided training for new cashiers, only 52.2% of the directors of small SNPs indicated they did. Further, only 67.1% of directors in small SNPs indicated that they trained newly assigned cashiers, while 85.5% of large SNPs reported so (Table 44). According to May et al. (2014), counting and monitoring reimbursable meals are very important tasks, and almost all participants (92% or higher) indicated that they provided training in reimbursable meal recognition and counting. Directors of small SNPs may need to be encouraged to provide this training more often to the person who operates the POS system and works as a cashier.



Table 43

*Frequency of Regular Training for Reimbursable Meals Between Small (n=156) and Large (n=137) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
Monthly	0	0.0	3	2.2	3.50
Each semester	19	12.1	31	22.8	5.89*
Each year	110	70.1	99	72.8	0.27
When the staff is newly assigned to be a cashier	82	52.2	105	77.2	19.69***
When switching to a new POS system	20	12.7	21	15.4	0.44

\* $p < .05$ , \*\*\* $p < .001$

Table 44

*The Frequency of Reimbursable Meal Training between Small (n=159) and Large (n=138) Sized School Districts*

	Small ( $\leq 2,500$ )		Large ( $> 2,500$ )		$\chi^2$
	<i>n</i>	% <sup>a</sup>	<i>n</i>	% <sup>a</sup>	
When switching to a new system	45	28.5	52	37.7	2.83
At the beginning of each semester	11	7.0	18	13.0	3.08
At the beginning of each academic year	82	51.9	83	60.1	2.03
When the staff is newly assigned to be a cashier	106	67.1	118	85.5	13.58***

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

\*\*\*  $p < .001$

The responses to recognizing reimbursable meals are listed in Table 45. More than two thirds of SNPs (68.7%) offered à la carte service for students. The majority of respondents ( $n = 199, 62.4%$ ) indicated that students chose reimbursable meals by themselves. When students missed one or more components of reimbursable meals, 51.4% ( $n = 164$ ) of the directors of SNPs reported that they sent the students back to the line to get the missing items but that items were charged à la carte if the students refused to get the missing items (Table 46). Because each reimbursable meal brings government funding and the accuracy of meal reporting is very important for SNPs, sending students back to the line may be the best way to maintain the requirements. However, the amount of food waste is of concern should students be forced to select an item that they would not choose if they had a choice. Continuing nutrition education

and improving food quality and acceptability may make the complete reimbursable meals more attractive to students who would not choose all components. Ultimately, students will receive nutritious and balanced meals through SNPs.

Table 45

*Reimbursable Meal Recognition (n=295)*

Questions	<i>n</i>	%
Do you offer à la carte service for your students		
Yes	219	68.7
No	76	23.8
Do SN staff members pre-assemble reimbursable meals for students		
Yes, we assemble meals for everyone	42	13.2
No, students choose by themselves	199	62.4
It depends, we assemble meals for some students	54	16.9
For CNPs who pre-assemble in specific situations only ( <i>n</i> =54):		
Situations when staff members pre-assemble meals		
Pre-k	13	4.1
Elementary	7	2.2
9th to 12th grade	2	0.6
Special needs	5	1.6
Breakfast	2	0.6
Special menu, cold, bowl	6	1.9
Field trips	4	1.3
Grab and go	5	1.6
Transfer to alternative learning environment	2	0.6
Speed line	1	0.3
No specific answer	7	2.2

<sup>a</sup> Percentages were calculated based on total number of respondents (*n*=319).

Table 46

*Reimbursable Meal Recognition (n=295)*

	<i>n</i>	% <sup>a,b</sup>
Send students back to the line to get missing items. But if they refuse, the items are charged à la carte	164	51.4
Send students back to the line to get “missing” items. (Students have no choice but bring additional items to make a reimbursable meal)	95	29.8
Send students back to the line to get missing items. But if they refuse, charge full price, but we do not report as a reimbursable meal	24	7.5
Other	16	5.0
Cashier provides the missing item at registration	10	3.1
Staff makes sure that everyone gets the items	1	0.3
No specific answer	5	1.6

<sup>a</sup> This is a multiple response question; therefore the total percentage of responses for this question exceeds 100%.

<sup>b</sup> Percentages were calculated based on total number of respondents (*n*=319).

## **SUMMARY AND CONCLUSIONS**

This study explored detailed activities and personnel involved in point-of-service (POS) system operation and free or reduced-price (F-RP) meal application procedures in school nutrition programs (SNPs) across the United States (U.S.). Researchers identified sequential flow of information, activities, and personnel in both paper and electronic POS systems and F-RP meal application procedures. In addition, the key personnel involved in paper-based and electronic POS systems and their skill levels, roles, and responsibilities were identified. The training provided to key personnel involved in a variety of POS systems (such as length of individual training activities, frequency of training activities related to POS systems and reimbursable meal identification, and the content of the training activities) were explored. Finally, operational challenges for POS system and F-RP meal application procedures were identified, and differences in findings between small- and large-sized school districts were analyzed.

