



# Practice Paper of the Academy of Nutrition and Dietetics: Comprehensive Nutrition Programs and Services in Schools



## ABSTRACT

It is the position of the Academy of Nutrition and Dietetics, School Nutrition Association (SNA), and Society for Nutrition Education and Behavior (SNEB) that comprehensive, integrated nutrition programs in preschool through high school are essential to improve the health, nutritional status, and academic performance of our nation's children. To maximize impact, the Academy, SNA, and SNEB recommend specific strategies in the following key areas: food and nutrition services available throughout the school campus, nutrition initiatives such as Farm to School and school gardens, wellness policies, nutrition education and promotion, and consideration of roles and responsibilities. This paper supports the joint position paper of the Academy of Nutrition and Dietetics, SNA, and SNEB published in the May 2018 *Journal of Academy of Nutrition and Dietetics*. In alignment with the joint position paper, this practice paper provides registered dietitian nutritionists and nutrition and dietetics technicians, registered with an overview of current school nutrition services and opportunities for professional careers in school settings. The Academy of Nutrition and Dietetics has several position papers related to youth preschool through adolescence that cover specific nutrition needs in more detail at [www.eatright.org](http://www.eatright.org).

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**T**HE NUTRITIONAL STATUS OF school age children in the United States has been supported by a national school meal program since 1946.<sup>1</sup> The scope of the initial lunch program has expanded to include nutritional support throughout the school day. In 2010, regulatory changes associated with the Healthy, Hunger-Free Kids Act (HHFKA) were designed to address poor dietary quality, food insecurity,

and obesity among US children. School nutrition programs utilize various initiatives to improve school meals and encourage student consumption of healthy meals. Registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered (NDTRs) can be valuable nutrition experts for school nutrition programs at the district, state, and federal level. They can provide skilled program leadership utilizing their nutrition training to advance school meal programs.

The need for a school-based food program became evident during World War II when 40% to 60% of draft-eligible men failed their military physicals because of malnutrition-related conditions.<sup>5</sup> In 1946, Congress passed and President Truman signed the National School Lunch Act outlining the purpose and policies for a comprehensive federal program focused on providing a school lunch for school-aged children at a reasonable price for paying students and at no charge for those economically disadvantaged. The lunch program was designed to provide 33% to 50% of a child's daily caloric needs.<sup>6</sup> Congress approved the Child Nutrition Act in 1966, which introduced the School Breakfast Program as a pilot. The National School Breakfast Program became permanently funded in 1975.<sup>7</sup>

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## HISTORY OF SCHOOL NUTRITION PROGRAMS

Prior to the establishment of a national lunch program, cities like Philadelphia established their own meal programs with local funding from a variety of sources. Emma Smedley, a dietitian, was the first program director in Philadelphia.<sup>2</sup> Smedley authored *The School Lunch: Its Organizations and Management in Philadelphia*, establishing the first school food program standards.<sup>3</sup> President Franklin Delano Roosevelt developed the Works Progress Administration in 1935, which provided work opportunities for women who assisted with school meals. The Works Progress Administration supervisory staff included dietitians because of their foodservice knowledge and skill.<sup>4</sup>

## PROGRAM EVOLUTION

After 70 years, school meal programs administered by the US Department of Agriculture (USDA) have evolved and expanded to the current level where schools provide to students not only breakfast and lunch, but also after-school snacks, supper, summer meals, and the Fresh Fruit and Vegetable Program (FFVP). Today over 101,500 public schools, nonprofit private

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schools, and residential child care programs operate the National School Lunch Program, feeding millions of children every day.<sup>8</sup> In 2016, more than 14.5 million breakfasts and over 30.3 million lunches were served in US schools.<sup>9</sup>

### HEALTHY, HUNGER-FREE KIDS ACT OF 2010

As an ongoing Congressional mandate, child nutrition programs must be reviewed every 5 years and the funding for the program reauthorized by Congress.<sup>9</sup> When congressional reauthorization is delayed, the programs are able to continue operating under existing funding levels. In the 2010 review and resulting HHFKA, the program regulations focused on meeting children's nutritional needs associated with obesity, as well as hunger and food insecurity. This resulted in the first major changes to the school meal requirements in 15 years. Updated requirements for local district wellness policy standards and new Smart Snack nutrition standards were also included in the HHFKA.

In addition to new meal pattern requirements, the HHFKA introduced other changes in school nutrition programs. To address food insecurity issues and hunger needs, the HHFKA introduced a Community Eligibility Provision (CEP). The CEP program allows eligible schools in high-poverty areas to serve free breakfast and lunch meals to all enrolled students. The HHFKA also introduced a requirement that paid meal prices be set at a comparable price relative to the amount of reimbursement received for free meals. When school districts have paid student meals priced below the amount of the free federal reimbursement rate, applying the federal meal equity calculator creates price adjustments to increase paid meal prices to a level closer to the free rate. Professional standards for school nutrition staff were also implemented as part of the HHFKA.<sup>6</sup>

### SCHOOL NUTRITION PROGRAM STANDARDS

The 2010 HHFKA required the USDA to update nutrition standards for the first time in more than a decade. The updated regulations mandated that

menus reflect the 2010 Dietary Guidelines for Americans with a wider variety of fruits, vegetables, and whole grains while limiting sodium, calories, and saturated fat as outlined in the [Table](#). These USDA nutrition standards included phases for implementation of new breakfast requirements, sodium targets, and inclusion of whole grain-rich menu items.<sup>11</sup> HHFKA required food-based menu planning and vegetable subgroups that include dark green, red, or orange starchy, legumes, and other vegetables each week.

