Nutrition Education in the K-12 Curriculum: The Role of National Standards: Workshop Summary

ISBN
978-0-309-28719-7

120 pages
6 x 9
PAPERBACK (2013)

Steve Olson and Sheila Moats, Rapporteurs; Food and Nutrition Board; Institute of Medicine

NUTRITION EDUCATION IN THE K-12 CURRICULUM

THE ROLE OF NATIONAL STANDARDS

Workshop Summary

Steve Olson and Sheila Moats, *Rapporteurs*

Food and Nutrition Board

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
www.nap.edu

THE NATIONAL ACADEMIES PRESS 500 Fifth Street, NW Washington, DC 20001

NOTICE: The workshop that is the subject of this workshop summary was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

This activity was supported by Contract No. AG-3198-C-12-0023 between the National Academy of Sciences and the U.S. Department of Agriculture. The views presented in this publication do not necessarily reflect the views of the organizations or agencies that provided support for the activity.

International Standard Book Number-13: 978-0-309-28719-7
International Standard Book Number-10: 0-309-29719-7

Additional copies of this workshop summary are available for sale from the National Academies Press, 500 Fifth Street, NW, Keck 360, Washington, DC 20001; (800) 624-6242 or (202) 334-3313; http://www.nap.edu.

For more information about the Institute of Medicine, visit the IOM home page at: **www.iom.edu.**

Printed in the United States of America

The serpent has been a symbol of long life, healing, and knowledge among almost all cultures and religions since the beginning of recorded history. The serpent adopted as a logotype by the Institute of Medicine is a relief carving from ancient Greece, now held by the Staatliche Museen in Berlin.

Suggested citation: IOM (Institute of Medicine). 2013. *Nutrition education in the K-12 curriculum: The role of national standards: Workshop summary.* Washington, DC: The National Academies Press.

"Knowing is not enough; we must apply.
Willing is not enough; we must do."
—Goethe

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the Nation. Improving Health.

PREPUBLICATION COPY—Uncorrected Proofs

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. C. D. (Dan) Mote, Jr., is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. C. D. (Dan) Mote, Jr., are chair and vice chair, respectively, of the National Research Council.

www.national-academies.org

PLANNING COMMITTEE ON NATIONAL NUTRITION EDUCATION CURRICULUM STANDARDS[1]

KAREN WEBER CULLEN (*Chair*), Professor of Pediatrics-Nutrition, USDA/ARS Children's Nutrition Research Center, Baylor College of Medicine, Houston, Texas
KAREN CHAPMAN-NOVAKOFSKI, Professor, Nutrition and Extension Specialist, Department of Food Science and Human Nutrition, University of Illinois, Urbana
PATRICIA CRAWFORD, Adjunct Professor and Director, Atkins Center for Weight & Health, University of California, Berkeley
ROBERT CROSNOE, Professor, Department of Sociology and Population Research Center, University of Texas, Austin
CARLETTE KYSER PEGRAM, Education Program Specialist, U.S. Department of Education, Washington, DC
KARLA P. SHELNUTT, Assistant Professor and Extension Nutrition Specialist, Department of Family, Youth and Community Sciences, University of Florida, Gainesville

IOM Staff

SHEILA MOATS, Program Officer
KAREN CAMPION, Research Assistant
ALLISON BERGER, Senior Program Assistant
FAYE HILLMAN, Financial Associate
GERALDINE KENNEDO, Administrative Assistant
LINDA D. MEYERS, Director, Food and Nutrition Board (until May 2013)

[1]Institute of Medicine planning committees are solely responsible for organizing the workshop, identifying topics, and choosing speakers. The responsibility for the published workshop summary rests with the workshop rapporteurs and the institution.

Reviewers

This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published workshop summary as sound as possible and to ensure that the workshop summary meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the process. We wish to thank the following individuals for their review of this workshop summary:

Sharon L. Contreras, The Syracuse City School District
Tracy Fox, Food, Nutrition, and Policy Consultants, LLC
Brian J. Griffith, Maryland State Department of Education
Pam Koch, Teachers College Columbia University

Although the reviewers listed above have provided many constructive comments and suggestions, they did not see the final draft of the workshop summary before its release. The review of this workshop summary was overseen by **Melvin Worth.** Appointed by the Institute of Medicine, he was responsible for making certain that an independent examination of this workshop summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this workshop summary rests entirely with the rapporteurs and the institution.

Contents

1

Introduction and Themes of the Workshop[1]

The childhood obesity epidemic and related health consequences are urgent public health problems. Approximately one-third of America's young people are overweight or obese (Ogden et al., 2012). Health problems once seen overwhelmingly in adults, such as type 2 diabetes, cardiovascular disease, and hypertension, are increasingly appearing in youth (Jago et al., 2006; Nelson and Bremer, 2010). Though the health of Americans has improved in many broad areas for decades, increases in obesity could erode these and future improvements (Stewart et al., 2009).

The IOM report *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation* recognized the importance of the school environment in addressing the epidemic and recommended making schools a focal point for obesity prevention (IOM, 2012). The development and implementation of K-12 nutrition benchmarks, guides, or standards (for a discussion of these terms, see the next section of this chapter) would constitute a critical step in achieving this recommendation. National nutrition education curriculum standards could have a variety of benefits, including the following:

[1]The planning committee's role was limited to planning the workshop, and the workshop summary has been prepared by the workshop rapporteurs, with the assistance of Institute of Medicine (IOM) staff, as a factual summary of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and participants and are not necessarily endorsed or verified by the IOM, and they should not be construed as reflecting any group consensus.

- Improving the consistency and effectiveness of nutrition education in schools;
- Preparing and training teachers and other education staff to help them provide effective nutrition education;
- Assisting colleges and universities in the development of courses in nutrition as part of teacher certification and in updating methods courses on how to integrate nutrition education in subject-matter areas in the classroom and in materials; and
- Establishing a framework for future collaborative efforts and partnerships to improve nutrition education.

Given the widespread and growing interest in nutrition education, the Food and Nutrition Service of the U.S. Department of Agriculture (USDA) asked the IOM to conduct a workshop on the merits and potential uses of a set of national nutrition education curriculum standards and learning objectives for elementary and secondary school children. Held in Washington, DC, on March 11-12, 2013, the workshop brought together more than 100 registered participants to identify current promising practices, consider the most important attributes of such standards, and suggest approaches to build acceptance and use among educators (see Appendix A for the Statement of Task). Box 1-1 lists some of the key questions derived from the statement of work to be addressed at the workshop.

The workshop was organized by a planning committee chaired by Karen Weber Cullen, professor of pediatrics at the Children's Nutrition Research Center, Baylor College of Medicine. The members of the planning committee played key roles in moderating sessions at the workshop and in synthesizing the observations made by breakout groups on the workshop's second day.

This report is a summary of the workshop's presentations and discussions prepared from the workshop transcript and slides. This summary presents recommendations made by individual speakers. However, none of these recommendations, including those summarized below from the closing session, should be seen as consensus recommendations of the workshop.

Following this introductory chapter, which provides background and introduces the main themes of the workshop, Chapter 2 describes the current opportunity to move forward on the development and implementation of national nutrition education curriculum standards. Chapter 3 provides an overview of past research on school-based nutrition education and a statistical summary of the extent of curriculum education occurring today. Chapter 4 looks at the lessons that can be learned from several major federal nutrition programs that include educational components. Chapter 5 recounts the experiences from California, Wisconsin, and Washington, DC, in instituting nutrition education in schools. Chapter 6 offers perspectives

BOX 1-1
Workshop Questions

Key questions to be addressed during the workshop included the following:

- What are the most important skills, tools, and knowledge for children to learn to support healthful diets? How adequate are the current nutrition education-related materials available to teachers in the K-12 setting in addressing these areas?
- Do teachers and administrators have adequate training to provide classroom instruction in the areas of nutrition education and/or nutrition education integration into core curriculum courses?
- What models, benchmarks, or promising practices should be used in developing the standards?
- What challenges could impact development and implementation of national nutrition education standards? What forces or barriers should be considered in developing these standards? How do age, gender, culture, community, and ethnicity need to be factored into the standards?
- How will the standards be used? Who will be a champion for the development and use of the standards?
- What are the potential positive outcomes resulting from the implementation of national nutrition education standards in core curriculum courses?

on nutrition education from a school board member, a superintendent, a principal, and a teacher. Chapter 7 examines the training and professional development of teachers that could enable them to deliver standards-based nutrition education effectively. And Chapter 8 provides the steering committee's synthesis of the observations made by six breakout groups that met for 2 hours to discuss several critical questions on the morning of the workshop's second day. Appendix A contains the Statement of Task and workshop agenda; Appendix B presents biographical sketches of the moderators and speakers; Appendix C provides the names and affiliations of workshop attendees; and Appendix D identifies acronyms and abbreviations.

THE USE OF THE TERM "STANDARDS"

The United States has been pursuing a standards-based vision of education reform for almost three decades. The 1994 reauthorization of the Elementary and Secondary Education Act mandated the establishment of rigorous content standards for all students and assessments to measure students' progress in meeting the standards (Improving America's Schools Act of 1994, P.L. 103-382). However, this approach to education reform has

encountered many practical difficulties. As a white paper from the National Academy of Education (2009) asks, "Exactly what should the standards be, how should they be set and by whom, and how should they be applied to ensure rigorous and high-quality education for American students?"

Even the word "standards" can generate concern over the procedures used to determine and assess what students should know and be able to do. The planning committee for the workshop decided to use the word standards to signify expectations for student learning in the area of nutrition. But on the first day of the workshop, all of the participants were given slips of paper on which they were invited to jot down alternatives to the word standards. Some of the suggested alternatives include

- competencies,
- guidelines,
- benchmarks,
- standards,
- expectations,
- goals,
- guidance
- objectives,
- framework,
- touchstone
- roadmap, and
- indicators.

This summary of the workshop generally uses the word standards to denote the complex of ideas captured by the terms listed by participants. However, the term should be interpreted broadly and does not imply a specific approach to nutrition education.

SUMMARY OF WORKSHOP THEMES

In the final session of the workshop, Katie Wilson, executive director of the National Food Service Management Institute at the University of Mississippi, reviewed some of the most important points made during the workshop. Her summary is presented here as an introduction to several of the workshop's major themes.

Nutrition education is a life skill that provides the appropriate knowledge and skills to eat healthfully, which affects both quality of life and longevity. Furthermore, research has shown that nutrition education can change behaviors. Many questions remain regarding what should be taught, how it should be taught, and how much time needs to be devoted to nutrition education. But enough evidence exists to convince people that nutrition

education is effective, Wilson observed, so long as that evidence can be presented to others in a convincing manner.

Nutrition education needs to be factual. Changes to the school meal patterns should be explained to students and staff. For example if meal patterns are changed to add more vegetables, students and staff need to learn the health benefits of eating vegetables in engaging ways. "Children want to know why," Wilson said. "Why can't I do what you're telling me not to do?" Teachers should not be espousing the latest fad read in a magazine or their own personal views on nutrition. Wilson particularly emphasized the need to teach nutrition every year so that knowledge builds sequentially and cumulatively.

Participants at the workshop spoke about both nutrition education and food literacy, and Wilson urged continued attention to the latter term. For example, encouraging people to eat foods from the produce aisle that have a variety of colors is food education. Scientific information focused on nutrients can be too far removed from the choices that students and parents make every day. People need simple and consistent messages that they can understand.

Nutrition education is designed to achieve a change in lifestyle, which will not happen overnight. Teachers, administrators, students, and parents all need time to incorporate new information and change their behaviors accordingly, and some will change more readily than others. Also, nutrition education "takes a village," Wilson said. The issue belongs to everyone, whether teacher educators in universities, new dietitians, the general public, or school nutrition staff. Moreover, the issue is international, with conversations about childhood nutrition, obesity, and education occurring in countries around the world.

Nutrition education is for teachers as well as students. Teachers can benefit greatly from better eating and health, which in turn will benefit their students. And as teachers learn more about nutrition, they are better able to convey that information—and their enthusiasm over better health—to their students.

Nutrition education needs champions. For example, Wilson referred to the organization Action for Healthy Kids, which is a grassroots organization devoted to changing the school environment. The people involved in that organization and similar organizations are "already doing it, and they're doing it in their districts with their district culture." Nutrition expertise also needs to be leveraged, given the scope of the changes that are necessary. For example, the National Food Service Management Institute, which provides education, training, technical assistance, and research in school nutrition, uses a train-the-trainer model to multiply impact, which Wilson recommended.

National nutrition education curriculum standards would need to be

aligned with state standards. They also would need support from multiple stakeholders, such as school boards, principals, and legislators. And they would need to be flexible to accommodate the great differences among schools.

Nutrition education can take advantage of the skills and enthusiasms of young people. They are the ones who are experts at social media and would know how to use new technologies and platforms to foster change. Students "are more than willing to tell you what they think, how they feel, and how you should do it right, so they'll help us."

Many nutrition education curricula already exist. These could be compiled, compared, and mined for valuable information and approaches, with the National Agricultural Library serving as a portal for wide dissemination.

More science-based evidence from studies on the effectiveness of various nutrition education curricula is needed to know how best to move forward. Strategic planning can help ensure that initiatives are taken thoughtfully and carefully. And education and practice need to reinforce each other—"they go hand in hand."

"The time is now," said Wilson. "Never before has the conversation been as loud." Support from the Obama Administration is very strong. Even the advocates of ideas that seem implausible, such as radical changes in food preparation in schools, have something to contribute to the dialogue. "Everybody is talking about childhood wellness," Wilson said—a term she prefers to "obesity" because of the stigmatizing effect of that term.

The workshop was not designed to produce definitive answers, Wilson observed. Rather, it was organized as a conversation, and the conversation needs to continue. "We have a responsibility," she said. "We are the ones who are passionate. We must keep the pendulum moving." As Wilson concluded, quoting the entrepreneur and speaker Jim Rohn, "You cannot change your destination overnight, but you can change your direction immediately."

2

The Current Opportunity

Important Points Made by Individual Speakers

- Poor eating and physical inactivity increase the likelihood of poor educational outcomes, which will have a direct impact on the future state of society.
- Issues of healthy eating and wellness are attracting more attention today than they have in the past.
- The knowledge and resources exist today to change eating patterns and food environments.
- Innovations in nutrition education could occur on a state-by-state basis and then expand.
- Hunger and obesity are societal problems, not the fault of any particular institution, which means that everyone can contribute to solutions.

In the first two sessions of the workshop, three speakers explained why the time is right for national nutrition education curriculum standards. The severity of the hunger and obesity problems has intensified an ongoing conversation to the point where action is possible. The knowledge and resources to teach students about healthy eating either already exist or could be developed. Education standards could capture and embody the collective responsibility of society to counter obesity and poor health outcomes. For these reasons and more, the workshop presented an opportunity to advance understanding of nutrition education.

COMBINING HEALTHY FOODS WITH NUTRITION EDUCATION

Healthy eating in America poses a dual challenge, said Janey Thornton, Deputy Under Secretary of Food, Nutrition, and Consumer Services at the U.S. Department of Agriculture (USDA). Hunger remains a "real issue," despite the widespread belief that everyone in America either has enough food to eat or is personally to blame for lacking sufficient food. At the same time, obesity is a serious problem across income levels and demographic groups.