The United States Department of Agriculture (USDA) does not specify how SNPs must keep track of meal counts at the POS because different circumstances within each SNP make it difficult for any government entity to identify technologies that meet each school's needs (May et al., 2014). A variety of POS systems were used in the 14 states studied in this research, and certain software was used in more SNPs than in others. There may be specific characteristics and reasons why individual SNPs choose their POS systems, although this project did not explore similarities and differences between POS systems. Beyond completing transactions at the cafeteria, SNP directors used POS systems for generating and transmitting sales summaries, managing student accounts, and identifying eligibility for F-RP meals. In addition, some

directors used the POS systems to generate a 3% random sample of parents for eligibility verification.

Results indicated that there were some differences in POS systems use and POS training between school districts of different sizes. Child nutrition (CN) professionals in small school districts, whether they are using electronic or paper-based POS systems, may find ways to properly train their employees to conduct transactions according to the rules and regulations of the USDA, Food and Nutrition Service (FNS). Funding may be limited in small school districts, and therefore, the CN professionals may seek opportunities for training offered by their state agency and professional association meetings at the state and national levels. For instance, the Alaska Department of Education and Early Childhood provides specific training related to point-of-service counting and claiming. All acceptable paper-based and electronic meal counting systems are explained during the training, in addition to providing specific instructions for how the meals should be tracked (Alaska Department of Education and Early Development, 2013). The Florida Department of Agriculture and Consumer Services also provides free, instructor-led training related to meal counts and POS systems to CN professionals in order to enhance SNP staff's understanding of these topics (Florida Department of Agriculture and Consumer Services, 2016).

Considering that certification errors are the most prevalent type of error (80% of all errors), and that such errors result in excessive benefit pay outs (USDA, 2015a), SNPs need to practice due diligence when receiving and processing paperwork. However, the huge number of applications and lack of human resources common in SNPs may make it difficult to process applications and verify them correctly.

An important suggestion for reducing these errors may be providing training programs and building professional standards for SNP directors and staff. The HHFKA of 2010 now includes methods for improving the accuracy of the certification process (USDA, FNS, 2016), and the USDA FNS requires professional standards that include education, training, and certification to be established for SNP staff (May et al., 2014). The new School Nutrition Specialist (SNS) Credential Program, which reflects USDA professional standards, includes program management and accountability training for accurate meal application and verification, as well as teaching the district reporting structure (SNS, 2015).

## **Sequential Flow of Information, Activities, and Personnel with Paper-Based and Electronic Point-of-Service Systems and Free and Reduced-Price Meal Application Procedures**

### ***Point-of-Service Systems***

Before conducting the study, the researchers intended to identify the sequential flow of activities for POS system operation. However, the findings related to the flow of information were not insightful or varied among different systems. Once information is made available on paper-based or electronic POS systems, students identified themselves at the POS. Information was then compiled automatically (electronic POS) or manually (paper-based), and submitted to the district office. At the end of each month, CN professionals reported the numbers of reimbursable meals and F-RP meals to their state agencies. Some SNPs required parents to prepay but others sent parents payment requests periodically. Most SNPs requiring prepayment accepted cash and check, although a significant number of programs allowed parents to pay using an online payment system. A small number of SNPs did not require any payments from parents as the programs were completely subsidized by the district or the local government.

### ***Free and Reduced-Price Meal Application Procedures***

Participants reported that the applications for F-RP meal eligibility were completed using paper-based or online systems. While the majority of SNPs accept only paper-based F-RP meal applications, a significant number of SNPs allowed both paper-based and online F-RP meal applications. Among school districts that accepted paper-based applications, many directors were concerned about the time- and resource-intensive nature of processing and verification of applications. Some SNPs (particularly the larger SNPs), employed temporary workers to help process the large volume of data at the beginning of the academic year. Multiple individuals at schools, districts, and SNPs were responsible for collecting paper-based application forms, which raises concerns regarding data confidentiality and increases the risks of meal application forms being lost or misplaced (Education Management Systems, Inc., 2016).

For SNPs where online applications were accepted, the sequential processes were much simplified as parents entered information directly without going through a variety of personnel who may receive the information from students or parents and pass it on to SNP staff. In addition, more SNPs using online F-RP meal application systems accepted the application at any time than those accepting paper-based applications.