In May 2017, newly appointed USDA Secretary issued a bulletin making three changes to the timeline of the HHFKA:

- The USDA will provide states continued whole grain flexibility for schools having issues gaining student acceptance with these products.
- Schools meeting current sodium standards Target 1 will be considered compliant through 2020. The additional time will allow schools to continue to develop acceptable low-sodium meals.
- Flavored milk exemptions will also be provided for states with School Foodservice Authorities allowing the service of 1% flavored milk.<sup>12</sup>

The HHFKA falls under federal regulation, upheld and evaluated by the USDA. All districts must meet these federal standards, but state legislation or regulation may impose more restrictive state level standards than those established by the USDA. Likewise, local education agencies may approve policies that are more restrictive than the state and federally approved standards. State and local standards may not be less restrictive than the federally approved regulations.

### SCHOOL MEAL IMPROVEMENTS AND CONSUMPTION PATTERNS

Considering that meal standard changes focused on improving the nutritional composition of school meals, researchers have evaluated the progress made with school meals and also student consumption.

Under these nutrition standards, menus can be planned providing choices within the food groups to allow for the option of Offer versus Serve. Offer versus Serve allows students to decline some food items that they do not wish to eat. At lunch, for example, students must choose three of five items offered in a reimbursable lunch. Offer versus Serve is designed to both decrease food waste and increase customer satisfaction.<sup>13</sup> Plate waste in school meals is a concern to many inside and outside the programs. It is an area of active study with researchers seeking consistent measurements techniques and effective strategies to decrease it. By introducing students to new items, the FVP has been shown to increase the fruit and vegetable intake of children.<sup>14</sup>

Turner and colleagues evaluated school lunches served in 2006 to 2007 and again in 2013 to 2014 for 4,630 public elementary schools. Extensive overall increases in healthier lunch options, including vegetables, fresh fruit, whole grains, healthier pizzas, and more salad bars as part of school lunches were observed in 2013 to 2014. The strong policy standards of the 2010 HHFKA positively improved the overall school nutrition environments in these elementary schools.<sup>14</sup>

Johnson and colleagues evaluated the nutritional quality of school meals in middle and high schools before and after the HHFKA implementation. Overall nutritional quality improvements were evident with increased nutrient density in school meals. Meal participation rates prior to and after HHFKA implementation were relatively similar; however, meal consumption was not measured.<sup>15</sup>

Smith and Cunningham-Sabo compared elementary- and middle school-aged children's calorie intake with the 2004 child nutrition meal requirements and the HHFKA. Few middle school children met the 2004 requirements from their school meal consumption, and more met the HHFKA calorie requirement. However, less than half of the elementary students had intakes below the 2004 requirements and the HHFKA. The majority of students surveyed selected fruit, but only 60% of the fruit was consumed; less than 40% of the students selected a vegetable, with 70% of vegetables being eaten.<sup>16</sup>

**Table.** Nutrition standards in the National School Lunch and School Breakfast Programs<sup>a</sup>

Grades	Breakfast meal pattern			Lunch meal pattern		
	K-5	6-8	9-12	K-5	6-8	9-12
<b>Meal pattern</b>	← <i>amount of food per week (minimum per day)</i> →					
Fruits (cups)	5 (1)	5 (1)	5 (1)	2 <sup>1</sup> / <sub>2</sub> (1 <sup>1</sup> / <sub>2</sub> )	2 <sup>1</sup> / <sub>2</sub> (1 <sup>1</sup> / <sub>2</sub> )	5 (1)
Vegetables (cups)	0	0	0	3 <sup>3</sup> / <sub>4</sub> (3 <sup>3</sup> / <sub>4</sub> )	3 <sup>3</sup> / <sub>4</sub> (3 <sup>3</sup> / <sub>4</sub> )	5 (1)
Dark green	0	0	0	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
Red/orange	0	0	0	3 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>
Beans/peas (legumes)	0	0	0	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
Starchy	0	0	0	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
Other	0	0	0	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>4</sub>
Additional vegetable to reach total	0	0	0	1	1	1 <sup>1</sup> / <sub>2</sub>
Grains (oz-eq)	7-10 (1)	8-10 (1)	9-10 (1)	8-9 (1)	8-10 (1)	10-12 (2)
Meats/meat alternate (oz-eq)	0	0	0	8-10 (1)	9-10 (1)	10-12 (2)
Fluid milk (cups)	5 (1)	5 (1)	5 (1)	5 (1)	5 (1)	5 (1)
<b>Other specifications</b>	← <i>daily amount based on the average for a 5-day week</i> →					
Min-max calories (kcal)	350-500	400-550	450-600	550-650	600-700	750-850
Saturated fat (% of total calories)	<10	<10	<10	<10	<10	<10
Sodium (mg)	≤430	≤470	≤500	≤640	≤710	≤740
<i>Trans fat</i>	Nutrition label or manufacturer specifications must indicate 0 grams of <i>trans fat</i> per serving.					