Poor eating and physical inactivity in turn contribute to key educational risks, including behavioral problems, short-term thinking, lack of motivation, disengagement from learning, and absenteeism. Before coming to Washington, Thornton was a home economics teacher and school nutrition director in Kentucky, and "I saw all of these things," she said.

These educational risks increase the likelihood of poor educational outcomes, including poor grades, low standardized test scores, grade level retention, and dropping out. These outcomes will have a direct impact on the future state of society, she said. "When people are saying, 'We have to get people off welfare rolls,' . . . it comes back to education."

The Obama Administration is committed to improving healthy eating and physical activity, and this commitment has already helped produce positive changes in schools and surrounding communities, Thornton observed. Schools serve about 32 million student lunches daily during the school year, and 12 million children participate in school breakfast programs. Yet only about 60 percent of the students in schools eligible for the school lunch program participate, and only about 28 percent of students take advantage of breakfast programs. "Kids aren't taking advantage of the food that's there."

Thornton particularly called attention to the problems posed by schools with open campuses, where students can go elsewhere for lunch. "If I'm a poor kid and I'm sitting there and all the cool kids go to the nearest fast food restaurant to eat, do you think I want to be caught dead in the cafeteria? I would rather be hungry than be viewed as a nerd." This problem cannot be solved overnight, in part because of the limited capacity of many school cafeterias, but if communities recognized the importance of good nutrition, they could augment school cafeterias and gradually require more students to stay on campus for lunch.

The Healthy, Hunger-Free Kids Act of 2010 (P.L. 111-296) calls for local wellness policies that include goals for nutrition education, physical activity, and other school-based activities that promote student wellness, in addition to school-based nutrition guidelines to promote student health and reduce childhood obesity. The act also requires that local wellness policies include goals for nutrition promotion. (Box 2-1 summarizes the act's well-

BOX 2-1
Requirements of the Healthy, Hunger-Free Kids Act

The 2010 Healthy, Hunger-Free Kids Act (P.L. 111-296, Sec. 204) "requires each local educational agency participating in the National School Lunch Program or other federal Child Nutrition programs to establish a local school wellness policy for all schools under its jurisdiction. Each local education agency must designate one or more local education agency officials or school officials to ensure that each school complies with the local wellness policy."

At a minimum, a local school wellness policy must

- Include goals for nutrition promotion and education, physical activity, and other school-based activities that promote student wellness.
- Include nutrition guidelines to promote student health and reduce childhood obesity for all foods available in each school district.
- Permit parents, students, representatives of the school food authority, teachers of physical education, school health professionals, the school board, school administrators, and the general public to participate in the development, implementation, and review and update of the local wellness policy.
- Inform and update the public (including parents, students, and others in the community) about the content and implementation of local wellness policies.
- Be measured periodically on the extent to which schools are in compliance with the local wellness policy, the extent to which the local education agency's local wellness policy compares to model local school wellness policies, and the progress made in attaining the goals of the local wellness policy, and make this assessment available to the public.

SOURCE: USDA-FNS, 2013a.

ness provisions.[1]) The educational component of the act raises several key questions, according to Thornton. What is the best way to promote food literacy and nutrition knowledge and educate students on how to make healthy eating choices? How can parents learn to say no when their children ask for unhealthy foods? How can teachers be trained and convinced not to use unhealthy treats as a reward for achievement in schools? Many states used to require that future teachers take a basic course in nutrition education, but such courses generally are no longer required for teacher certification. "Yet, we expect nutrition education to be implemented and integrated in our classrooms today," Thornton said.

[1]See http://www.fns.usda.gov/tn/healthy/wellnesspolicy.html.

A wealth of resources and information is available.[2] But putting these resources to use requires changes in schools. When Thornton was a school nutrition director, she tried to do some kind of nutrition education activity in 12 classrooms per year. But she oversaw 24 schools and spent less than an hour in each of those classrooms each year. "That's not even a speck of sand on the beach," she said. Similarly, school nutritionists from land-grant colleges do "great work," but their impact is dwarfed by the job that needs to be done.

Teachers feel overwhelmed and underappreciated, Thornton noted. They need to be empowered to help them understand how good nutrition and healthy eating can improve their classrooms. Teacher educators in colleges and universities need to teach future teachers how to implement nutrition education into their instruction. Teachers need to understand the importance of nutritional balance and proper portion sizes. Nutrition education needs to be incorporated not just into mathematics or science instruction but across the curriculum, with some form of accountability for nutrition instruction.

Such changes could occur on a state-by-state basis and then expand, Thornton noted. Schools are highly competitive, and recognition for one school can spur others to make changes. The media can be a catalyst for such changes by celebrating successes where changes in schools increase learning.

Thornton described some of the "phenomenal" school visits she has made, from seeing students eating baked kale in Arizona to visiting schools in Idaho where seniors join younger students for lunch and encourage them to eat healthy foods. Many current students have never seen or tasted kiwis, asparagus, Brussels sprouts, or broccoli. "Kids don't have it at home, and they don't know what it is."

Nutrition education and physical activity can ease the pressure on school budgets, help students make healthy choices that become lifelong habits, and improve the nation's health, Thornton concluded. But progress will require acknowledging the issues, continued dialogue, goals focused on the big picture, and recognition of the roles that everyone can play. The realization has been growing that obesity and hunger are societal problems, not the fault of any particular institution. The consequence is that everyone can contribute to the solution. "It's going to take everybody working together."

[2]See http://www.teamnutrition.usda.gov.

A TIPPING POINT FOR NUTRITION EDUCATION

The nation has reached a tipping point on issues involving healthy eating and wellness, according to Norris Dickard, who directs the Healthy Students Group at the U.S. Department of Education. Shortly before the workshop, First Lady Michelle Obama announced the Let's Move Active Schools initiative to create active environments for students before, during, and after school.[3] A new report issued by the Healthy Schools Campaign and Trust for America's Health, entitled *Health in Mind*, has compiled the scientific studies related to good nutrition, physical activity, learning, and mental health, providing what Dickard called "a good summary of the connection between healthy mind, wellness, and academic achievement" (Carr et al., 2013). Emerging science has informed the nutrition standards embodied in the My Plate guidelines.[4] Secretary of Education Arne Duncan has spoken often about the connection between wellness and academic success, and a key component of wellness is nutrition.

Nutrition education needs to be infused throughout the curriculum to capture the hearts and minds of students, Dickard said. Students need enough time to eat in a healthy manner during school meals. They need to be educated about the benefits of eating healthy foods so that, as Dickard recalled of his daughter's experiences at school, untouched apples do not end up in trash cans.

The Education Department is prohibited by statute from exercising "any direction, supervision, or control over the curriculum, program of instruction, administration, or personnel of any educational institution, school or schools system, or over the selection of library resources, textbooks, or other printed or published instructional materials" (20 U.S.C., Sec. 1232a). But it can provide program models that teachers and administrators can use and adapt. Dickard cited the example of the Carol M. White Physical Education Program at the Department of Education, which emphasizes nutrition as well as physical activity. The grants made to schools and community-based organizations under this program foster innovation and emphasize getting parents and the community involved.

Those seeking to develop nutrition education standards can learn from similar efforts in other fields. Various groups have developed standards in the arts, social sciences, mathematics, science, and other areas of the curriculum, and states have moved individually or as collaborative groups to implement these standards.

But in developing curriculum standards it is important to be mindful that teachers feel squeezed by everything that they are asked to do, Dickard

[3]See http://www.letsmove.gov/active-schools.
[4]See http://www.choosemyplate.gov.

said, echoing Thornton's comments. When he was a middle school science teacher, Dickard also was asked to teach the drug abuse prevention unit, the sex education unit, and other topics. The many demands made of teachers and schools require educators to make trade-offs if they are asked to teach new material. Adding to the curriculum may require subjects to be deleted from the curriculum elsewhere.

Nevertheless, Dickard was optimistic. "The time is right. You have the most important and right questions before you. You have a broad group of people with the diverse expertise required to discuss the matter. . . . We're at a crest of the issue of making a connection to student wellness and academic achievement."

NUTRITION IN HEALTH AND LEARNING

To support the need for nutrition education, Virginia Stallings, professor of pediatrics at the University of Pennsylvania Perelman School of Medicine and Children's Hospital of Philadelphia, provided an overview of evidence on the effects of nutrition on children's health and learning.

At a broad level, health affects learning when children miss school or are late for school. More specifically, going to school without a good breakfast has a consistent impact on readiness to learn. In addition, food security has a major impact on learning. A student who is hungry multiple times during a week or during a month cannot help but be affected physiologically and emotionally. Children can be hungry and skinny or hungry and obese, and we in the educational setting need to particularly strive to understand that hunger and obesity often go together.

Nutrition is mostly about food, not about specific micronutrients, with the exception of iron. Over time, the emphasis in nutrition programs has moved from micronutrients to the amount and variety of food, which is also easier to teach, Stallings observed. However, evidence about how to promote wellness and sustain health through healthy eating can be harder to generate than evidence about preventing illnesses caused by deficiencies of specific nutrients.

Obesity rates among children have risen continually for more than 30 years, though the most recent evidence suggests that the rates may be plateauing. Nevertheless, obesity now affects large numbers of children in school, not just a few, as was the case in the past. As a result, more poor health outcomes are being seen in children. "Adult-onset" type 2 diabetes is now commonly seen in the pediatric endocrine clinic where she practices, which marks a "fundamental shift," according to Stallings. Children also are exhibiting cardiovascular disease and hypertension at an earlier age, have more orthopedic problems, and are more likely to suffer from asthma and sleep apnea. Anemia is less common than it used to be but has not been

eradicated, and poor nutrition continues to have an effect on bone health. Nutrition also has an effect on dental health, which in turn can affect eating, speaking, and attending to learning.

Anorexia and bulimia are being seen in younger and younger children and in boys as well as girls. Night eating syndrome also is proving to be common in adults who eat large amounts of calories at night, and expose their children to this behavior. According to surveys, many children in middle schools and even some in elementary schools say they are dieting, though the effects on their eating are largely unknown. Nevertheless, "the concept is already in their vocabulary and in how [they] think about food and life," said Stallings.

Children who are obese continue to suffer from discrimination from adults and peers, as well as bullying, despite the fact that obesity is fairly common in school-aged children. They also are more likely to feel a sense of isolation and to experience depression.

Nutrition education has a "huge opportunity" to change these poor health outcomes, according to Stallings. The public has a greater awareness of the need for healthy foods and good nutrition, which may be contributing to the stabilization of obesity rates.

First, the food environment in schools is slowly changing. In the past, students have had many options for food during the school day, including à la carte items, vending machines, food from fundraisers, school stores, and competitive foods bought outside schools. These alternatives are culturally and often financially embedded in schools. At the same time, 99 percent of public schools and 83 percent of private schools participate in the school lunch program, and with that opportunity comes a responsibility to control the food environment, said Stallings. The Institute of Medicine (IOM) report *School Meals: Building Blocks for Healthy Children* offered a set of practical and economical recommendations for standards that reflect current nutritional science, increase the availability of key food groups, and allow the National School Lunch Program and School Breakfast Program to better meet the nutritional needs of children, foster healthy eating habits, and safeguard children's health (IOM, 2009). As a result of this and other initiatives, students have been eating more fruits and vegetables at lunch and fewer starchy foods and refined grains, Stallings reported.

The school lunch and school breakfast programs are, in effect, the largest restaurant chain in the country, Stallings noted. A student who has lunch at school every day would consume one-sixth of his or her meals each year in that setting, and a student who has lunch and breakfast each day would consume one-third. "There's almost nothing else in our interaction with the public where we could influence student health across such a big platform." If all the foods in schools could be healthy choices, healthful eating would be considerably advanced.

Children make frequent food decisions related to calories, fats, sugar, salt, vegetables, snacks, portion sizes, and food choices. To make healthy choices, they have to be as interested in the carrot sticks and healthy sandwich as in the less healthful snacks available to them. Most students—along with most teachers—get most of their information about foods from the media, their parents, and their peers. Some of this information is accurate and some is not, and nutrition science remains a work in progress and is sometimes contradictory. Teachers themselves need training to learn the basics after being barraged by a stream of accurate or inaccurate or confusing information.

The IOM report *Nutrition Standards for Foods in Schools* identified foods to encourage and foods to avoid (IOM, 2007). It recognized the need for flexibility at the state and local levels and for traditions such as parties, holidays, and fundraisers. But it also proposed minimum standards and reasonable limitations on when and where specific foods would be available. For example, it identified standards for foods and beverages related to such criteria as calories in a serving, calories from fat, the kinds of fats in food, and sugar and sodium content. Proposed rules from USDA to establish nutrition standards for all foods sold in schools, beyond the federally supported school meals programs, have incorporated most of these recommendations, though at the time of the workshop the regulations had not yet been finalized.

Fragmented efforts could be unified, said Stallings. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program, Head Start, day care, school meals, competitive foods, and the Supplemental Nutrition Assistance Program (SNAP) all affect eating and nutrition. The Dietary Guidelines for Americans were revised in 2010 and are in the process of being revised for 2015. USDA regulations and congressional legislation also provide overarching guidelines. The move to the My Plate system constitutes a dramatic change in nutrition education guidance. Furthermore, new research, such as the School Nutrition Dietary Assessment study series, provides solid data on which to evaluate future changes.

More political will exists today than at any time in the past, and stakeholder groups have been coming together to discuss how best to make progress. "There is no question that the health of children can be improved by what we serve in schools," Stallings concluded. "Our next challenge is education and behavior so that students will choose the right things, and then that will blend into the rest of their lives."

3

The Context for Change

Important Points Made by Individual Speakers

- Reviews of the research evidence suggest that nutrition education is effective overall, even if it is not effective across the board in all individual studies and individual behaviors.
- The outcomes of nutrition education should be stated in behavioral terms, whether related to health, food systems, food safety, or other relevant issues.
- Nutrition education needs to enhance the motivation to act and facilitate the ability to engage in behaviors that promote and support health and food-related concerns.
- Between 40 and 50 hours of education are needed to change general knowledge, practices, and attitudes.
- Of all the institutions that influence eating behaviors, schools may have the greatest potential effect.

The development and implementation of national nutrition education curriculum standards would not occur in a vacuum. Two workshop presenters described research that they and others have done on past nutrition education and the lessons that can be drawn from that research.

LESSONS FROM PAST RESEARCH

Is nutrition education effective, or should attention be devoted primarily to changing access to food and the food environment to change eating behaviors? Isobel Contento, the Mary Swartz Rose Professor of Nutrition Education and Coordinator of the Program in Nutrition at Teachers College Columbia University, summarized the results of past research to answer this question.

A recent meta-analysis by Waters et al. (2011), which looked at 55 studies of obesity prevention interventions in more than 27,000 children through age 18, found an overall reduction in body mass index of 0.15 kg/m^2, with the greatest reduction (of 0.26 kg/m^2) among children aged 0 through 5 years. The authors concluded that one of the promising strategies was school curriculum that includes healthy eating, physical activity and body image. Similarly, a meta-analysis by Katz et al. (2008), which looked at the effects of nutrition education along with physical activity and a reduction in television watching in 10,752 children aged 5 through 18 in eight separate studies, found significant reductions in body weight compared with controls, Contento noted. Subsets of the eight studies that were less comprehensive had smaller effects, but even these subsets were effective in reducing weight.

These meta-analyses found positive effects overall despite the fact that the results of individual studies in terms of *specific* behaviors related to energy-balance (and hence weight) have been mixed. These behaviors include consumption of sweetened drinks, snacks, fast foods, fruits and vegetables, as well as physical activity, or sedentary behaviors. Some studies have resulted in desired changes for some of these behaviors but not all, and others did so for one gender only or one particular age group.