### **Key Personnel Involved in Point-of-Service System Operation**

To maximize the effectiveness of POS systems, SNP directors must select and train employees who can ethically and accurately process transactions and use the system effectively. SNP directors had different approaches to selecting employees to operate the POS system. There was no consensus on the minimum requirements for POS handlers, with the result that employees possessed different skill levels. Results further showed that both soft (i.e., customer service) and technical skills (i.e., computer proficiency) were considered important for



employees who work with POS systems. SNP directors also had different approaches to selecting employees who would operate the POS system. While some CN professionals used literacy and numeracy tests to ensure that they hired qualified individuals, others hired employees who had computer and cashiering skills. A few simply stated “we hired anybody” and would provide training to ensure the employees master the necessary skills. To maximize the effectiveness of POS systems, SNP directors may need to select employees who can effectively and ethically process POS transactions.

### **Training Provided to Key Personnel Involved in Point-of-Service System Operation**

Given the variety of POS systems in use in SNPs across the U.S. and the recruitment of POS operatives based on soft skills and trainability, employee training and re-retraining appear to be very important in the school nutrition (SN) environment. Every transaction must be completed accurately and with integrity to maximize the effectiveness of the SNP operation and to minimize errors.

Different individuals provided training on POS systems, including directors, coordinators, and POS system providers. Often, employees were trained when they were assigned to be cashiers but did not receive ongoing training. Along with certification errors, meal-claiming and aggregate errors were considered major sources of error in the SN environment (USDA, 2015a); there have also been anecdotal reports of transaction errors (Bass, 2010). Therefore, SNP directors should ensure that employees are appropriately trained to complete and report transactions.

## **Operational Challenges with Point-of-Service Systems and Free and Reduced-Price Meal Application Procedures**

### ***Point-of-Service System Operation***

While most respondents were satisfied with their current POS system, CN professionals identified challenges associated with these systems, mostly related to software (e.g., customization of functions and reports) and POS providers (e.g., lack of technical support). These findings suggest that CN professionals should share their expectations with POS providers so that providers can ensure that product functionality can meet their needs before they select a system. Many SNPs also desired a POS system that communicates with the district computer system so that POS systems can exchange information with the student-data management system, allowing integration of data.

### ***Free and Reduced-Price Meal Application***

Applications for F-RP meal eligibility were either paper-based or submitted online. The most common challenges for school districts that accept paper-based applications were the time- and resource-intensive nature of the application processing and 3% mandatory verification of applications. Larger SNPs employed temporary workers to help process the large volume of data at the beginning of the academic year.

It remains unknown if these temporary workers are familiar with processing application forms or whether their work is verified by other SN staff. Furthermore, multiple individuals (i.e., teachers and cafeteria employees) were responsible for collecting paper-based application forms, which raises concerns regarding data confidentiality and increases the risks of meal application forms being lost or misplaced (Education Management Systems, Inc., 2016).

Regarding verification, 10% ( $n = 31$ ) of respondents indicated that the 3% random verification sample was inadequate. While some CN professionals stated that they had no choice but to accept the documentation received at face value, some questioned whether parents might intentionally omit some forms of income documentation to obtain a higher level of benefit. In addition, many SNP directors stated that response rates were very low when parents were asked to provide verification information. A previous study identified non-respondents as being married, comparatively better educated, and having higher incomes (St. Pierre, Puma, Battaglia, & Laysner, 1990). However, that study was conducted more than 25 years ago; future studies might investigate the status and reasons for non-response and identify strategies to encourage parents to submit verification information.

### **Impact of the Size of Districts on Point-of-Service Systems and**

#### **Free and Reduced-Price Meal Applications**

##### *Point-of-Service System Operation*

More small SNPs with total enrollment  $\leq 2,500$  used paper-based POS systems than did large SNPs. Further, a significant number of small SNPs used electronic systems other than the most common POS systems. For POS operators, large SNPs provided stand-alone POS system training more regularly than small districts. While the majority of SNP directors in both small and large districts provided POS system training, more SNPs in large districts provided training by middle management staff (i.e., area coordinators) or employees in the same positions as those being trained.

##### *Free and Reduced-Price Meal Applications*

Congruent with the fact that more paper-based POS systems were used in small districts, more paper-based F-RP meal applications were received in small districts. Many large districts

used a dual system, allowing either paper-based or online F-RP meal application. As indicated previously, a significant number of large districts (10%) hired temporary staff to process applications during enrollment periods. In addition, the mean number of documents accepted for verification was lower in small districts than in large districts, and more small districts accepted pay stubs only as acceptable form of income verification.