<sup>a</sup>Reprinted from US Department of Agriculture, Food and Nutrition Service.<sup>10</sup>

Schwartz and colleagues compared meal component consumption over 3 school years beginning in 2012. More fruits were selected by students (increased from 54% to 64%) and the total consumption of the selected fruit remained the same (74%) with the HHFKA implementation. Fewer students selected vegetables (decreased from 68% to 52%) but 20% more of the vegetables selected were eaten. Overall a reduction in plate waste was observed with the implementation of the new meal standards.<sup>17</sup> Similar student acceptance with decreased plate waste results were seen by Cohen and colleagues.<sup>18</sup> Both student groups participating in these two studies were from low-income families and routinely participated in the school meal program potentially improving their level of school meal acceptance. Echon analyzed 644,070 student lunches from 61 elementary schools with average 51% fruit serving consumption and

less than 10% vegetable serving consumption.<sup>19</sup> School meal acceptance and plate waste have continued to be concerns, and additional research is needed to evaluate the impact the HHFKA meal standards have had on these issues.

To improve fruit and vegetable selection and consumption, nutrition education, taste testing, and application of behavioral economic principles can be implemented. RDNs and NDTRs understand the importance of healthy eating, especially for school-aged children developing lifelong eating habits. Having qualified nutrition experts providing nutrition education with hands-on activities such as cooking can involve students in preparing healthy food items, possibly resulting in better consumption of those foods. Continued creative recipe and menu development, including nutritional assessments by dietetics practitioners, would also be beneficial in increasing student healthy food consumption.

**SMART SNACKS IN SCHOOL AND OTHER COMPETITIVE FOODS**

To ensure all foods and beverages sold in school during the school day are nutritious choices, the USDA implemented the Smart Snacks in School standards beginning with the 2014 to 2015 school year.<sup>20</sup> The Smart Snacks regulation requires all competitive foods, those sold outside and in competition with reimbursable school meals, meet a set of nutrition standards and at least one of the general standards. Separate and specific standards exist for beverages at elementary, middle, and high schools.<sup>21</sup>

**Nutrition Standards**

- Snack items and side dishes: ≤200 calories per item as served, including any added accompaniments; entrée items: ≤350 calories per item as served including any added accompaniments;

- snack items and side dishes:  $\leq 200$  mg sodium per item as served, including any added accompaniments; entrée items:  $\leq 480$  mg sodium per item as served, including any added accompaniments;
- $\leq 35\%$  calories from total fat as served;
- $< 10\%$  calories from saturated fat as served;
- $\leq 35\%$  of weight from total sugar as served;
- 0 grams of *trans* fat as served ( $\leq 0.5$  g per portion).

### General Standards

- Be a grain product that contains 50% or more whole grains by weight or have whole grains as the first ingredient; *or*
- have as the first ingredient one of the nongrain main food groups: fruits, vegetables, dairy, or protein foods (eg, meat, beans, poultry, seafood, eggs, nuts, seeds); *or*
- be a combination food that contains at least  $\frac{1}{4}$  cup fruit or vegetable;
- if water is the first ingredient, the second ingredient must be one of the above.

### USDA FOODS

USDA Foods, previously known as commodities, are grown, processed, and packaged in the United States and made available to school districts through annual allocations for the purpose of reducing purchased food costs. USDA Foods provide approximately 19% of all foods offered in school lunches, offering districts many nutritious choices from which to choose.<sup>22</sup> This USDA program offers more than 200 different food items for schools to use, including fruits, vegetables, whole grains like pasta and brown rice, cheese, and meat products (beef, chicken, fish, pork, and turkey). These items come in a variety of forms including fresh, canned, and frozen with improved nutritional specifications to reflect the updated school meal standards.<sup>23</sup> Many USDA Foods are available for further processing through commercial manufacturers. Schools can also use their USDA dollars for fresh produce through the

Department of Defense Fresh Fruit and Vegetable Program.

### STUDENT MEAL MODIFICATIONS

Meal modifications can be made in school meals for special dietary requirements associated with student disabilities or a physical or mental impairment where the student is not able to eat the meals prepared for the general student population. Physical and mental impairments include multiple diseases and conditions, including metabolic diseases such as diabetes and food anaphylaxis.<sup>24</sup> The Individuals with Disabilities Education Act recognizes 13 disability categories. Students possessing one of these disabilities requiring special meals must have a physician's statement that provides the foods to be omitted and the food approved for substitution. Addressing the nutritional needs of these students requires involvement of the school foodservice and school staff working with health care professionals and families to provide the appropriate meal options.

Food allergies continue to be a concern for school meal programs. There are estimated 6% to 8% of preschool to grade 12 children with food allergies, with milk being the most commonly identified allergy.<sup>25</sup> Food allergies that result in a severe, life-threatening reaction are considered a disability and must be accommodated. Health care providers' notes are required for these meal modifications; these modifications must be planned and then prepared by the school nutrition staff.<sup>26</sup> RDNs understand how to modify menus for food allergies, and their assistance in determining the foods that students with food allergies should avoid, as well as those foods that would provide comparable nutritional composition minus the allergens, is beneficial. RDNs' expertise with understanding special diets and menu modifications provides for accurate and appropriate substitutions.