A review of school-based fruit and vegetable interventions found a range of effect sizes, from medium to large (Howerton et al., 2007), though all the changes were positive. Interventions led by the researchers had a larger effect than those led by teachers, suggesting the importance of effective implementation of education programs. Furthermore, even relatively small changes in servings can represent a large effect if spread across millions of children, Contento observed.

Individual studies of fruit and vegetable consumption also have produced promising results. In a study of 15 interventions promoting children's fruit and vegetable consumption, Knai et al. (2006) found that 9 of 11 elementary school programs and 1 of 4 high school programs were effective at significantly increasing daily consumption of fruit and vegetables by 0.3 to 0 .99 servings. Moreover, three of the studies had effect sizes of between 0.7 and 0.9 servings.

Contento described an earlier systematic review she did of 40 studies of

children mostly in grades three through nine. Eight of 17 studies directed at general nutrition education were effective, while 18 of 23 directed at behavioral changes were effective at achieving behavior change (Contento et al., 1995). This is important, said Contento, because changing behavior is more difficult than changing knowledge and behavioral change should be the goal of nutrition education.

Finally, a meta-analysis of 12 meta-analyses found a positive effect on health behavior changes in eating and physical activity (Johnson et al., 2010).

"On balance," Contento concluded, "reviews of evidence suggest that nutrition education is effective overall, even if it is not across the board in all individual studies and individual behaviors and the effects are often modest."

Contento also included an older study because at that point the researchers were able to divide the studies between those that focused on general nutrition education topics versus studies that focused on specific behaviors. Whitehead (1973) did a systematic review of nutrition education with school-aged children conducted between 1900 and 1970 and identified several elements of effective programs:

- Changing behavior was clearly specified as the goal.
- Educational methods were appropriate to the goal.
- Individuals themselves were involved in problem solving.
- An integrated community approach was used.

Similarly, in a comprehensive and systematic review of 40 studies between 1980 and 1995 involving children primarily in grades three through nine, Contento and colleagues (1995) found that some behavior change was achieved in 18 of 23 behaviorally focused nutrition education interventions, but only in eight of 17 studies directed at general nutrition education. This is important, said Contento, because changing behavior is more difficult than changing knowledge, and behavioral change (supported by knowledge and skills) should be the goal of nutrition education. This review concluded that the outcomes of nutrition education should be stated in behavioral terms (whether related to health, food systems, or food safety). Education standards tend to focus on knowledge rather than behaviors, Contento said.

Elements contributing to the effectiveness of nutrition education include

- Eating and educational strategies based on both theory and evidence, including:
  - Cognitive dimensions (involving concepts and skills),
  - Affective dimensions (involving motivations, beliefs, values, and emotions)

    - Behavioral dimensions (involving personalized self-assessments, decision making, and behavioral-change strategies)
- Adequate duration and intensity (Box 3-1 discusses the critical issue of how much nutrition education is needed to change behaviors.)
- Sequential and coherent
- Involve intervening in the school environment
- Parent involvement, particularly for younger children
- Community involvement.
- Coordinated with the school curriculum and school meals.

Box 3-2 looks at the National Health Education Standards as a model for national nutrition education standards.

Katz et al. (2008), Knai et al. (2006), and Waters et al. (2011) also derived lists of promising policies and strategies, from which Contento abstracted several elements that are common to all the lists:

- Curricula should focus on healthy eating and physical activity.
- Specific behaviors should be the goals.
- Programs should be active and participatory and include exposure to healthy food.
- Attention should be devoted to cultural and diversity issues.
- Teachers need to be given support.
- Schools, families, and communities should be involved.

In general, she said, these elements constitute a social ecological model for both individuals and the environment (Contento, 2010). Nutrition education needs to enhance the motivation to act and facilitate the ability to engage in behaviors that promote and support health and food-related concerns. Cerin et al. (2009), in a review of seven school-based interventions that fit their criteria, found that effective mediators of behavioral change were beliefs about outcomes (which affected motivations), behavioral-change and goal-setting skills (which helped students change behaviors through enhanced self-efficacy) and habit. Nutrition education also needs to provide a universe of concepts and skills while fitting with the educational mandates and the needs and constraints of teachers, including the time limits on nutrition education. "Obviously we have a lot of challenges," Contento said.

Enhancing motivation involves knowledge, values, attitudes, and social norms. People may have outcome expectations based on scientific evidence, but they also can be motivated by risks, concerns, preferences, attitudes, and self-efficacy. Similarly, people need food- and nutrition-related knowledge and skills to act, but they also need self-regulation skills in such areas as self-assessment, decision making, planning, and self-monitoring.

Finally, Contento described what nutrition education programs look like in practice. Accessibility to healthy foods is important but is not enough. As an example, she cited Cookshop, which is an ongoing program in 500 schools. In the initial effectiveness study, when provided with whole grains and vegetables, only those students who received nutrition education in the classroom, and particularly cooking instruction, improved their eating (Liquori et al., 1998). In another study, younger children who received plates of vegetables and fruit were more likely to consume those foods if they also received cartoons of children their age eating those foods along with stickers for eating them. Even after the cartoons and rewards were stopped, the targeted children were eating more fruits and vegetables 6 months later (Horne et al., 2004). "They needed something to get them to become familiar with the fruits and vegetables, and then once they were familiar them, the behavior seemed to continue."

People who are directly involved with nutrition have large stores of nutrition science knowledge, and "we love all that information," said Contento. As a result, they often try to include as much information as possible in introductory nutrition education presentations and lessons. While their enthusiasm for the subject is laudable, the developers of nutrition education standards will need to be careful not to include too much specific nutrition science information. Rather, the standards need to enhance motivation to act and facilitate the ability to act on behaviors that promote and support health and other food-related concerns. Standards can be comprehensive while still avoiding too much detail. Contento argued for an emphasis on functional knowledge—information that people can use to change behaviors, such as knowing how much sugar a particular beverage contains. "Our teachers are going to have less time, and they need to have information that is going to be practical." Also, the integration of nutrition education into other subjects will be different in elementary schools, where topics are more integrated, than in middle and high schools.

An issue that came up in the discussion following Contento's presentation is how to define nutrition education. The word nutrition technically covers the entire diet, but it also can be interpreted to refer specifically to nutrients. One possibility would be to refer to food and nutrition education. Another possibility is to refer to food literacy, which could be interpreted to include physical activity.

SCHOOL-BASED NUTRITION INTERVENTIONS: FINDINGS FROM THE LITERATURE

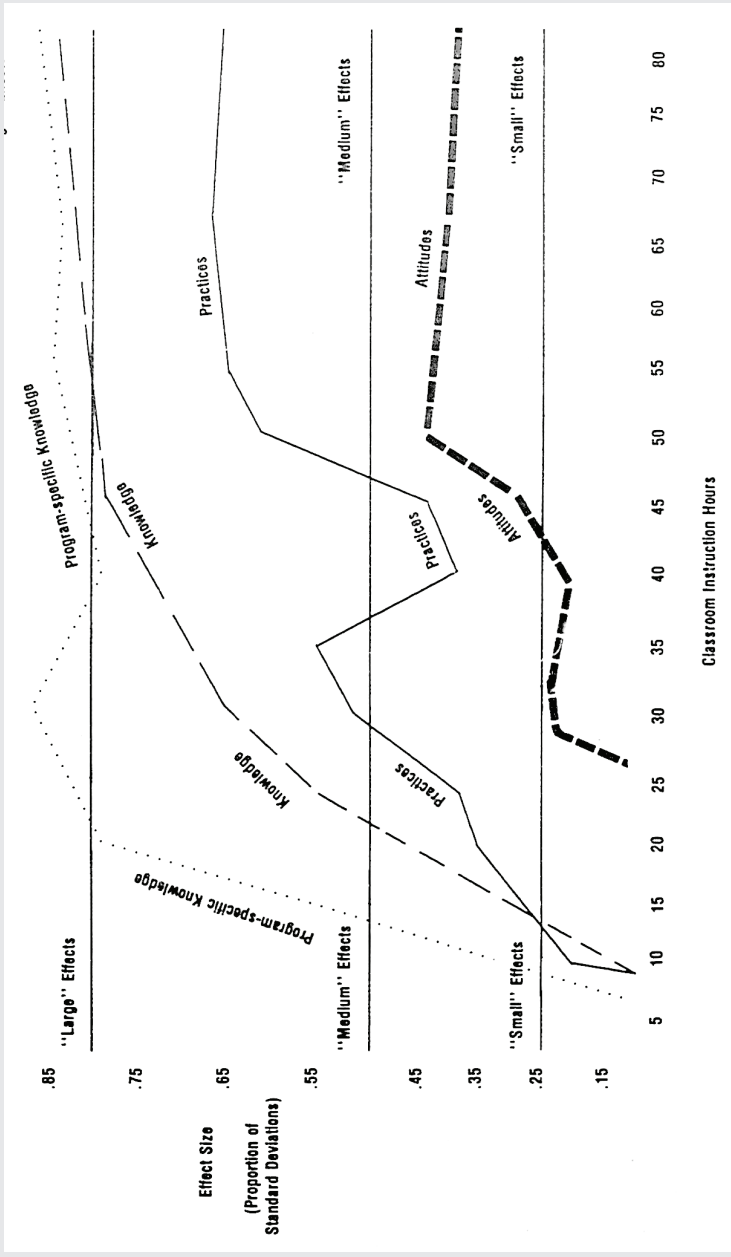
Between the ages of 5 and 17, 95 percent of children and adolescents are educated by U.S. schools (U.S. Census Bureau, 2011). Of all the institutions that influence eating behaviors—including government, industry, and

BOX 3-1
How Much Time Should Be Spent on Nutrition Education?

In her presentation, Contento suggested that between 40 and 50 hours of nutrition education may be needed for that education to be effective. This number comes from a study done by Connell et al. (1985) of more than 1,000 classrooms in which four model curricula were tested on 30,000 students in grades four through seven (Figure 3-1). Evaluation instruments found that program-specific knowledge increased substantially during the first 15 hours of classroom instruction, but general knowledge, practices, and attitudes did not increase to their maximal levels until after 40-50 hours of classroom instruction. In contrast, the School Heath and Programs Study of 2006 found that nutrition and dietary behavior topics consume a *median* of 3.4 hours in elementary schools, 4.2 hours in middle schools, and 5.9 hours in high schools (Kann et al., 2007). The total hours will be somewhat greater. Other studies have found 8-12 hours devoted to nutrition education.

As was observed later in the workshop, the typical school year includes about 1,000 hours of instruction, Nutrition education may need 40-50 hours of time to have optimal effects, but if other subjects outside of the standard curriculum require comparable amounts of time, teachers may be hard pressed to include everything they are asked to include. Some of the hours may thus need to come from other school venues.

FIGURE 3-1 Knowledge, practices, and attitudes do not undergo large changes until after 40-50 hours of instruction.
SOURCE: Connell, D. B., R. R. Turner, and E. F. Mason. 1985. Results of the School Health Education Evaluation: Health promotion effectiveness, implementation, and costs. *Journal of School Health* 55(8):316-321. Reprinted with the permission of the *Journal of School Health*.



BOX 3-2
The National Health Education Standards

Contento called attention to the National Health Education Standards as a model for the development of nutrition education standards. These standards call for the following:

1. Comprehend concepts related to enhancing health.
2. Analyze the influences of family, peers, culture, media, and technology on health behaviors.
3. Access and analyze valid information, products, and services to enhance health.
4. Use interpersonal communication skills to enhance health, reduce or avoid health risks, or both.
5. Use decision-making skills to enhance health.
6. Use goal-setting to enhance health.
7. Practice behaviors to reduce risk and promote health.
8. Promote and support personal, family, and community health.

Also associated with the National Health Education Standards are a Health Education Curriculum Analysis Tool, which includes a healthy eating module (CDC, 2007), and guidelines for school programs to promote lifelong healthy eating. The guidelines cover the following:

1. School policy on nutrition;
2. Curriculum: preschool through secondary school as part of a sequential coordinated school health education curriculum designed to help health students adopt healthy eating behaviors;
3. Instruction for students: developmentally appropriate, culturally relevant, fun activities that involve social learning strategies;
4. Integration of school food service and nutrition education;
5. Training for school staff;
6. Family and community involvement; and
7. Program evaluation.

SOURCE: CDC, 1997.

the media—schools may have the greatest potential effect, said Mary Roseman, associate professor in the Department of Nutrition and Hospitality Management at the University of Mississippi.

In 2011, Roseman and two colleagues published a content analysis of 26 K-12 school-based nutrition interventions (Roseman et al., 2011). They used 12 school-based nutrition intervention reviews published between 1995 and 2000 to derive 10 general recommendations for school-based nutrition interventions, and then they used those 10 recommendations to

TABLE 3-1 Components of the School-Based Nutrition Interventions

Component	Percentage
Incorporating classroom curriculum	85
Involving parents at home	62
Training teachers on classroom nutrition education	42
Disseminating physical education materials	42
Increasing fruits and vegetables	38
Providing incentives for students or families	38
Lowering fat	31
Training school nutrition staff	31
Involving student peers	27
Establishing physical activity goals	27
Establishing school foodservice guidelines	15
Providing school incentives	12
Involving parents at school	8

SOURCE: Roseman et al., 2011.

analyze 26 new studies of obesity- or health-related school interventions published between 2000 and 2008. These 26 studies had many differences and used a wide variety of approaches (Table 3-1), but collectively they provide a valuable overview of what has been done in the past.

At the workshop, Roseman stepped through the 10 recommendations and examined their relevance to possible future nutrition interventions:

1. *Nutrition interventions are most effective when they are behaviorally focused.* All of the 26 interventions studied were behaviorally focused, despite many other differences in the studies. Eighty-five percent had both knowledge-based and behaviorally focused components of school-based nutrition interventions, whereas 15 percent were focused on behaviors only.
2. *The use of multicomponent interventions that address multiple influences on health behavior is important.* Eighty-eight percent of the studies addressed multiple components, but relatively few—only 27 percent—included physical activity goals. "I think we all would like to see that a bit higher," Roseman said.
3. *Healthful changes in the food and school environment can improve behavior changes at the population level.* These changes may affect lunch and breakfast programs, à la carte food, vending machines,

school stores, marketing, and advertising but seemingly smaller changes also make a difference, Roseman noted, such as educators eating with their students to set good examples and recognition and rewards for students based on their fruit and vegetable consumption.

4. *Family involvement enhances the effectiveness of school-based programs*. Family involvement was common—in 62 percent of the interventions—but Roseman also pointed to the difficulties involved in working with families. Nevertheless, families are critical because of their influence on what is eaten at home, how much physical activity takes place, and what kinds of role models exist for students.
5. *Incorporation of student self-assessments containing a feedback component is effective in middle school or older students*. Such assessments occurred in a third of the studies of middle and high school students. Especially important is teaching children how to assess their diet and how to make appropriate changes to create an improved diet.
6. *Inclusion of quantitative evaluation measures that capture food-related behaviors, eating patterns, and anthropometric measures is important*. The studies used a variety of evaluation methods, which tend not to be standardized, resulting in large variations in reporting across the studies. Roseman also emphasized the value of qualitative data, including interviews of students, staffs, and faculty; parent interviews; and focus groups.
7. *Interventions with links to the larger community can enhance school nutrition interventions*. Such involvement occurred in only 15 percent of studies, but several valuable models for such links exist, such as the community and school health program model provided by the Centers for Disease Control and Prevention.
8. *More studies should include ethnic and cultural groups to determine effective strategies and approaches for specific groups versus using entire school populations*. Only 15 percent of the studies looked at ethnic groups. In general, the literature lacks studies of minorities, Roseman noted.
9. *Use of innovative multimedia technology tools may enhance children's engagement in the intervention*. Children are proficient with new technologies—which were incorporated in about a third of the studies—and these technologies offer many potential benefits, ranging from Web-based instruction to celebrity videos to excite and motivate children.