### **Recommendations**

Based on the findings of this research, the following recommendations are provided for SNPs as well as government and professional organizations such as USDA, state agencies, the Institute of Child Nutrition, and the School Nutrition Association. The SNP directors and other agency leaders may use these findings to identify where potential errors may occur. A small proportion of participants expressed concerns about the limitations of the present income verification and POS systems; nevertheless, state and district SNP directors should continue to find ways to operate SNPs at maximum efficiency and effectiveness.

### **Recommendations for School Nutrition Programs**

#### ***Point-of-Service System Operation***

For point-of-service operation, the SN program directors may do the following:

- Utilize a form of electronic POS system. Electronic POS systems offer a wide range of functions that will allow SNPs to run more efficiently, thereby reducing the amount of manual work, which is more prone to human errors.
- Request product demonstrations from electronic POS system vendors to gain a better understanding of which functions of the electronic POS system are useful in particular school foodservice operations and which system best fits their needs.

- Provide regular training on POS system use, cash handling, and ethical handling of information (e.g., cash safety and confidentiality of information).
- Seek data integration among different systems (i.e., student-data management system). Such integration may improve efficiency and confidentiality of information due to reduced double handling of information.
- Visit school districts of similar size and structure to compare and contrast the POS systems used in other programs in order to identify a POS system that meets the expectations and needs of the SNP. A national conference and expo may also enable CN professionals to learn what other directors are using in their programs without being influenced by vendors' attempts to promote their products. Study participants did not consider all current functions of POS systems to be essential.

For F-RP meal applications, the SN program directors may do the following:

- Utilize online F-RP meal application systems. The online application reduces both the number of human errors and the workload at schools, especially at the beginning of the school year. In addition, the online system minimizes risks related to confidentiality and security of information. A greater number of people involved in collecting and processing the forms leads to a greater likelihood of errors or violation of confidential information.
- Encourage parents to apply online if both online and paper-based applications are accepted. Encouraging parents to apply online will reduce workload and improve accuracy. If parental access to online systems is limited due to parents' access to acceptable devices, schools may provide computers and/or tablets at school offices to encourage online applications.

- Maximize the use of direct certification procedures as suggested by the USDA, FNS. While many respondents to this research indicated that they were utilizing direct certification procedures, some reported not utilizing them. Utilizing direct certification procedures will reduce over-certifying F-RP meal participants and also eliminate the need for parents to supply documents for income verification.
- Use more inclusive reports for 3% income verifications instead of documents such as pay stubs or support payment decrees from courts. Pay stubs and court documents can be easily missed or underreported, resulting in over-certification of participants. Examples of inclusive documents include direct certification through award letter for Supplemental Nutrition Assistance Program (SNAP) and previous year tax reports. The fewer documents received, the less effort is need to keep track of confidential documents.

For staff selection and training, SN program directors may do the following:

- To attract and retain qualified individuals, SNPs are advised to offer competitive compensation packages.
- Ensure that employees who handle POS systems receive regular training and are cross-trained to gain essential skills.
- Include training content on cash handling, ethics, and reimbursable meal-related topics to individuals handling POS systems.
- Identify effective methods of training for SNP employees who handle POS systems and F-RP applications (e.g., on-job training, simulation, etc.).
- Ensure training resources are available to the CN professionals who provide training so that each training provider follows the same protocol and covers the same content.

**Recommendations for the United States Department of Agriculture, State Agencies, the  
Institute of Child Nutrition, and the School Nutrition Association**

***Point-of-Service System Operation***

Because there are no specific guidelines on acceptable formats for POS reports, there is a lack of consistency in record keeping and reporting among SNP directors. Therefore, the USDA, state agencies, Institute of Child Nutrition (ICN), or School Nutrition Association (SNA) may develop a system that can be used in school districts where electronic POS systems are not available to increase efficiency of data collection and reporting. Some state agencies may already have developed and communicated such a document format with their constituents. However, the data collected for this report did not clearly identify the availability of such guidance documents; therefore, a standardized format would help all districts where paper-based POS systems are being used.

***Free and Reduced-Price Meal Applications***

The USDA, state agencies, ICN, or SNA may further encourage SNP directors to consider the above-mentioned recommendations for improving F-RP meal application processes. The USDA, state agencies, ICN, or SNA may provide guidance for acceptable documentation for F-RP meal application and verification requirements to assist SNP directors and staff members in streamlining the application and verification processes while reducing human errors.

The latest data show that, of the students who are eligible to receive free meals through SNAP direct certification, more than 10% still did not utilize the direct certification route (USDA, FNS, 2015). While the option for direct certification is available, 26% of respondents in this study indicated that they do not utilize it. Therefore, SNP directors may need to be informed of and encouraged to use this error-proof verification method.

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The University of Mississippi  
School of Applied Sciences  
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