### IMPACT OF SCHOOL NUTRITION PROGRAMS

School meals and other school-based nutrition programs play a critical role in addressing the health and well-being of American students, preschool

through high school. Although the concerns have shifted from the malnutrition seen in World War II soldiers to childhood food insecurity and obesity in the 21st century, the goals have remained much the same: to ensure that students are well nourished and ready to succeed at school. A recent USDA HHFKA policy brief explored the strategies that school nutrition directors could use to reduce the impact childhood obesity and other health issues.<sup>27</sup> The roles described for school nutrition directors are well suited to the knowledge base and skill set of many RDNs and NDTRs, which makes school nutrition a practice area filled with professional opportunities.

### Food Insecurity

Hunger and food insecurity remain serious problems for America's school children. In *Map the Meal Gap 2015*, Feeding America reports that 21.4% of children in the United States live in food insecure homes.<sup>28</sup> Childhood food insecurity exists in every US county with rates ranging from 6% to 43%. Most children living in food insecure households are eligible for and regularly participate in free or reduced-priced meals at school. According to the USDA participation data, the number of children receiving free meals has continued to climb. In 2016, approximately 12 million eligible children ate free or reduced-priced breakfast and 22.1 million ate free or reduced-price lunch.<sup>29</sup>

Unfortunately, gaps still exist in access to and participation in federal school nutrition programs. In its 2017 School Breakfast Scorecard, the Food Research & Action Center provided a detailed analysis of participation during the 2014 to 2015 school year, noting that there is room for improvement. School breakfast participation grew by 3.7% over the previous school year; however, only 56% of eligible low-income children participated in school breakfast for every 100 participating in school lunch, leaving a breakfast gap of 46%.<sup>30</sup> Although some of these children may eat at home, many others may start the school day too hungry to learn. There is also an extensive gap in participation for the Summer Food Service Program (SFSP). Realizing that "hunger does not take a summer vacation," the Food Research & Action

Center also tracks participation in SFSP. In summer 2016, there were decreases in the number of children eating free meals. At maximum attendance only 15 children participated in SFSP for every 100 low-income children participating in school lunch during the regular school year.<sup>31</sup> According to the USDA, preliminary participation numbers for the summer meals in 2016 showed an increase in the number of summer feeding sites with a decrease of approximately 10 million meals.<sup>29</sup>

### Childhood Obesity

Discussions in the popular press have often blamed school meals for the rise in childhood obesity rates. The reality is that school meals represent only a portion of children's intake. Many provisions of HHS regulations were designed to control caloric intake at school and to ensure that the calories provided are as nutrient-rich as possible. The relationship between the new nutrition standards and childhood body mass index (BMI) has not been studied nationally. However, we do know that among youth the prevalence of obesity did not change from 2003 to 2004 through 2013 to 2014.<sup>32</sup>

Some studies have indicated positive effects of school nutrition programs on childhood BMI in specific populations. Qian and colleagues used measured BMI from a panel of Arkansas school children participating in the USDA FFVP.<sup>33</sup> The results suggested that FFVP participation can help lower obesity rates, overweight rates, and average BMI z-score (percentile rank). In the first longitudinal study of the effect of school breakfast consumption on BMI, Yale University researchers found that concerns about a second breakfast at school increasing risk of excessive weight gain were unsupported. In this 2-year study conducted before the implementation of the new HHS breakfast pattern, students who regularly consumed breakfast at school, including double breakfast eaters, were more likely to exhibit a healthy weight trajectory than breakfast skippers.<sup>34</sup> An analysis of Breakfast in the Classroom (BIC) in New York City schools over a similar time period agreed: Consuming BIC did not increase BMI and may have had a very small effect on reducing rates of obesity.<sup>34</sup>

### Academic Achievement

Decades of international research, numerous observational studies, and frequent national surveys support the premise that better nourished children do better in school. The strength of the evidence, especially for the impact of school breakfast, has recently been more closely examined. A 2013 review article of 36 articles found an association between breakfast and classroom behaviors and some evidence for improved academic performance in mathematics, especially in low-performing students eligible for free lunch.<sup>35</sup> The authors cautioned that associations are often confounded by socioeconomic status and by methodological weaknesses. One quasi-experimental examination of moving breakfast from the cafeteria to the classroom in a large urban district documented marked improved in academic achievement, especially for low-performing, free lunch-eligible students.<sup>36</sup>

A 2014 evaluation of the School Breakfast Program using numerous national data sets found evidence that "persistent exposure to the relatively more nutritious breakfast offered through the School Breakfast Program throughout elementary school can yield important gains in achievement."<sup>37</sup> Although supporting the impact of child nutrition programs on cognitive achievement, the analysis did not find a positive effect on school attendance. The 2016 study of New York City's BIC failed to document improvements in either academic performance or attendance.<sup>34</sup>

More research is needed to explore the impact of the new meal patterns on child nutrition programs, which were phased in beginning in 2012 to 2013. As practitioners in school districts and as academic researchers, RDNs and NDTRs are well positioned to evaluate the multiple impacts of these programs.