10. *Nutrition education should be sequential, with sufficient duration and intensity, and include developmentally appropriate strategies.* Forty-two percent of the interventions studied extended for at least 6 months, but challenges in this area are great in the school environment, and more consistent and effective reporting and methods are needed.

Of the 26 nutrition interventions covered by the study, they were conducted in only 16 states, and four states—California, Florida, Minnesota, and North Carolina—had multiple interventions (Figure 3-2). Only one intervention published in the 9-year period from 2000 to 2008 came from one of the eight states (NSCH, 2007) with the highest obesity rates among youth ages 10 to 17. According to Roseman, this observation may suggest a lack of funding for new researchers trying to enter the field.

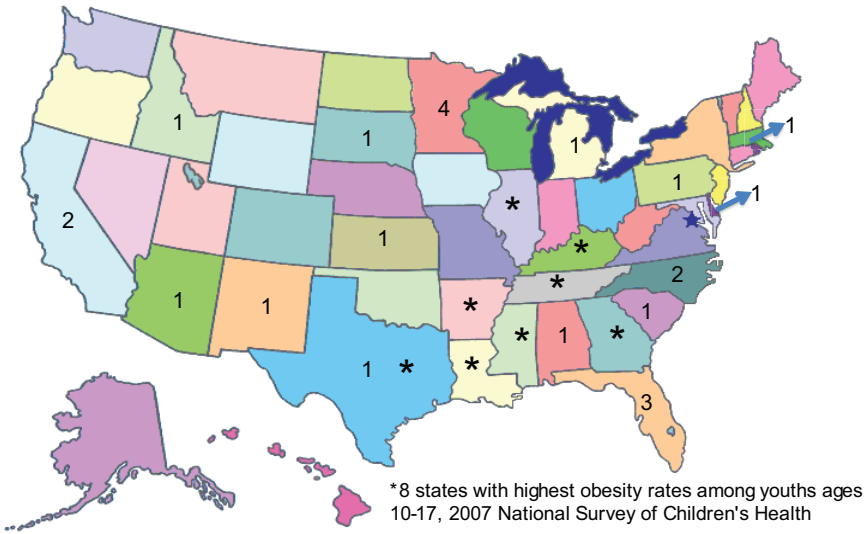


FIGURE 3-2 Eighteen of 26 nutrition interventions occurred in just 16 states and in only 1 of the 8 states with the highest obesity rates among youth.
NOTE: Data on interventions from Roseman et al., 2011 (Table 1). Eight of the 26 interventions studied did not report state information.
SOURCE: Roseman, 2013.

4

Lessons Learned from Federal Programs

Important Points Made by Individual Speakers

- The development and implementation of national nutrition education curriculum standards need to draw on the resources, materials, and experiences of past nutrition education efforts.
- Standards need to reflect appropriate learning methods, be behaviorally focused and evidence based, have program and fiscal accountability, and be consistent with legislation and with the mission, goals, and focus of the relevant government agencies.
- Standards also need to be appropriate for the backgrounds of the multiple audiences that receive nutrition education.
- Most schools devote less time to nutrition education than the suggested amount needed to change behaviors.

The U.S. Department of Agriculture (USDA) has extensive experiences delivering nutrition education to school children, food assistance recipients, and other groups. The Expanded Food and Nutrition Education Program (EFNEP) and the education component of the Supplemental Nutrition Assistance Program (SNAP-Ed) have been working for decades to improve the food literacy and eating patterns of low-income groups. The Nutrition Promotion and Technical Assistance Branch in the Child Nutrition Division of USDA's Food and Nutrition Service (FNS) supports a wide variety of efforts to enable children and adolescents to make healthy eating choices.

And USDA supports and conducts research on the nature and extent of nutrition education in the United States. Three USDA speakers at the workshop described these programs and summarized this research.

LOW-INCOME NUTRITION EDUCATION THROUGH THE U.S. DEPARTMENT OF AGRICULTURE: EFNEP AND SNAP-ED

Both EFNEP and SNAP-Ed employ a social ecological framework for nutrition and physical activity decisions (Figure 4-1) and a community nutrition education model for programmatic decisions (Figure 4-2), said Helen Chipman, national program leader in the Nutrition Division of USDA's National Institute of Food and Agriculture (NIFA). Standards for nutrition education play a role in each of these models, as they do in the programs these models inform.

The purpose of EFNEP is to bring together federal, state, and local resources to improve the health and well-being of limited-resource families and youth. Created in 1969 and administered by the National Institute of Food and Agriculture, it currently is provided by 75 land-grant universities in all 50 states, U.S. territories, and the District of Columbia (USDA NIFA, 2013) and had a federal allocation in fiscal year (FY) 2012 of $67.9 million

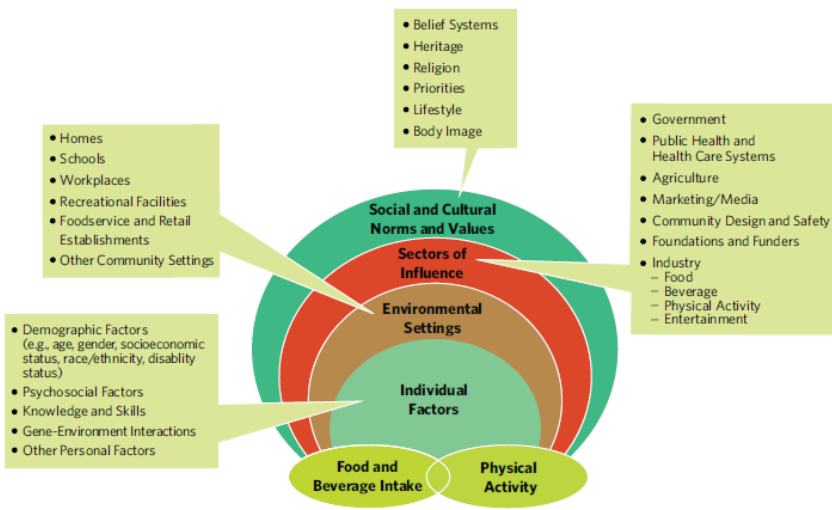


FIGURE 4-1 A social ecological framework for nutrition and physical activity decisions incorporates different levels of influence.
SOURCE: USDA and HHS, 2010.

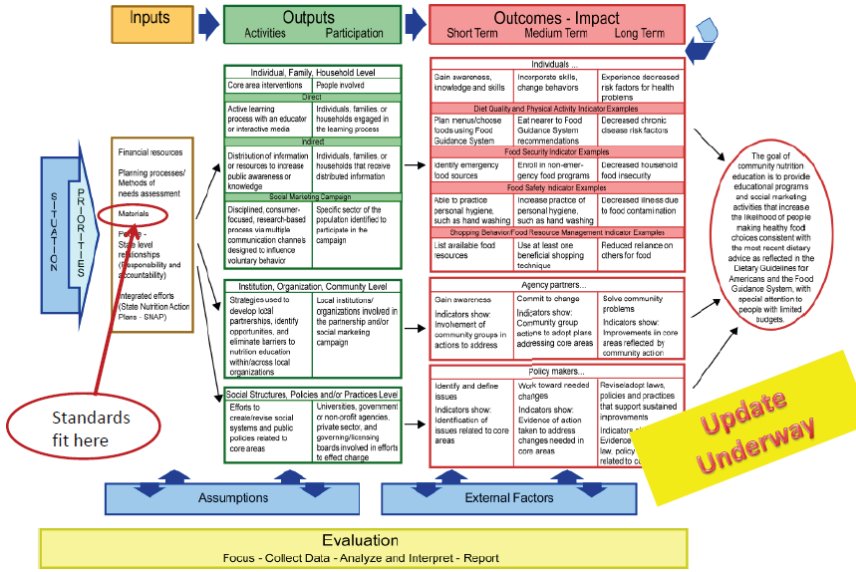


FIGURE 4-2 A community nutrition education logic model indicating that nutrition standards would be incorporated in the education materials made available as inputs.
SOURCE: Chipman, 2013.

(P.L. 112-55, Div. A). It uses a paraprofessional model to provide education by peers, which can foster behavioral change at the local level and within communities. It also uses a series of hands-on, interactive lessons and a learner-centered approach that extends across the lifespan and has a strong structure for supervision and for the delivery of content knowledge.

EFNEP addresses four core areas:

1. Health issues, including diet quality and physical activity education;
2. Food access and security issues;
3. Economic issues, including food resource management education; and
4. Food safety issues.

The program has a strong data collection component. Data collection provides focus, facilitates program accountability, informs program leadership decisions, guides program management decisions, and is useful for all users at the local, state, and national levels, said Chipman. These data reveal that the program is available in approximately 800 counties and

directly reaches more than 130,000 adults and 450,000 youth, and indirectly reaches nearly 400,000 family members. Approximately 85 percent of EFNEP families are at or below the poverty line, earning $22,350 a year or less for a family of four, and 73 percent of EFNEP adults are minorities (USDA NIFA, 2013). Among youth and children, more than two-thirds are reached through in-school programming, receiving on average six sessions and 8.8 contact hours (S. Blake, USDA NIFA, unpublished data, 2013). Although states have flexibility in how to allocate their EFNEP funding to meet the needs of their populations, Chipman emphasized the importance of schools in nutrition education.

Because the emphasis is on hands-on activities, students read labels, try a variety of foods, improve food preparation and safety practices, and increase their ability to select low-cost nutritious foods. As an example of these activities, Chipman quoted a peer educator in the Alaska EFNEP program:

> When I arrived to teach nutrition, the kids were always eating candy and drinking soda from the snack bar. I talked with the staff and the director about it and eventually a few nutritious items were added, but the candy always sold first. After going over label reading, we took the youth shopping. They were amazed at the high sodium, sugar, and fat of snack bar items. They, by themselves, eliminated items from the list because they weren't nutritious. They voted to make the snack bar a candy/soda free zone, and the director supported it. These young people are making healthy choices and developing healthy habits.

Turning to SNAP-Ed, Chipman said that the goal of the program is to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for Americans and USDA's Food Guidance System. Begun in 1992, the program currently serves all 50 states, the District of Columbia, and the Virgin Islands. It is administered by the Food and Nutrition Service and had an allocation of $388 million in FY 2012 (USDA-FNS, 2013b). State SNAP agencies apply for the funds, while subcontractors such as universities, public health agencies, food banks, and nonprofit organizations implement the program.[1]

Within the context of the program's defined audiences and policies, SNAP-Ed uses individual or group-based nutrition education, health promotion, and intervention strategies that are comprehensive and multilevel. Community and public health approaches also help improve nutrition.

The desired outcomes tend to be more granular and concrete than for EFNEP. They include the following:

[1]See http://www.fns.usda.gov/supplemental-nutrition-assistance-program-education-snap-ed.

- Make half your plate fruits and vegetables, at least half your grains whole grains, and switch to fat-free or low-fat milk and milk products.
- Increase physical activity and reduce sedentary behaviors as part of a healthy lifestyle.
- Maintain appropriate calorie balance during each stage of life: childhood, adolescence, and adulthood; pregnancy and breastfeeding; and older age.

According to 2012 data, more than 6 million participants were taught directly and an additional 76 million contacts were made directly through SNAP-Ed (U. Kalro, USDA FNS, personal communication, 2013). These are two mutually exclusive ways the data are collected, as participants and as contacts. Of those who were taught directly, more than two-thirds of the participants were in the K-12 grade range. Direct education was provided in more than 53,000 learning sites, including schools, before-school and after-school programs, community centers, work sites, and other places where youth and adults congregate. SNAP-Ed also engages in social marketing campaigns and indirect education, which involves mass communication, public events, and material distribution. Many more people are reached through these additional approaches.

According to a review of SNAP-Ed delivered through land-grant universities, more than half of participants for whom evaluation data were collected indicated eating closer to the recommended amounts of grains, vegetables, and fruits; and 38 to 62 percent of participants, depending on the specific program, increased physical activity (Sexton, 2013). More than three-quarters reported improved hygiene, such as hand washing, and about half adopted the use of safe temperatures to store food. About one-third adopted beneficial shopping, preparation, and storage practices, and 78 percent tried new foods or recipes.

Chipman concluded by talking briefly about standards and other essential elements of nutrition education. Standards have a variety of benefits, including increased consistency in teaching. However, their use can create challenges where states or districts have different and sometimes contrasting requirements for standards. Linking nutrition standards with other education standards, such as mathematics and science standards, is critical, said Chipman. "That is a way to get a foot in the door. It's also a way of making things easier for teachers." Moreover, nutrition standards can complement what is happening in homes and communities. "It's a synergistic effect that can happen as we put these pieces together."

Educational programs also need to reflect appropriate learning methods, be behaviorally focused and evidence based, have program and fiscal accountability, and be consistent with legislation and with the mission,

goals, and focus of the relevant government agencies. Nutrition education needs to be age appropriate, culturally appropriate, and audience appropriate, which can be a challenge with multiple audiences. Research is essential both to develop the evidence on which to base practice and to determine whether the evidence being gathered answers the right questions. One way the National Institute of Food and Agriculture has gathered evidence is through Agriculture and Food Research Initiative childhood obesity prevention grants, which seek to develop effective obesity prevention strategies that take into account behavioral, social, cultural, and environmental factors. These grants also are designed to develop effective behavioral, social, and environmental interventions.

As an example of a successful nutrition education intervention, Chipman cited the KidQuest program in South Dakota, which is a school-based nutrition and physical activity curriculum designed especially for fifth and sixth graders. It features activity supplements, leaders' guides, healthy homework worksheets, and 10-minute activities. Each nutrition lesson includes a brief instructional slideshow followed by hands-on group activities. The nutrition lessons are approximately a half hour long, with physical activity lessons provided if more time is available. The lessons are linked to food dietary guidelines and current food messages. The nutrition lessons build on concepts related to nutritional information and behaviors in a sequential manner, so they work best if they are provided in order. To maximize the educational benefit and encourage behavioral change, it is recommended that the lessons be provided at least 1 week apart from each other.

Since its inception in 2004, KidQuest has been pilot tested and evaluated for efficacy in over 40 South Dakota schools. Improvement has been seen in the behaviors of overall fruit and vegetable intake and decreased consumption of sweetened beverages, and in the skill of reading food labels (Jensen et al., 2009). Beginning in 2009, additional research components have included objective anthropometric and biochemical measures. Ten graduate students already have used or are planning to use data from the program for their master's or doctoral work. "We are starting to connect all the dots in terms of what we're trying to accomplish," said Chipman.