### Local Food, Gardening, and Culinary Programs

Over the past decade, many school nutrition programs have introduced cross-cutting initiatives that mirror public interest in local food, chef-inspired meals, and gardening. Programs like Farm to School, school gardens, and culinary education for

staff, students, and families are popular and growing, often championed by RDNs and NDTRs. Although toolkits, case studies, and poster presentations abound, few of these initiatives have been able to measure definitive quantitative evidence for positive benefits on the nutrition and health status of students. The evidence that does exist is largely based on self-reported outcome measures. Taylor and Johnson noted the lack of peer-reviewed research and recommended use of validated dietary assessment materials.<sup>38</sup> A 2015 commentary by Adams and colleagues found many gaps and little evidence for the effectiveness of salad bars on food choice, consumption, and waste.<sup>39</sup> A systematic review of more than 40 school gardens studies from the United States, United Kingdom, and Australia and a 2017 review of 14 articles also found limited quantitative research while noting that most studies suggest a small but positive influence.<sup>40</sup> These reviews do not mean that current initiatives are ineffective. They do, however, point to the need for rigorous study designs, consistency in how impacts are measured, and assessment of consumption patterns over at least 1 year. The GREEN (Garden Resources, Education, and Environment Nexus) Tool outlines an evidence-based framework for successful school garden integration into preschool to grade 12 education.<sup>41</sup>

A theoretical framework for the impact of Farm to School programs on child health was first outlined in 2012.<sup>42</sup> This was further refined into the 2014 Evaluation for Transformation: A Cross-Sectoral Evaluation Framework for Farm to School, which the USDA will use for ongoing evaluation of Farm to School grantees and other programs.<sup>43</sup>

The 2015 Farm to School Census demonstrates the rapid growth in this area and its wide acceptance. A few of the notable findings are<sup>44</sup>:

- Of districts surveyed by the USDA, 42% say they participate in Farm to School activities, which translates to 5,254 districts and 42,587 schools.
- There has been \$789 million invested in local communities through Farm to School purchases. This represents a 105% increase over the first USDA

Farm to School Census in school year 2011 to 2012. Nearly half (47%) of these districts plan to purchase even more local foods in future school years.

- There are 17,089 salad bars, representing 62% of school districts with Farm to School programs that operate salad bars, often stocked with local options.
- Of schools with salad bars, 78% increased their purchase of fresh fruits and vegetables.
- There are 7,101 school gardens, representing an increase of 42% from the previous census.

Schools with a Farm to School program also reported wider benefits, including greater community support for school meals (38%), greater acceptance of HHFKA changes (28%), lower meals costs (21%), increased participation (17%), and reduced food waste (18%).

### Sustainability in School Foodservice

Environmental sustainability is an important topic of conversation in all types of 21st-century foodservice operations. A 2011 article by Peregrin outlined key areas of interest when considering sustainability in foodservice, including energy audits, water conservation, food safety, and food waste.<sup>45</sup> Reduction of food waste in school nutrition programs has been a focus of the USDA with the release of the 2014 “Reducing Food Waste: What Schools Can Do Today” infographic as part of the US Food Waste Challenge.<sup>46</sup>

School nutrition programs can play critical roles in reducing day-to-day food waste and in educating students about the impacts of food system sustainability on the environment and society.<sup>47,48</sup> Although many districts like San Diego Unified School District in California have developed successful sustainability initiatives and resources,<sup>49</sup> there is a dearth of quantitative evidence for positive benefits to program operation or student health.

### Local Wellness Policies

The 2004 Child Nutrition Reauthorization Act<sup>50</sup> required the development of local school wellness policies by all school districts participating in any school meals programs by 2006.<sup>51</sup> With the 2010 HHFKA passage,

additional requirements were added addressing wellness policy implementation, evaluation, and public wellness policy progress reports. Wellness policies must include food nutrition guidelines for all foods served in the school district, nutrition education and physical education goals, and how the wellness policy will be evaluated.<sup>11</sup>

RDNs are uniquely qualified for policy development and also for policy evaluation. Including RDNs on local wellness committees as nutrition experts would benefit policy strength because the 2010 HHFKA requires involvement of community stakeholders. Wellness policies could positively impact school districts if they are written with strong policy language and implemented effectively at the local school level.<sup>52</sup> Local wellness policies in six school districts demonstrated regulation compliance, but they were not fully implemented.<sup>53</sup> Larson and colleagues evaluated wellness policy strength in 180 Minnesota districts, reporting responses from principals and teachers.<sup>54</sup> The wellness policy strength impacted better nutrient-dense food and beverage options available through vending in the districts studied; however, the secondary schools showed the greatest inconsistency in overall policy implementation. The development and implementation of effective wellness policies continues to be a challenge, but the nutritional content of foods and beverages provided in schools is improving. Continued wellness policy assessment on a periodic basis would be beneficial to ensure school-level compliance.

### Water Accessibility

The HHFKA also included a requirement for free potable water being accessible to children during school meal service to be implemented by the 2011 to 2012 school year.<sup>55</sup> Schools are required to provide water at no charge where the school meals are being served. The water delivery method can vary as long as children are able to access drinking water in the same location as they eat school meals.

### Marketing

The implementation of behavioral economic theories for the purpose of

influencing selection of healthier school meal options may have a positive influence on students selecting healthier foods. A creative name for healthy foods like vegetables has also shown a greater likelihood for student selection. Combining choice architecture with chef-enhanced meals that taste better resulted in increased healthy food selection and consumption by students.<sup>18</sup> Behavioral economic theories should be actively utilized with school meal programs serving better-tasting healthy food. RDNs' knowledge may be beneficial in planning the placement and creative naming of healthy food options using choice architecture.

### Social Media

In the digital age, it is no surprise that social media channels have been used as an instrument in negative school nutrition campaigns. Numerous other exposés with disgusting school meal photos have gone viral for varying lengths of time. Some purport to be student-driven, and others have the backing of groups with a variety of agendas. School nutrition professionals and advocates at all levels, from the USDA and the School Nutrition Association (SNA) to state child nutrition offices and local school districts have begun to present a more balanced view of school meals across channels. Examples include USDA blogs,<sup>56</sup> Team Nutrition initiatives,<sup>57</sup> and SNA's Tray Talk.<sup>58</sup> Individual school districts, often led by RDNs and NDTRs, are using Facebook, Twitter, Instagram, and mobile apps to promote their programs to students and families.

### Nutrition Education

School-based nutrition education can influence school-aged children to accept healthier foods like vegetables.<sup>59-61</sup> Unfortunately, teachers have reported limited classroom time and a lack of incentives for teaching nutrition education. The development of nutrition education incorporated as part of regular curriculum would make the educational delivery more consistent.<sup>62</sup> Student nutrition knowledge level has shown improvement when science curriculum incorporated nutrition standards.<sup>63</sup> The challenges of limited classroom time and limited nutrition expertise provide opportunities for

Organization/agency	Information/services	Website
<b>USDA<sup>a</sup> Food and Nutrition Service</b> <b>Team Nutrition</b> <b>HealthierUS School Challenge: Smarter Lunchrooms</b>	<ul style="list-style-type: none"> <li>• Federal agency administering all school food programs</li> <li>• Free materials and resources for all school nutrition programs</li> <li>• Voluntary certification program recognizing schools for excellence in nutrition and physical activity</li> </ul>	<a href="http://www.fns.usda.gov/school-meals/child-nutrition-programs">www.fns.usda.gov/school-meals/child-nutrition-programs</a> <a href="http://www.fns.usda.gov/tn/team-nutrition">www.fns.usda.gov/tn/team-nutrition</a> <a href="http://www.fns.usda.gov/hussc/healthierus-school-challenge-smarter-lunchrooms">www.fns.usda.gov/hussc/healthierus-school-challenge-smarter-lunchrooms</a>
<b>US Food Waste Challenge: K-12 Schools</b>	<ul style="list-style-type: none"> <li>• Resources for schools to reduce, recover, and recycle food waste on their premises</li> <li>• Strategies for recovering wholesome excess food for donation</li> </ul>	<a href="http://www.usda.gov/oce/foodwaste/resources/K12_schools.html">www.usda.gov/oce/foodwaste/resources/K12_schools.html</a>
<b>Institute of Child Nutrition, University of Mississippi</b>	<ul style="list-style-type: none"> <li>• USDA funded institute for applied research in child nutrition, training, education and technical support</li> </ul>	<a href="http://nfsmi.org">http://nfsmi.org</a>
<b>School Nutrition Association</b>	<ul style="list-style-type: none"> <li>• School nutrition resources, publications, and conferences for members and nonmembers</li> <li>• Publishes <i>The Journal of Child Nutrition &amp; Management</i></li> </ul>	<a href="https://schoolnutrition.org">https://schoolnutrition.org</a> <a href="https://schoolnutrition.org/jcnm">https://schoolnutrition.org/jcnm</a>
<b>Academy of Nutrition and Dietetics</b> <b>Kids Eat Right</b>	<ul style="list-style-type: none"> <li>• Large organization of food and nutrition professionals includes School Nutrition Services dietetic practice group (SNS DPG)</li> <li>• Initiative of Academy and its foundation with resources for families and schools</li> </ul>	<a href="http://www.eatright.org">www.eatright.org</a> <a href="http://www.snsdpg.org">www.snsdpg.org</a> <a href="http://www.eatright.org/resources/for-kids">www.eatright.org/resources/for-kids</a>
<b>National Farm to School Network</b>	<ul style="list-style-type: none"> <li>• Network providing information, training, and technical assistance for local food sourcing, gardens, and agricultural education for school systems</li> </ul>	<a href="http://www.farmtoschool.org">www.farmtoschool.org</a>
<b>Pew Charitable Trusts Kids' Safe and Healthful Foods Project</b>	<ul style="list-style-type: none"> <li>• Collaboration between Pew Charitable Trusts and Robert Wood Johnson Foundation offers nonpartisan analysis, policy recommendations, and resources for schools</li> </ul>	<a href="http://www.pewtrusts.org/en/projects/kids-safe-and-healthful-foods-project">www.pewtrusts.org/en/projects/kids-safe-and-healthful-foods-project</a>
<b>Alliance for a Healthier Generation</b>	<ul style="list-style-type: none"> <li>• Founded by American Heart Association and Clinton Foundation, offers tools, resources, and technical assistance for schools</li> </ul>	<a href="http://www.healthiergeneration.org">www.healthiergeneration.org</a>
<b>Action for Healthy Kids</b>	<ul style="list-style-type: none"> <li>• Offers grants, tools, and events across the United States, including team activities in some states</li> </ul>	<a href="http://www.actionforhealthykids.org">www.actionforhealthykids.org</a>