TEAM NUTRITION AND THE HEALTHIERUS SCHOOL CHALLENGE

The Nutrition Promotion and Technical Assistance Branch in the Child Nutrition Division of USDA's Food and Nutrition Service—which goes by the name Team Nutrition—is divided into the two categories embodied in

its name,[2] said the branch chief, Eileen Ferruggiaro. The technical assistance component generally is directed at the people who run school food and nutrition programs, including kitchen personnel and school nutrition directors. For example, Team Nutrition provides the *Food Buying Guide for Child Nutrition Programs* that enables schools to calculate how much food to purchase to meet the portion sizes required by regulations. "Our portion sizes are much smaller than you'll find in restaurants," said Ferruggiaro. In addition, Team Nutrition offers one-page fact sheets for school nutrition professionals on such topics as trans fats, vegetables, low-fat dairy, and whole grains. "When they're working with the staff in the cafeteria, they have a basic knowledge and know why they're adjusting their recipes and menus to meet these new requirements."

A new online recipe book, *Recipes for Healthy Kids*, includes student-tested and student-approved recipes that were developed for the new school meal pattern. The recipes include whole grains, healthy vegetables, and no more than 15 ingredients commonly available to school food services and are low in total fat, saturated fat, sugar, and sodium. The recipes are at three different levels: 50 and 100 servings for schools, 50 and 25 servings for child care settings, and 6 servings suited for homes. If a school provides a healthy meal in the cafeteria, the same recipe can be made at home.

Promotional materials such as posters reinforce the provision of healthier options. For example, a promotional package, *Healthier Middle Schools: Everyone Can Help*, has resources aimed at principals, teachers, students, parents, and community members. Short video clips introduce the changes in meals while handouts can go home with students.

An example of the nutrition education materials provided by Team Nutrition is *Nutrition Voyage: The Quest to Be Our Best*, which is a series of lessons for grades seven and eight that takes students on an exploratory journey into school wellness. The lessons, which are presented in the form of treks, have been tested on focus groups and are integrated with mathematics, science, and the language arts.

Another example, for grades one through six, is *Serving Up MyPlate*. The lessons include original songs that students can sing and dance about fruits, vegetables, and whole grains as well as teacher guides. Parent handouts in English and Spanish can go home, with handouts in French and Chinese on the way.

Materials being developed at the time of the workshop included a nutrition education curriculum for kindergartners, an update of the *Two Bite Club*, which is a storybook aimed at preschoolers and kindergartners, an update of *Grow it, Try it, Like it!*, which is a gardening curriculum for the same age group, and a nutrition education and gardening curricula

[2]See http://www.teamnutrition.usda.gov.

for third through sixth graders. "If the kids know where their food comes from, they're more likely to eat it," said Ferruggiaro. Table 4-1 lists all of the above mentioned resources with the link to their website.

She also described the HealthierUS School Challenge, which is a voluntary certification initiative recognizing excellence in school nutrition and physical activity. The challenge has been aimed primarily at preparing schools for changes based on the 2010 dietary guidelines. Schools that received a HealthierUS School Challenge award have had much less difficulty adjusting to the new meal patterns, Ferruggiaro said. Schools start at the bronze level and work their way through three subsequent levels. Criteria include participating in the school lunch and school breakfast programs, offering reimbursable breakfasts and lunches that reflect the dietary guidelines and meet USDA nutrition standards, providing more nutritious competitive foods, having a local wellness policy, and providing nutrition education, physical education, and opportunities for other physical activity outside of physical education. Meal requirements include providing foods that are rich in whole grains, dark green and red/orange vegetables, legumes, and fruits. The requirements also call for variety and for at least some fresh fruits and vegetables, along with additional amounts of whole grain-rich and vegetable subgroups.

The criteria are focused on the entire school environment as well as on homes and the community. For example, the criteria for nutrition education excellence could include the use of Team Nutrition education curricula or

TABLE 4-1 USDA Team Nutrition Resources

Resource	Website
Food Buying Guide for Child Nutrition Programs	http://teamnutrition.usda.gov/Resources/foodbuyingguide.html
Recipes for Healthy Kids	http://teamnutrition.usda.gov/Resources/recipes_for_healthy_kids.html
Healthier Middle Schools: Everyone Can Help	http://teamnutrition.usda.gov/Resources/healthiermiddleschools.htm
Nutrition Voyage: The Quest to Be Our Best	http://www.fns.usda.gov/tn/Resources/nutritionvoyage.htm
Serving Up MyPlate: A Yummy Curriculum	http://www.fns.usda.gov/tn/resources/servingupmyplate.htm
*Two Bite Club**	http://teamnutrition.usda.gov/Resources/2biteclub.html
*Grow It, Try It, Like It!**	http://teamnutrition.usda.gov/Resources/growit.html

*Currently being updated.

work with a chef in the *Chefs Move to Schools* program, the criteria for physical activity excellence could include promotion of walking to school and recess before lunch, while the criteria for school farm service excellence could include farm-to-school initiatives or Smarter Lunchroom techniques. The criteria also cover fundraising and wellness policy initiatives.

Schools receive incentive awards ranging from $500 to $2,000—"it isn't very much money for the amount of work they go through, but it does help, and they get recognition." They also get a banner and plaques that many schools proudly display. "It helps so much for the school and nutrition people to realize that we are the people helping with the health of your kids." More than 5,000 schools had qualified for the HealthierUS School Challenge at the time of the workshop, and the number had been growing rapidly.

A STATISTICAL OVERVIEW OF NUTRITION EDUCATION

Jay Hirschman, director of the special nutrition staff in the Office of Research and Analysis at USDA's Food and Nutrition Service, provided a statistical overview of research that has been done on the nature and extent of nutrition education. Data collected in 1995 from 916 public schools showed that most schools taught nutrition, with a slight decline in the last 2 years of high school (Figure 4-3). According to a report published a few years later, 88 percent of K-5 teachers taught about nutrition in school year 1996-1997, and the mean number of hours during which nutrition was taught was 13 per year (Celebuski and Farris, 2000). As Hirschman pointed out, this is significantly less than the 50 hours mentioned by Contento.

The Team Nutrition initiative has undergone extensive evaluation, Hirschman observed, starting with a pilot of the program in the 1990s. Team Nutrition was designed to deliver nutrition education through multiple and reinforcing channels:

1. Student exposure to at least one Team Nutrition public service message,
2. Student receipt of Team Nutrition classroom instruction,
3. Student participation in Team Nutrition cafeteria events,
4. Student participation in Team Nutrition community activities,
5. Parent participation in Team Nutrition or any other nutrition events at school, and
6. Parent participation in Team Nutrition or any other nutrition activities at home.

An evaluation of the pilot found that students who reported an increase in the number of channels through which they received information also

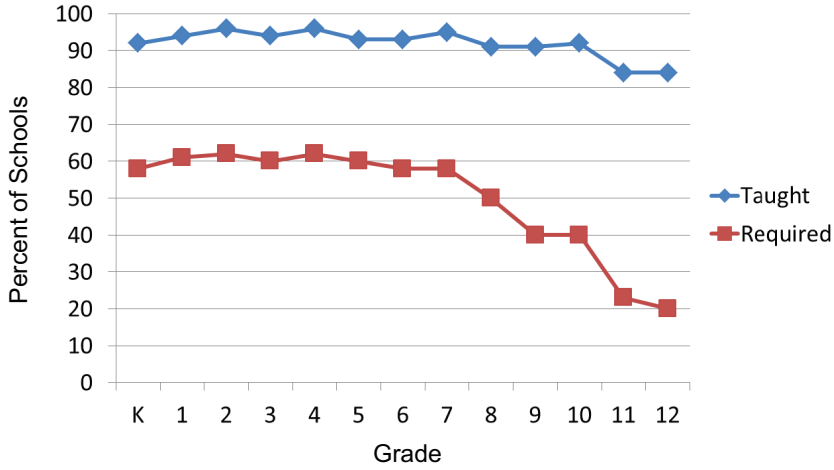


FIGURE 4-3 Percent of public schools where nutrition was taught and where nutrition education was required by school district or states in 1995.
SOURCE: Celebuski and Farris, 1996.

reported a progressive increase in improved nutrition behaviors, which testifies to the "sound underpinning" of the Team Nutrition effort, according to Hirschman.

Also since the 1990s, four School Nutrition Dietary Assessment (SNDA) studies have been conducted. A list of topics covered in past SNDA studies is shown in Box 4-1. In the most recent study, which reported on data collected from a national sample of public schools in school year 2009-2010, slightly fewer than two-thirds of all schools had a requirement for classroom-based nutrition education in all or some grades (Figure 4-4). However, 36 percent of all schools did not require such education. "We haven't quite got everybody convinced yet that this is the right thing to do," Hirschman said.

Among the schools requiring nutrition education in class, the majority required fewer than 5 hours or between 5 and 10 hours of instruction (Table 4-2), But some schools fell into the range of 21 to 100 hours of nutrition education per year.

A separate survey supported by the Centers for Disease Control and Prevention has found significantly smaller numbers for hours of instruction that teachers provide on nutrition and dietary behavior, ranging from a median of 3.4 in elementary school classes to 5.9 in high schools (Kann

BOX 4-1
Topics Covered in the School Nutrition Dietary Assessment Studies

- Student participation
- Meal prices
- Menu planning and meal production
- Meal service practices
- Food safety and sanitation
- Staff education, experience, and credentials
- School wellness policies and practices (including classroom-based nutrition education)
- Meal scheduling
- Competitive foods
- Foods offered in the school lunch and school breakfast programs and after-school snacks
- Calorie and nutrient content of school meals and afterschool snacks
- Availability of meals that meet standards
- Potential contribution of meals to USDA Food Patterns
- Changes in school meals since implementation of the School Meals Initiative
- Schools participating in the HealthierUS School Challenge

SOURCE: Fox et al., 2012.

et al., 2007). However, this survey also asks about instruction on a wide range of other health topics, which may affect the results, Hirschman said.

The most recent SNDA study also surveyed principals about their schools' participation in specific nutrition wellness initiatives (Figure 4-5). Of the 30 percent of principals who were able to identify at least one such initiative, Team Nutrition was mentioned by 6.4 percent and the HealthierUS School Challenge was mentioned by 1.5 percent.

Another initiative mentioned by Hirschman, the Bridging the Gap program supported by the Robert Wood Johnson Foundation, has monitored school policies following the federal mandate requiring the establishment of local wellness policies in schools. This longitudinal study has found a strengthening of school policies over time at each grade level (Figure 4-6). It also has found a greater emphasis over that period on behaviorally focused skills at all grade levels (Chiriqui et al., 2013).

The most recent SNDA study also collected data about changes in schools participating in the HealthierUS School Challenge. Though the sample size for the available data was small and nonrandom, participating schools did a better job than elementary schools nationwide in offering and

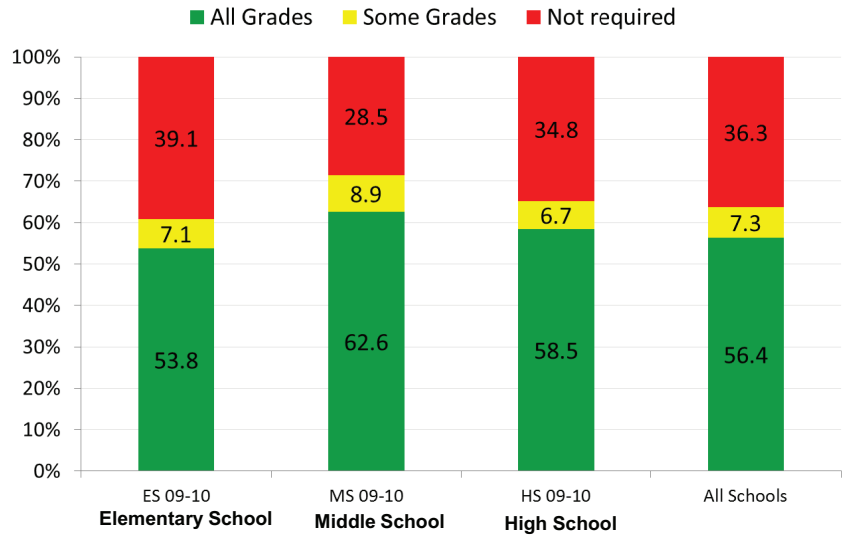


FIGURE 4-4 Almost two-thirds of public schools surveyed in school year 2009-2010 required classroom-based nutrition education.
SOURCE: Hirschman, 2013. Data from Fox et al., 2012.

TABLE 4-2 Number of Hours of Required Classroom-Based Nutrition Education per Year, 2010

	Percent of Schools in Grade Level			
	Elementary	Middle	High	All Schools
<5 Hours	21	15	11	18
5 to 10	41	25	21	33
11 to 20	17	11	11	14
21 to 100	14	23	19	16
>100	0.6	11	15	6
Missing	9	15	23	13

SOURCE: Hirschman, 2013. Data from Fox et al., 2012.

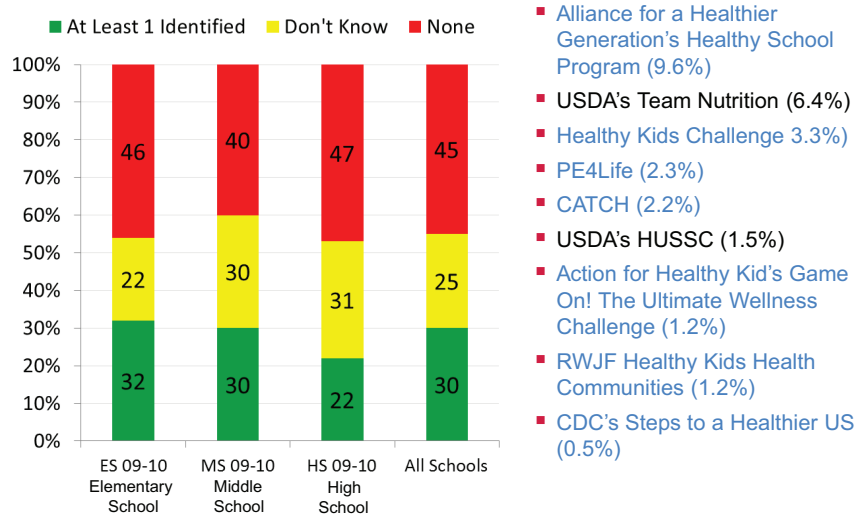


FIGURE 4-5 About 30 percent of surveyed principals could identify at least one wellness initiative in which their schools participated.
SOURCE: Hirschman, 2013. Data from Fox et al., 2012.

serving lunches that met standards of the School Meals Initiative for calories and nutrients. These schools also were more likely to have requirements for classroom-based nutrition education, and food service staff at these schools were more likely to participate in activities promoting good nutrition, such as conducting a nutrition education activity in the food service area, participating in a school meeting about local wellness policy, attending a PTA or other parent group meeting to discuss the school food service program, or participating in a nutrition education activity in the classroom.

Finally, Hirschman noted that plans are under way for the fifth SNDA study. Data will be gathered in school year 2014-2015, and the study will look at meal costs to relate the costs of meals and meal production to the nutritional quality of the meals produced. He encouraged workshop participants who have ideas about the study design to provide input to the planning process.