(continued on next page)

**Figure.** National governmental, professional, and nonprofit organizations focused on school nutrition programs.

Organization/agency	Information/services	Website
Fuel Up to Play 60	<ul style="list-style-type: none"> <li>• In-school nutrition and physical activity program launched by the National Dairy Council and the National Football League in collaboration with USDA to help encourage today's youth to lead healthier lives</li> <li>• Grants, resources, and technical assistance for school programs to enhance nutrition and activity programming</li> </ul>	<a href="http://www.fueluptoplay60.com">www.fueluptoplay60.com</a>

<sup>a</sup>USDA=US Department of Agriculture.

**Figure.** (continued) National governmental, professional, and nonprofit organizations focused on school nutrition programs.

RDNs and NDTRs to assist with curriculum content alignment between the curriculum and nutrition standards. RDNs and NDTRs could also assist with delivery of nutrition lessons in schools. There is evidence supporting the benefits of classroom nutrition education on student selection and consumption. Continued research on the most effective method to deliver nutrition education for the greatest long-term results on student consumption is needed to ensure that effective nutrition education is delivered in schools.

### PROFESSIONAL STANDARDS IN SCHOOL NUTRITION

The 2010 HHFKA mandated that the USDA develop hiring standards for all school nutrition personnel and local and state program directors, in addition to the annual training requirements for each level of employee. The annual training requirements ensure that personnel continue to develop their knowledge to enhance the profession. The SNA has developed the professional standards training guidelines to assist developing trainings and tracking the content areas. The national hiring standards are defined based on specific district enrollment levels, and the basic hiring requirements for educational credentials are also detailed in the HHFKA. These standards went into effect on July 1, 2015.<sup>64</sup>

Existing school nutrition staff members do not have to meet the educational credential requirements, but newly hired staff must have the required educational level. The USDA's minimum hiring educational requirements for child nutrition program

administrators of school districts and state agency directors includes a bachelor's degree in dietetics. RDNs meet this educational requirement. The Institute of Child Nutrition has defined 10 competencies for successful child nutrition management,<sup>65</sup> which align with the Accreditation Council for Education in Nutrition and Dietetics standards for dietetic program.<sup>66</sup> NDTRs would meet the hiring standard for districts with less than 2,499 students. NDTRs may also be considered for positions in districts with enrollment with less than 9,999 students, although the standard strongly encourages the completion of a bachelor's degree. More opportunities for RDNs and NDTRs may be available as current school nutrition leadership positions become available.

### QUALIFIED LEADERSHIP

The HHFKA professional standards support both the requirement for hiring qualified leadership in all program roles and also continuing the school nutrition staff member development with professional standards. These standards are designed to make all school nutrition professionals better able to meet the job demands. The various aspects of the school nutrition programs combined with the strict nutrition standards require qualified leadership to effectively administer the different programs.<sup>67</sup> The new professional standards enhance the national school nutrition program leadership, allowing the means for every district program to continue to develop and grow in delivering healthy appealing school meals to the nation's school children. Based on educational background and training,

RDNs and NDTRs are uniquely qualified to lead school nutrition programs, utilizing their skills in communication, education, nutrition program management, foodservice management, community nutrition, and nutrition care. Given the many opportunities for nutrition professionals in training to make positive contributions to school nutrition programs, school nutrition directors are encouraged to precept students and interns. Exposure to school nutrition programs through supervised practice will assist students and interns in understanding the varied career paths available within school nutrition programs.

### PROFILE: PORTLAND, OR, PUBLIC SCHOOLS

Of the more than 100,000 US schools participating in school nutrition programs, no two are exactly the same. Key variables include geographic location; number of students and serving sites; percentage of students eligible for free and reduced-price meals; status of school kitchens, central kitchens, and foodservice equipment; district finances and support for nutrition programming; availability of foodservice workers; professional staffing patterns; and participation in school nutrition initiatives. Portland, OR, Public Schools (PPS) was chosen for this district profile because this large urban district illustrates many of the challenges and opportunities, including those for dietetic practice, in school nutrition.

PPS enroll approximately 48,000 students with about 46% eligible for free and 3% eligible for reduced-price meals. Twenty-five of their schools are able to serve meals to all children

through the CEP. They have 84 kitchens and serve meals at more than 80 sites during the school year and 52 locations (schools and parks) during the summer. No à la carte items are served in the district. The average daily participation in USDA programs is approximately:

- National School Breakfast Program—11,000
- National School Lunch Program—20,000
- Supper Program—3,000
- Summer Food Service Program—5,000

Portland is an ethnically diverse city with high percentages of Hispanic (16.2%), African-American (10%), and Asian (7.3%) students, as well as small populations of Native American or Alaskan Native (0.9%) and Pacific Islanders (0.9%). In school cafeterias there are menu cards in five languages: Chinese, Vietnamese, Spanish, Russian, and Somali. On the district website, the menu can be translated into any common language.