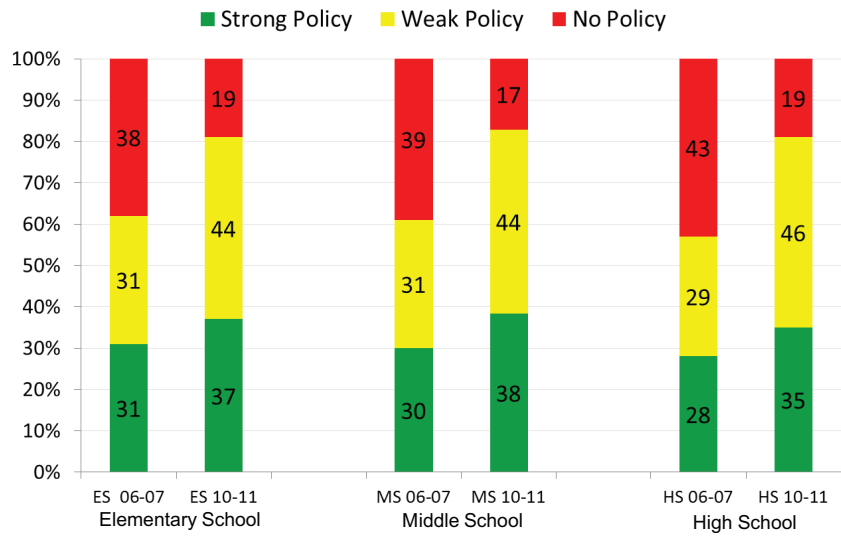


FIGURE 4-6 More schools report stronger nutrition education curriculum policies since 2006. SOURCE: Hirschman, 2013. Data from Chriqui et al., 2013.

5

Lessons Learned from State and Local Experiences

Important Points Made by Individual Speakers

- Despite limited budgets and other constraints, states and localities have exerted strong leadership in integrating nutrition education and food literacy into classrooms.
- Nutrition education standards need to be comprehensive, sequential, and skill based and include food literacy, food preparation skills, and physical activity.
- Nutrition standards could be both integrated into other content areas and serve as the basis for standalone courses.
- A good starting point for teachers is to approach health and nutrition from a personal perspective, which helps them serve as role models for students.
- Support from principals is critical and is augmented when principals seek out external partners.

Though national nutrition education curriculum standards do not yet exist, some states have extensive experience with implementing standards, benchmarks, or expectations in nutrition education. Presenters from California, Wisconsin, and Washington, DC, described the development of nutrition education standards in their jurisdictions, some of the barriers they encountered, and what their experiences might mean for national standards.

EXPERIENCES IN CALIFORNIA

Carol Chase Huegli, associate division director of the Nutrition Services Division at the California Department of Education, reported that California has nearly 10,000 public schools, more than 1,000 school districts, and 58 counties, each with an office of education. Its 6.3 million students are exceptionally diverse, with Hispanics representing 52 percent of the student body, whites 26 percent, Asian Americans 8.6 percent, African Americans 6.5 percent, and the remainder consisting of a very wide range of ethnic groups. California schools serve 238 million breakfasts a year, 600 million lunches per year, and 2.7 million suppers for at-risk children per month, and the majority of its students are eligible for free and reduced-price meals.

Budgets for education in California have been severely restricted, observed Chase Huegli, yet the state has exerted strong leadership in integrating nutrition education and food literacy into classrooms. California has developed a *Nutrition Education Resource Guide* that integrates nutrition into the curriculum, both during the school day and in before- and afterschool programs (California Department of Education, 2011). The guide includes nutrition competencies that are aligned with the California health education content standards (Table 5-1). The competencies were reviewed by national, state, and local experts in nutrition, education, and food service, and they underwent a field review and survey by California public school teachers in 250 schools. The guide also includes recommended nutrition curricula resources, supplemental instructional materials, and guidance on implementing a nutrition education program.

TABLE 5-1 Nutrition Competencies Aligned with California Health Education Content Standards

Health Education Standards	Nutrition Competencies
Essential Health Concepts	Essential Nutrition Concepts
Analyzing Health Influences	Analyzing Nutrition Influences
Accessing Valid Health Information	Accessing Valid Nutrition Information
Interpersonal Communication to Enhance Health	Interpersonal Communication about Nutrition
Decision Making about Health	Decision Making for Nutrition Choices
Goal Setting	Goal Setting for Nutrition
Practicing Health-Enhancing Behaviors	Practicing Nutrition-Enhancing Behaviors
Health Promotion	Nutrition Promotion

SOURCE: Chase Huegli, 2013.

The competencies support programs that are sustainable, comprehensive, sequential, and culturally relevant, said Chase Huegli. They enhance the curriculum, strengthen teacher skills, and link the cafeteria and the classroom. Materials included in the curriculum section have to be standards based and grade level appropriate.

The *Nutrition Education Resource Guide* is currently being updated to include food literacy and preparation skills and an online search function. It also will include additional reviewed curricula, several of which have been very successful in California public schools. Chase Huegli mentioned in particular Power Play, Linking Science and Nutrition, Linking Math and Nutrition, Linking Language Arts and Nutrition, and Nutrition to Grow On, all of which were developed through effective partnerships among organizations. In turn, some of these partners, such as the Dairy Council of California, have developed materials based on the health education standards and nutrition competencies.

The Child Nutrition Advisory Council, which reports to the California Board of Education, has been exceptionally active and has made nutrition education a priority. The council also has sent a letter to the committee chairs of the Common Core initiative with recommendations to incorporate nutrition competencies into the Common Core standards. In addition, California has a Healthy Kids Resource Center, which provides online resources, teacher training, and expertise in curriculum design.[1]

Based on the experiences in California, Chase Huegli offered several recommendations that would pertain to national nutrition education curriculum standards. Experiences in California have demonstrated the importance of partnerships, a regional infrastructure with funding and support for districts, and training and support for schools. California's experience also has demonstrated the importance of leadership by the state superintendent of public instruction and by district officials. Development of the standards would need to be inclusive, with teachers, superintendents, principals, nutritionists, researchers, and parents all involved. Draft standards should undergo state and local peer evaluation and field testing at each stage.

Nutrition standards would need to be aligned with national health education content standards and frameworks and with the Common Core standards. They would need to be comprehensive, sequential, and skill based and include food literacy, food preparation skills, and physical activity. They also should address food insecurity and obesity prevention and make connections to the cafeteria and meal programs.

A standards development effort would need to provide recommended curricula or the funding to develop such curricula. Standards should both be integrated into other content areas and stand alone. They should incor-

[1]See http://californiahealthykids.org/index.

porate a multilevel approach, be experiential, and provide culturally competent materials. They also should provide guidance on implementation in such areas as recommended hours of nutrition education, integration with other subjects, and professional development.

Standards would need to allow for flexibility at the state and local levels. They also need to be sustainable. Multiyear funding to state departments of education would help states implement a regional technical assistance model with nutrition specialists at county offices of education or similar entities. Districts also could receive funding and technical support such as nutrition specialists or resource teachers.

An issue that arose during the discussion session was linking physical education standards with nutrition standards. The programs tend to be separated, said Chase Huegli. "We have to find a way to somehow bring us together."

EXPERIENCES IN WISCONSIN

The development of model nutrition education standards in Wisconsin was a multiyear process, explained Susan Nitzke, professor emeritus and extension specialist in nutrition sciences at the University of Wisconsin–Madison. First, statewide leaders in nutrition education in Wisconsin, after extensive discussion about the need for nutrition standards in the state, secured support and expert assistance from the U.S. Department of Agriculture, the Centers for Disease Control and Prevention, a variety of other state and federal agencies, the Wisconsin university system, and other organizations to work on obesity prevention, nutrition education, and physical activity. Existing practices, gaps, and needs were identified, and a core team was put together to develop the standards.

The team set "SMART" objectives, which stands for specific, measurable, achievable, realistic, and time sensitive. It consulted with experts and involved a wide range of stakeholders. Then, as Nitzke put it, the team "drafted, reviewed, revised, reviewed, revised, et cetera." Both the development team and the reviewers included a wide range of stakeholders from the public and private sectors. The model standards were published by the Wisconsin Department of Public Instruction in print and online in 2009 (Wisconsin Department of Public Instruction, 2009).

The target audience for the document was wide ranging, including students, parents, educators, administrators, policy makers, and community members. The team worked hard to make the guidance age appropriate, sequential, and complementary to existing curricula. That was not easy because of the differences among schools in Wisconsin, said Nitzke. "Still, a 10-year-old is a 10-year-old," and the team drew on developmental experts to verify what was age appropriate.

The goal of the standards was that "students will gain the knowledge and skills to select foods for a healthy diet that supports health and reduces the risk of illness and future chronic diseases." The simplicity of that goal belies the many hours that went into establishing it. For example, the writers chose "foods for a healthy diet" rather than "healthy foods." "That sounds like a trivial wording change, but it's actually a big deal," Nitzke said. Providing the knowledge and skills to select foods for a healthy diet supports health and reduces the risk of illness and future chronic diseases.

The purposes established for the document were to support state and local school district nutrition education by

- Setting expectations at fourth, eighth, and twelfth grades;
- Suggesting a framework for effective and comprehensive nutrition education;
- Augmenting core academic standards and integrating across disciplines;
- Defining methods, goals, and outcomes; and
- Highlighting cultural diversity.

In establishing these purposes, the writing group examined all the core academic standards related to nutrition and sought to align its standards with the existing curricula. For example, when students are learning about the historical link between cranberries and other fruits and Native Americans, they also can learn about the nutritional value of cranberries. At the same time, the group emphasized diversity to counter the middle class and white orientation of some existing lessons.

As key concepts to target for each lesson recommendation, the group identified

- Nutrition for growth and energy,
- Food safety,
- Critical thinking and practical reasoning,
- Healthy behaviors,
- Diversity, and
- Identification and classification of foods.

The standards defined both the content that should be mastered by the fourth, eighth, and twelfth grades and the performance standards that provide evidence of learning the content embodied in the standards. The writing group also defined a set of applications to which the content can be applied:

- Global awareness;
- Financial, economic, and business literacy;
- Health literacy;
- Learning, innovation, and creativity skills; and
- Information, media, and technology literacy.

The writing group devoted considerable time to deciding which guiding theories and models it would use in organizing the information in the guide. It choose two: a cognitive development model that defines preoperational, concrete operational, and formal operational levels of learning, and an experiential learning model that emphasizes experiencing or doing something, sharing what you have learned, processing what it means, developing generalizations, and applying new knowledge and skills to your life. It also recognized a socioecological context incorporating food concerns, other health concerns, and concerns over the availability and accessibility of food, which overlap with nutrition education, health promotion, and public health nutrition.

As an example of a standard, Nitzke cited the following standards in the area of energy and growth performance for the fourth, eighth, and twelfth grades:

- A.4.1. Identify why people need to eat different kinds of foods.
- A.8.1. Explain the concepts of variety, moderation, and balance, and balancing caloric intake and energy expenditure.
- A.12.1. Describe the nutritional needs associated with life stages (prenatal through adulthood).

The standards at each grade level build on preexisting knowledge, said Nitzke, so that students have enough information to build on previous concepts.

Many groups are using the standards, including not just schools but the SNAP-Ed program, the Wisconsin Department of Health Services, farm-to-school programs, and others. The Wisconsin Department of Public Instruction (2011) also has developed a companion document, *Nutritious, Delicious, Wisconsin: Connecting Nutrition Education and Local Foods*, which recommends lessons to teach the standards at various grade levels. It also was finalizing a new unit connecting the model academic nutrition standards to state family and consumer science standards.

EXPERIENCES IN WASHINGTON, DC

In 2010 the Washington, DC, City Council passed the Healthy Schools Act (DC Law 18-029), which was designed to build on school health

policies that had been established to respond to child obesity, said Stacy Snelling, associate professor and associate dean in the School of Education, Teaching, and Health at American University. The act encouraged schools to serve a vegetarian option each week and required that they serve a different vegetable and fruit each day. It established a preference for unprocessed foods grown in Washington, DC, and surrounding states along with grants to develop curriculum-coordinated school garden programs. It mandated annual assessments and reports on student achievement according to health and physical education standards as well as profiles detailing health, nutrition, and physical education programs and wellness policies.

The act also required that students receive 75 minutes of health education for elementary and middle schools per week by the school year 2014-2015. Nutrition education is a component of this health education, and knowledge of health is measured in Washington, DC, along with knowledge of mathematics and reading. "DC has been out in front in looking at this," said Snelling.

As an example of the act's effects, Snelling described the example of Kelly Miller Middle School. The school is one of about 200 in Washington, DC. About 45 percent of DC schools are public charter schools, and the system serves about 77,000 students altogether. Kelly Miller Middle School is in Ward Seven at the eastern corner of Washington. Of Ward Seven's 71,000 residents, 73 percent are overweight or obese, 25 percent live in poverty, and 20 percent are unemployed. The school has approximately 325 sixth, seventh, and eighth graders. Ninety-nine percent are African American, 86 percent are eligible for free and reduced-price lunch, and 25 percent receive special education.

Kelly Miller Middle School was a school that needed improvement, said Snelling. In 2010 only 19 percent of its students were reading at grade level, and only 18 percent were doing mathematics at grade level. In 2011-2012, an 8-hour intervention for teachers was integrated into existing professional development over an 8-month period. The intervention included reflection on personal health habits, a school nutrition assessment, and provision of introductory health and nutrition information followed by a demonstration of how teachers could align these themes with the learning standards in the core and elective courses. Innovations included quick fit breaks, a pedometer program for teachers, one-on-one grade level instruction and discussion, and adaptation of existing nutrition curricula. The intervention also included a comparison of the Common Core standards with the health and nutrition curriculum, which at Kelly Miller Middle School included the establishment of a school garden. For example, the mathematics standard on estimating the results of computations was matched with laying out and estimating the costs of the garden.

A survey of teachers' beliefs about health education found significant

increases in the rate at which teachers approved of the following three statements:

1. The health of students is an important issue to teachers.
2. It is my responsibility as a teacher to address health issues in the classroom.
3. As a teacher, I feel prepared, empowered, or able to integrate health education into my current curricula.

Teachers also demonstrated significantly improved self-efficacy in answering the following questions:

- How much can you do to get students to believe they can engage in health habits?
- How much can you do to help your students value health habits?
- How much can you do to motivate students to engage in healthy behaviors?
- How much can you do to improve the health status of a student who is engaging in unhealthy behaviors?
- How much can you do to help your students think critically about their health-related behaviors?

"That survey was very encouraging to us," said Snelling.

The program did not detract from improvements in academic performance at the school. During the 2-year period when the program was implemented, the number of students reading at grade level improved from 19 to 24 percent, and the number doing mathematics at grade level rose from 18 to 39 percent. "We still have a long way to go," Snelling observed. Every student deserves to be reading and doing mathematics at least at grade level. But "we have learned we have to work with teachers in order for us to reach the students."

Washington received a Team Nutrition grant in partnership with American University to expand the program to 15 middle schools. The program plans to continue to work to engage teachers in healthy lifestyles and integrate the health curriculum across the schools.

Snelling drew several lessons from the experience in Washington, DC. First, approaching health from a personal perspective appears to be a good starting point for teachers. Also, time is a barrier for successful implementation. Support from principals is critical and is augmented when principals seek out external partners.

Matching learning standards with nutrition and curriculum ideas facilitates implementation for teachers. Finally, teachers have an opportunity to be role models for nutrition and health concepts. "It would be good

business for us to first take care of our teachers so that we can serve [their] students."

An issue that arose during the discussion session that pertained to each of the three programs was the extent to which nutrition education is being implemented in individual classrooms. These data have not been compiled in a comprehensive fashion, the speakers pointed out, though many schools and teachers cover nutrition to some extent. Chase Huegli said that she would love to work with an academic partner to derive such results.