PPS are committed to staffing their program with RDNs. As of school year 2015 to 2016, there were six RDNs on staff; four permanent positions require an RDN: director, assistant director, program manager, and coordinator. The program frequently hosts dietetic students and interns from Oregon programs. Several of these interns have been hired into temporary and permanent positions with PPS and other local school districts. Like many districts, Portland was already adhering to high standards of professional development before the implementation of the USDA standards in 2015. All staff members are required to participate in multiple training opportunities including in-house sessions, workshops, webinars and *School Nutrition Magazine* continuing education credits.

The Portland school district has worked hard to grow their school garden and Farm to School initiatives. They currently have over 52 active gardens on school property and purchase approximately 38% of their food from local farms and manufacturers. Popular local foods include apples, watermelon, berries, potatoes, greens, and ground beef, as well as bread products, pizza crust, and ketchup. The benefits of local purchases and Harvest of Month include teaching students

where their food comes from, connecting gardens to classrooms, and an increased willingness to try new fruits and vegetables. Finding financial support for garden coordinator positions is an ongoing challenge.

Nutrition education in PPS classrooms and school gardens is provided through a variety of community partners, including Oregon SNAP-Ed, Growing Gardens, Earth Art Ag, and the Schools Uniting Neighborhoods Program. Marketing and promotion of meals is coordinated through a yearly menu calendar (featuring student art and distributed to all families), Harvest of the Month posters (printed and posted in school kitchens and cafeterias), and social media channels. PPS Nutrition Services has established a strong presence on Facebook (<https://www.facebook.com/pps.ns/>) and Twitter ([https://twitter.com/PPS\\_Nutrition](https://twitter.com/PPS_Nutrition)).

## SUGGESTED STRATEGIES TO ENHANCE PRACTICE OF SCHOOL NUTRITION

Not only would providing dietetic students with a better understanding of the practice of school nutrition expose them to the opportunities associated with this area for potential career opportunities, it would also educate them about positive ways to support their local program as future RDNs and NDTRs (Figure). Unfortunately, there is often limited knowledge about school nutrition programs among young professionals, so exposing dietetic students and interns through practicum experiences can provide the best overview. Contributing support for the healthy meal program initiatives as community members or even parents later in life could provide valuable resources to school nutrition program leadership. School districts may benefit from the contribution of RDNs and NDTRs delivering nutrition education to students, providing training to the school nutrition staff, and serving on school wellness councils or health committees.

Incorporating school nutrition into the dietetic internship experience would provide exposure to the professional opportunities within this application of dietetics. Including internship work within school nutrition would provide future RDNs a better understanding of how they might contribute

as a qualified dietetic professional to strengthen and enhance school meal programs. School nutrition leaders would benefit from volunteer support contributed by RDNs and NDTRs in areas nutrition education, school gardens, taste testing, staff education, and wellness policies. Overall parental support, particularly from nutrition experts, for the healthy program initiatives is always beneficial.

Research gaps exist in many areas of school nutrition practice. For example, there is limited research on the impact nutrition education has upon the food choices students make, and additional studies could provide a better understanding of the most effective nutrition education methods. Research exploring the benefits of children receiving nutrition education and how it impacts their lifetime eating choices would allow school nutrition professionals the opportunity to focus on providing nutrition education resulting in the greatest long-term outcomes. Additional areas that could benefit from more research, especially by dietetics professionals, include timing and length of school meal service, effect of salad bars on produce consumption, and impact of school garden education.

## SUMMARY

Meal programs in US schools have continued to improve to more effectively address the needs of children. Early program goals focused on impacting malnutrition and hunger. The current goals of the 2010 HHSFKA include childhood hunger, food insecurity issues, and a new focus on reducing childhood obesity. As school districts implemented 2010 HHSFKA regulations, multiple outside initiatives have impacted the effectiveness and success of the process. Local school wellness policies improve the school environment when a strong policy is implemented and routinely assessed. USDA Smart Snack regulations have required snack foods served in schools meet nutritional standards. Positive impact on childhood BMI levels has been seen in some initial research related to the HHSFKA. School breakfast participation has also been associated with improved classroom behavior and academic achievement; however, additional research is needed to continue to measure the impact of healthy school meals.

Promoting healthy school food items and providing school curriculum-centered nutrition education can help with student acceptance of these changes. Social media has provided the opportunity for the positive and the negative program stories to be easily shared with the national public. Popular school-based initiatives with Farm to School efforts, school gardens, culinary training, and more have been well accepted and continue to be evaluated for long-term benefits with children developing lifelong healthy eating habits.

The HHFKA-mandated professional standards will result in more qualified personnel working in and leading school nutrition programs. Career opportunities in school nutrition leadership utilizing the dietetic training and knowledge they have obtained are available for RDNs and NDRTRs. Having qualified leadership in school nutrition programs is necessary to continue the national school meal programs' impact on removing food insecurity and obesity for our nation's school-aged children.

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**STATEMENT OF POTENTIAL CONFLICT OF INTEREST**

D. Hayes has had consultancies with the US Department of Agriculture, multiple state departments of education and agriculture, American Egg Board, California Walnuts, National Dairy Council and state/regional dairy councils, National Cattlemen's Beef Association and state beef councils, National Peanut Board, Potatoes USA, The Mushroom Council, US Highbush Blueberry Council, Clif Bar, Barilla USA, and General Mills. L. Dodson has no potential conflicts to disclose.

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