6

Perspectives from Educators

Important Points Made by Individual Speakers

- Schools need to be held accountable if education standards are to be implemented.
- Programs at the state level could act as models for providing nutrition education, building and maintaining partnerships, and applying nutrition policies and practices.
- The development of education standards in other curriculum areas provides an opportunity to incorporate nutrition content and assessments into those subjects.
- Schools have many responsibilities but strictly limited time available for instruction.
- Nutrition education standards should provide a framework that teachers and school districts can use to develop comprehensive K-12 nutrition programs.
- Students need strategies, techniques, and knowledge to make healthy decisions.

Implementing nutrition education curriculum standards may depend on the policy makers, administrators, and teachers in individual districts and schools across the nation. Four representatives of these groups spoke at the workshop: a school board member, a superintendent, a principal, and a teacher. Each pointed to the potential of nutrition education even as they described the obstacles that must be overcome to deliver that education.

PERSPECTIVE OF A SCHOOL BOARD MEMBER

Elaine Gantz Berman has been a member of both the Denver Board of Education and the Colorado State Board of Education. In Colorado, State Board of Education members are elected by party affiliations. "I find that terribly unfortunate," she said, because "politics enter into many of our very important policy decisions. You would think that nutrition education is non-partisan. It is not." The Colorado State Board currently has four Republicans and three Democrats. Thus, for votes pertaining to nutrition education, that means "it's never quite smooth sailing."

Starting in 2009, Colorado added comprehensive health education standards to its preexisting academic standards. Health education includes sex education, which "was definitely a little tricky, but we [managed to reach consensus]," in part through artful compromises. Health education also includes physical education, which is staffed in a different department than nutrition education. One way to coordinate the two, which Berman believes is important, would be to establish a team that brings together representatives of these departments to coordinate their work, but such teams also need to have the ear of the commissioner of education so that they do not end up talking just among themselves.

In the area of "apply knowledge and skills to engage in lifelong healthy eating," Colorado established the following expectations:

Elementary school expectations

1. Demonstrate the ability to engage in healthy eating behaviors.
2. Demonstrate the ability to set a goal in order to enhance personal nutrition status.
3. Examine the connection between food intake and physical health.
4. Demonstrate the ability to make and communicate appropriate food choices.
5. Identify eating and drinking behaviors that contribute to maintaining good health.
6. Know that eating a variety of foods from the different food groups is vital to promote good health.
7. Identify the major food groups and the benefits of eating a variety of foods.

Middle school expectations

1. Analyze factors that influence healthy eating behaviors.
2. Demonstrate the ability to make healthy food choices in a variety of settings.

3. Access valid and reliable information, products, and services to enhance healthy eating behaviors.

High school expectations

1. Analyze the benefits of a healthy diet and the consequences of an unhealthy diet.
2. Analyze how family, peers, media, culture, and technology influence healthy eating choices.
3. Demonstrate ways to take responsibility for healthy eating.

School districts in Colorado are required to implement all 10 of the Academic Standards, beginning in school year 2013-2014. However, if these standards are to be implemented then there must be a way to hold them accountable for the implementation, Berman stated. Every school in Colorado has a wellness policy, but are those policies actually being put to use? This "is a problem in policy making in general," said Berman. "We have a lot of policies but, in many cases, we have no way of knowing if they get implemented."

In Colorado, the State Board of Education has the authority to adopt academic content standards, but the curriculum is left up to the local school district. Nevertheless, many districts, and especially small rural districts, are eager to use model curricula made available by the state or other entity. In some cases, the provision of model curricula has generated "extraordinary pushback." For this reason, the state generally refers to "guidelines for implementing standards" rather than model curricula.

Despite the difficulties encountered in developing and implementing standards in Colorado, the attention given to childhood obesity has made the process politically possible, said Berman. Support from philanthropy also has been critical. The Colorado Health Foundation has made reducing obesity its number one priority, and other foundations, including the Colorado Legacy Foundation, the Bill and Melinda Gates Foundation, and the Kaiser Foundation, also have been involved in school health and wellness in the state. In addition, Berman called attention to the potential for local school foundations to raise money for special initiatives. In Colorado, this can be done at the state level, and it enables action to be taken more quickly than through the state department of education.

Colorado has the lowest rates of adult obesity in the country, though the rate is still above 20 percent and has been increasing. But the state is 23rd in the nation in childhood obesity, which means that adult obesity is likely to increase in the future. Colorado has been implementing new meal pattern standards and nutritional standards for competitive foods. It also has made free water available whenever meals are served during mealtimes

and is adjusting the prices of school lunches for students who pay the full amount in order for this amount to become more equitable with the reimbursement rate. And a bill being discussed at the time of the workshop called Breakfast after the Bell would enable the delivery of breakfast during instructional hours.

In closing, Berman raised several issues that still require attention. At the time of the workshop, 39 states had policies for competitive foods, but none were consistent with the standards recommended by the IOM. She also expressed concern about students opting out of school lunches if they are dissatisfied with the lunches provided. "What we hear a lot is high school students are still hungry after they've had their meal, [although] maybe that's because they're overeating to begin with." And having sufficient time and money are always considerations in making and certifying changes in education.

PERSPECTIVE OF A SUPERINTENDENT

The Elk Grove Unified School District in southern Sacramento County, California, is not only the "face of California," according to its superintendent Steven Ladd, but the "face of the world." Its 62,000 students spread across 320 square miles are 26 percent Latino, 25 percent white, 22 percent Asian American, and 18 percent African American, with a wide range of other ancestral backgrounds included. "We have a rich and wonderfully diverse population," said Ladd.

Elk Grove has had the opportunity to combine many different elements into a health and nutrition program. In 2006 the district's board, which has been very supportive of the district's emphasis on health, adopted a wellness policy with a coordinated school health program. The district has used the Shaping Health as Partners in Education (SHAPE) model, which includes a variety of initiatives (discussed below). It also is part of Network for a Healthy California, has a Harvest of the Month Club that brings local healthy foods into the classroom, and has a farm-to-school program.

The district began participating in SHAPE 18 years ago with 27 K-6 teachers. It now has 500 teachers participating—one-seventh of its teaching force. SHAPE includes field trips to food processing centers, farmers' markets, and local grocery stores. These trips are supplemented by a wide variety of other activities and programs, including nutrition Olympics, Professor Mimo kindergarten nutrition lessons (in which a consultant dressed as a clown delivers a message to elementary students about colorful vegetables and fruits), junior chef cooking assemblies, school gardens, student-run health fairs, and parent communications. Partnerships with Kaiser Permanente, the Dairy Council, Future Farmers of America, Power Play!, community service clubs, and nonprofit organizations support

and diversify the offerings. "It's going to take everybody to be involved, and thankfully we have a community and our partnerships that are very strong," said Ladd.

The district has breakfast programs in every one of its 64 schools. It participates in the USDA's HealthierUS School Challenge and in 2011 all 39 elementary schools in the Elk Grove district received an award.

Nutrition education is taught in some seventh grade physical education or science classes through nutrition laboratories. A nutrition unit in ninth grade health class is mandatory for graduation, and high schools offer electives for advanced nutrition studies. The district also has a culinary arts academy and regional occupational program courses focused on food. Ladd also pointed to the potential of online education to create blended classrooms in which a diverse array of materials can be introduced into the classroom in a variety of ways.

Ladd briefly reviewed the nutrition standards adopted in California in 2008. Nutrition is one of six California health content standards and has eight overarching standards. Within each of these eight are a set of skills-based standards that focus on students making healthy choices and avoiding risky behaviors regarding nutrition. All of the curricula in the district are aligned to these state standards, with instruction linked to core content areas and the mandated family life education curriculum. More than 475 district elementary teachers receive nutrition education professional development annually, and they are provided with and use free curricula from the Dairy Council, Agriculture in the Classroom, Power Play!, and USDA's MyPlate. Teachers are adept at adapting the curriculum material that is available to making the points they need to make, Ladd said.

Children need to be able to apply what they learn to their own lives if nutrition education is to improve health. In that regard, Ladd urged the use of SHAPE as a national model for offering healthy meals in child nutrition programs, providing nutrition education, building and maintaining partnerships, and applying nutrition policies and practices. He also urged the development of a nutritional framework that provides competencies as opposed to standards alone. Assessments could help determine whether students have mastered these competencies, he added during the discussion session, though assessments inevitably will focus more on literacy and mathematics, with food literacy part of the content across the curriculum.

Making changes such as those his district have adopted is not necessarily easy. He told of pairs of students who were buying three lunches to split between themselves. Removing junk food from his schools cost the district between $250,000 and $350,000 in money earned to support school activities. Many students move not just within a state but among states. California is 49th out of the 50 states in per-pupil expenditures, and the Elk Grove district is now in danger of losing part of the SNAP-Ed fund-

ing it has used for nutrition education, which would mean that much of the work the district has been doing could not continue. Finally, Ladd and several other speakers in the session emphasized the potential disruption of sequestration, which had just gone into effect at the time of the workshop and was reducing funds for staff, professional development, and other essential activities. "We're bracing to figure out what will be the next steps."

The Common Core standards will be a sea change for public education, Ladd said. The development of the Common Core provides an opportunity to reexamine what is occurring in districts, but it also is anxiety producing. "The biggest challenge, I believe, will come out of the assessments portion. How are we going to measure academic achievement?" California is a member of one of the two consortia that are developing Common Core standards and assessments, and the state plans to impose additional requirements beyond those of the Common Core. This process will provide an opportunity to incorporate nutrition content and assessments into other subjects, whether science, the language arts, or mathematics. For example, "genetically modified foods is a conversation that allows people to go back and forth," said Ladd. "You can talk about crop yields, you can talk about percentages, and you can talk about how much that will help feed the world." The problem, from the perspective of a superintendent, comes if the Common Core standards are added on to what already exists. In addition, professional development, curricula, and technology all add costs. These costs are not insurmountable, Ladd said, but they are important considerations.

Public education has many competing interests. For nutrition education to be sustainable in the curriculum, students need to understand why nutrition is important and how to apply it to their lives. Students, teachers, and parents need to understand the relevance and value of nutrition education. Districts need flexibility because of the great differences in their sizes and capacities. Districts often lack support for curriculum, and not every district has career academies[1] or culinary programs, as Elk Grove does. But changes going on in education provide opportunities for nutrition education that did not exist in the past.

PERSPECTIVE OF A PRINCIPAL

Fred Storti, executive director of the Minnesota Elementary School Principals' Association and an elementary school principal for 27 years before that, offered a ground-level perspective on nutrition education. Borrowing from a presentation by education analyst, speaker, and writer Jamie

[1]A specialized high school program that provides college preparatory curriculum based on a career theme (http://www.aypf.org/documents/092409CareerAcademiesPolicyPaper.pdf).

Robert Vollmer, he noted that schools have assumed an ever-growing list of responsibilities over the course of the 20th and 21st centuries. In the initial decades of the 20th century, they accepted responsibility for nutrition, immunization, and health, which "we're still trying to get right," said Storti. That was followed by physical education, home economics, vocational education, and mandated school transportation. The middle of the century brought such varied offerings as business education, art, music, speech, drama, half-day kindergarten, school lunch programs, expanded mathematics and science education, driver's education, stronger foreign language requirements, sex education, Advanced Placement programs, Head Start, Title I, consumer education, and career education.

In the 1970s, during which the rate of breakups of American families grew substantially, schools added drug and alcohol abuse education, parenting education, behavior adjustment classes, character education, special education, Title IX programs, environmental education, women's studies, African American heritage education, and school breakfast programs. In the 1980s, "the floodgates opened," said Storti, and schools became responsible for keyboarding and computer education, global education, multicultural education, nonsexist education, English as a second language and bilingual education, teen pregnancy awareness, Hispanic heritage education, early childhood education, full-day kindergarten, various preschool and afterschool programs, alternative education, antismoking education, expanded health and psychological services, and child abuse monitoring.

The 1990s and 2000s brought conflict resolution and peer mediation, HIV/AIDS education, distance learning, concurrent enrollment options, dropout prevention, wellness programs, and many other topics and programs. "The school curriculum is kind of full, isn't it?" said Storti. "There is a lot we are asked to do."

The problem, Storti continued, is that the time available for education is strictly limited. In a typical Minnesota elementary school, 50 percent of the day is devoted to literacy, writing, and mathematics. Specialists in art, music, physical education, and media technology take up about 17 percent of the day, with health, science, social studies, and other subjects taking up another 17 percent. Lunch, recess, and opening and closing the day take up much of the remaining 16 percent. The result is that it is very difficult to find 75 minutes a week for health instruction, said Storti.

From Storti's perspective, national nutrition education standards are important. "If we don't have them, they're not going to happen." However, they should not be mandatory. Rather, they should provide a framework for school districts to develop comprehensive K-12 nutrition programs. These programs should equip students with the lifelong critical thinking skills they need to judge the reliability of information. Students should understand key concepts such as healthy eating behaviors, food safety, and nutrition

for growth, health, and energy. They need to be actively engaged in their education so that they make healthier choices.

The purpose of nutrition education, said Storti, should be to empower student consumers and ensure health literacy, which are key 21st-century skills. Nutrition education standards give teachers the framework to develop age-appropriate lessons consistent in scope and sequence. Content standards should specify the skills and knowledge that students should have by the end of the fourth, eighth, and twelfth grades, while performance standards should demonstrate that students are achieving the content standards. In this way, nutrition education can provide students with important life skills taught through a comprehensive approach.

The curriculum should be devised at the local level to focus instruction from prekindergarten through grade 12 to prepare students to meet the standards, Storti said. The curriculum specifies the details of day-to-day learning at the local level. Elementary school teachers have to prepare for seven different subjects in a day, and they need help to do so, especially in the area of health and nutrition.

Storti advocated for tight content and performance standards but a loose approach to the curriculum and teaching. Teachers need the flexibility to figure out how to achieve the standards. The integration of subjects "is one of the beautiful things about the elementary school day," said Storti. "Yes, the teacher is responsible for all those things, but they do a great job of integrating these skills with the other subject areas." Thematic units also can be a useful way of integrating skills on a grade-level or schoolwide basis.

As in many other states, funding for professional development has been decreasing, "but that doesn't mean that we can't move forward," said Storti. A key step will be to involve national organizations in the conversation, such as the National Association of Elementary School Principals, the National Education Association, and national superintendents' organizations. "Getting the right stakeholders to the table can leverage this."

Principals are critical to the process and need to do five things, according to Storti:

1. Be instructional leaders and not just managers;
2. Be teachers of instruction;
3. Be in classrooms as much as possible;
4. Guide the mission, vision, and goals of the school; and
5. Help establish and model the tone for the school.

"If I believe that nutrition is important—and I demonstrate and I work with my teachers and my kids—then they are going to believe it and see the benefits," Storti said.

PERSPECTIVE OF A TEACHER

For 15 years, Jason Dane, the 2013 Midwest District Health K-12 Teacher of the Year, has been a lunchroom supervisor at New Trier High School, where he teaches health. "If you really want to know what's going on in the school, spend some time in the lunchrooms, really seeing what students are doing and talking about and putting theory into practice," he said.

Dane said that of course he could not speak for every teacher, but much of what he heard at the workshop sounded very familiar. Nutrition education is very different than it was even 10 years ago. Adolescents have far more choices than in the past. Modern American supermarkets can confront consumers with something like 50,000 choices—an overwhelming number for adults as well as students. Eating at restaurants introduces even more choices. "How do we get students to make educated decisions, to make good choices, to take what they're learning in the classroom and apply that outside the classroom?"

The number of shows on television devoted to foods and cooking has skyrocketed. Some are good, and some are "probably misleading," said Dane. Advertisements add to the onslaught of information and confound the process of making healthy choices.

The brains of adolescents are still developing, and they think about risks and rewards in different ways than do adults. Thus, teaching students to make good choices extends beyond foods to other types of behavior, such as the use of drugs or alcohol or personal safety measures, such as wearing a helmet while biking. Dane's goal is to give his students the strategies and techniques they need to make good decisions.

One approach Dane has taken is to educate students about the choices they make every day. For example, he will show his students four ice cream sandwiches that together contain 68 grams of sugar and a 20-ounce soda that contains 70 grams of sugar. Students know that they should not eat four ice cream sandwiches, but they do not realize that they are getting even more sugar from the soda. "Students have trouble making that connection, because they could easily drink a 20-ounce soda." This kind of comparison can introduce a lesson in obesity and type 2 diabetes that would not make as much sense to students without the comparison.

Similarly, Dane pointed out, an individual deep dish pizza can contain more salt than three 10-ounce bags of potato chips—and more than twice the recommended daily consumption of sodium. Students need to understand what they are putting into their bodies if they are to make good decisions, he said.

New Trier High School is a very high performing school, and Dane emphasizes to his students the benefits of good nutrition to performance

and coping with stress and fatigue. "What you're putting into your body might have an effect when you get to that last period of the day. You're tired now—well, what did you eat beforehand?" He asks his students whether they are making good choices when they buy meals or snacks. He also tries to take advantage of the ability of computers and cell phones to deliver information from reliable sources to his students almost instantaneously. "That's the world we live in now." Not all students have cell phones, and they typically cannot use them in class, but most have access to cell phones after school, and many apps exist that can help students plan their eating and physical activity. "If I give the first person in here a dollar to tell me the saturated fat content in a Big Mac, we'd have 50 phones out and you'd have it in 30 seconds. Our students should be able to access that information and understand what it means."

The health curriculum contains a lot of material and a lot to get done, Dane emphasized. Nutrition education needs to be integrated into other parts of the curriculum, including the Common Core standards, to be effective. His school has one classroom unit, covering 13 or 14 days, devoted to nutrition, and Dane covers nutrition education during his weight-lifting unit and mental health unit, but many schools spend less time on nutrition education. Dane is part of a professional learning cohort at his school that is focused on fitness and nutrition and includes about 25 members, including teachers, librarians, and special education instructors. The group has looked at such issues as vending machines, the school lunch program, special events, and bake sales. "We're taking a lot of research that is out there and bringing it back to the students."

Other health issues at schools also require attention, such as special initiatives at Dane's school on binge drinking and mental health that a school risk behavior survey revealed to be problems. Socioeconomic issues are also "huge," said Dane. Inexpensive foods may not be healthy, but many students rely on them. In addition, students come from many different cultures, some of which have an emphasis on foods that can contribute to obesity.

Progress will require collaboration among many different groups, Dane concluded, including national groups like the American Alliance for Health, Physical Education, Recreation and Dance. "There has to be a partnership among schools, among families, and certainly among various agencies that will have a say in whatever might be done."

7

Teacher Preparation and Training

Important Points Made by Individual Speakers

- The courses required of many future teachers do not provide adequate nutrition content.
- National, state, and accreditation standards should address the minimum number of credit hours of undergraduate study required to qualify teachers to teach nutrition education.
- Program directors, professors, and teachers need to be held accountable for nutrition education for future teachers.
- Increasing the number of trained teachers to teach nutrition education in elementary, middle, and high schools is imperative if standards in nutrition education are to be met.
- Professional development of existing teachers also will be essential to implement nutrition education standards effectively.
- Multiple groups interested in nutrition education standards will have to work together to achieve buy-in and support for standards.
- Standards will need to be maintained once they are implemented.
- Integrated nutrition education, standalone courses, and combinations of the two provide a variety of options for schools to implement nutrition education.

Three speakers noted that teachers will need training and professional development to implement nutrition education standards. But the nature and extent of that training will depend on the content of nutrition education, which again emphasizes the role of standards in improving the nutrition knowledge and skills of students.

UNDERGRADUATE TRAINING OF FUTURE TEACHERS

The costs of health care in the United States exceed $20,000 per family, said Esther Okeiyi, professor and program director for the dietetic internship program and didactic programs in dietetics at North Carolina Central University. Given that poor nutrition is a contributor to this cost, nutrition education must be a high priority. "We are not getting to the root of the problem [unless we] address nutrition," she said.

Okeiyi specifically examined the steps needed to provide training to educate future teachers and the methods used to evaluate that training. At North Carolina Central University, all undergraduates must take a minimum of 124-128 hours to graduate. As part of this requirement, they must take health education and physical education, both of which are 3–credit hour courses. Introduction to Human Nutrition is another 3–credit hour course that is not required for all students, though Okeiyi expressed the opinion that nutrition education is just as important to students as health education and physical education.

All undergraduates who are in health care–related programs or majors such as nursing, nutrition, public health, physical education, or sports and exercise science may take Introduction to Human Nutrition or they may obtain nutrition knowledge from some of their core courses or electives that incorporate nutrition topics. However, Okeiyi expressed concern about whether nutrition is covered adequately in these other courses. Introduction to Human Nutrition covers nutrients, their function in the body, and food services. In contrast, a health education class that could meet the requirement is described as "an introductory study of personal health promotion and disease prevention with an emphasis on changing behaviors from those that threaten health to those that promote lifelong wellness." In addition, science majors at her university are not required to take Introduction to Human Nutrition. "Again, I have a concern about a science graduate teaching nutrition without having basic preparation in nutrition."

Majors in the nutrition program at North Carolina Central University take higher level courses that are aimed at preparing them to teach nutrition. However, future teachers do not have to take these courses. "Now that I have come through this workshop, I'm beginning to think that I should make some recommendation to my dean that we require this course for students teaching nutrition in public schools." The courses teach how

to prepare a teaching package, how to develop goals and student learning outcomes, and how to implement and evaluate the teaching package, "which I think would be appropriate for those teaching nutrition education in public school."

North Carolina Central University also offers licensure programs at the undergraduate level and for first-degree holders. The licensure program is housed in the School of Education and has various specializations, such as elementary education, middle school education, secondary school education, and a variety of subject-matter and administrative areas. All programs follow accrediting and state standards.

To determine the steps needed to provide training for future teachers, Okeiyi interviewed university program directors involved in the preparation of teachers, state consultants assisting with policy, university teachers who teach nutrition education, and undergraduates. She also examined state policy with an eye toward items that may need to be changed. For example, North Carolina state policy requires that all high school students obtain 1 credit hour of health and nutrition education to graduate. However, there is no minimum number of classroom hours established for instructors that teach nutrition education, and there is no monitoring as to whether the state standards are being met.

The program directors she interviewed stated that their students are being well prepared, both at the undergraduate level and at the licensure level. However, they did not know whether their former students were effectively teaching nutrition education in public schools, nor did they know how many hours of health education or nutrition were being taught.

The state consultants Okeiyi interviewed were not sure if teachers teaching health education were well qualified to teach nutrition. Nor were they sure how many hours were being taught or if students were learning about nutrition, because there are no questions about nutrition on end-of-grade examinations. Finally, they could not attest to the quality or quantity of health courses being taught.

The teachers Okeiyi interviewed said that they did not feel that they were adequately prepared to teach nutrition. Teachers advocated requiring more undergraduate nutrition courses so that teachers would be well prepared. A majority—92 percent—felt that they had effectively changed the dietary behavior of students. However, they also observed that the quantity and quality of the nutrition education delivered had not been assessed, though all agreed that nutrition education is important.

The undergraduates who were interviewed could not remember how many hours of nutrition education they had received in middle or high school. They did not think that the nutrition education they received was effective in changing their personal dietary behaviors and wished that they had learned enough to make informed decisions in college.

On the basis of her assessment, Okeiyi concluded that many students majoring in physical education, public health education, and other nonfamily and consumer science majors are not being adequately prepared to teach nutrition education. The qualifying requirements to teach nutrition are not standardized, and there are no assessments of the implementation of the quality or quantity of nutrition education by teachers, the state, or program directors. State consultants, program directors, and teachers disagree on how qualified teachers are in implementing nutrition education in public schools. In addition, the implementation of nutrition education varies by school and by teacher.

Okeiyi made several recommendations given her findings. She said there should be continuous direct and indirect assessment of the quantity and quality of nutrition instruction on the knowledge and application of knowledge. Direct assessment could include student work, papers, projects, tests, and observation. Indirect assessment could include survey information, interviews, course grades, or all of these components. Testing should be designed to include questions on healthy living or nutrition education components.

Nutrition education in elementary, middle, and high schools should be taught by "well-qualified" trained teachers, she said. National, state, and accreditation standards should address the minimum number of credit hours of undergraduate study required to qualify teachers to teach nutrition education. Educators and teachers must know what skills, knowledge, and values students should have acquired in the area of nutrition. In addition, experiential learning such as garden-based curricula, cooking skills for healthful meals, and the quality of the dining experience, including time for meals, should be included in teaching, according to Okeiyi.

Suggested nutrition core courses for those who plan to teach nutrition include introduction to nutrition (3 credit hours), intermediate nutrition (3 credit hours), food sanitation (2 or 3 credit hours), food science and preparation (3 or 4 credit hours), and nutrition education (3 credit hours), for a total of at least 14-16 credit hours.

Okeiyi also recommended that program directors, professors, and teachers be held accountable through SMART (specific, measurable, achievable, realistic, and time sensitive) goals. Student learning outcome measures should be prepared along with the standards.

Food and nutrition practitioners must work to ensure mandatory, consistent funding for integrated and comprehensive education and promotion programs, Okeiyi said. These programs need to be coordinated at the national level, administered at the state level, and implemented at the local level. They would provide needed infrastructure and help leverage resources among other nutrition-related federal programs.

Increasing the number of trained teachers to teach nutrition educa-

tion in elementary, middle, and high schools is imperative if standards in nutrition education are to be met, Okeiyi continued. National, state, and accreditation standards can continue to drive nutrition education while keeping the focus on learning and improvement. Career development entails educating undergraduate students about career options centered around nutrition education, creating opportunities such as internships and job placement for graduating seniors interested in nutrition education, and involving health care professionals in nutrition education.

Okeiyi listed 12 potential outcomes of such a campaign:

1. Students will gain increased knowledge of nutrition.
2. They will gain enhanced skills in food purchasing and healthy meal preparation.
3. New knowledge will lead to dietary behavior changes now and in the future.
4. Standards will lead to a consistent curriculum.
5. Obesity rates among children and families will fall.
6. A larger percentage of children will be educated in nutrition.
7. Nutrition education will improve, at both the university level and the school-age level.
8. Nutrition education curricula will become more consistent.
9. Health disparities among socioeconomic disadvantaged groups will decline.
10. The 2020 national and state nutrition health objectives will be met.
11. Health care costs in the government and within families will fall.
12. The quality of life related to being overweight or obese will improve.

STANDARDS AND TEACHER CERTIFICATION

Phillip Rogers, executive director of the National Association of State Directors of Teacher Education and Certification, reviewed the process by which teachers are certified in areas subject to education standards. He began by reviewing a set of guidelines for the accreditation of teacher preparation programs in the United States (Lauer and Dean, 2004):

1. Courses are aligned with national and state content standards.
2. Standards documents are part of course materials.
3. Candidates must identify content standards in lesson plans.
4. Candidates learn to develop lesson plans and assessments aligned to standards.
5. Candidates learn to examine evidence of student learning and modify instructional practice based on needs revealed by evidence.

6. Candidates learn to differentiate instruction to address all student needs.
7. The program assesses candidates on both content and pedagogical knowledge and uses the results to monitor the effectiveness of the candidate and the program.
8. Education faculty collaborate with arts and sciences faculty and with K-12 teachers and administrators to ensure that the program content is aligned with K-12 content standards.

New teachers are much more sophisticated about the use of standards than they were 10 years ago, he said. The faculty in teacher preparation programs work hard to make sure that their courses are aligned with standards, and teacher candidates become thoroughly familiar with standards in the course of their preparation. As a result, new teachers especially understand the importance of aligning their instruction with standards.

Experienced teachers are not ignorant of standards, said Rogers, but neither were they prepared to understand how to use standards in their classrooms. Furthermore, given that a relatively small percentage of teachers are replaced each year in many school districts, certification of teacher preparation programs is necessary but not sufficient. While teacher preparation is important, "if you really want to move this forward in your lifetime, then you're going to have to heavily develop and invest in professional development of existing teachers."

Many different groups have been developing standards in various content areas. The National Council of Accreditation of Teacher Education, which at the time of the workshop was changing its name to the Council on Accreditation of Educator Preparation (CAEP), works with these groups in evaluating teacher preparation programs. As the Mid-continent Research for Education and Learning organization has shown, several prominent issues can arise in this process. Sometimes, more than one organization promulgates standards in a particular area, resulting in multiple sources of documents. Also, the definitions of *standard* can vary, with even the basic terminology not solidly established (as described in Chapter 1).

The wording of standards can vary, which can be confusing to teachers and in teacher preparation programs. Standards also may apply to grade ranges or to specific grades. Finally, a standard can have different levels of generality: "Is it in small pieces; is it in medium pieces; how is it divided up?"

Teacher preparation programs need to be submitted to the state for approval, Rogers observed. The state then reviews these programs to ensure that they align with state requirements. Programs may need to demonstrate points of emphasis that a standards body requires. Accreditation generally

occurs at the state level, though some states simply require national accreditation by CAEP. States also oversee teacher certification and licensure.

The National Association of State Directors of Teacher Education and Certification works with the states on approvals of teacher preparation programs and teacher licensure. In considering whether to incorporate standards-based education into a particular area, important considerations are the need for standards in a particular area, the voices advocating for change, the availability and distribution of materials that reflect standards, the extent to which the standards have been adopted, and updates to the standards. Multiple groups interested in nutrition education standards will have to work together to achieve buy-in and support for standards, and they then will need to maintain the standards once they have been implemented. "All kinds of standards out there are out of date, because the passionate people have gone on."

"Teachers are under an incredible amount of pressure and stress," Rogers concluded. "But one thing always stands out: their students come first. And your mission of bringing these nutrition standards forward for the use of teachers is something they're going to be very interested in, because they're very interested in their students."

NUTRITION EDUCATION: INTEGRATION, STAND-ALONE, OR BOTH?

Marilyn Townsend, Cooperative Extension nutrition specialist in the Department of Nutrition at the University of California, Davis—who develops and studies nutrition education programs for nutrition educators—examined in depth an issue that emerged repeatedly during the workshop: the advantages and disadvantages of integrating nutrition education into the rest of the school curriculum versus standalone curriculum on nutrition. With both options, nutrition and physical activity objectives and content first need to be developed, and then this content is aligned with existing education standards. For example, nutrition education can be integrated with mathematics and reading in elementary schools—which are the major topics of attention for elementary school teachers—and with mathematics, English, science, geography, and history in middle and high schools. In addition, nutrition ties in naturally with health education, and physical education. The national school food programs are another venue for nutrition education. Table 7-1 provides a summary of benefits and challenges of integrated and standalone nutrition education formats.

However, integration into other curriculum areas can face serious challenges. As an example, Townsend described the Eat Fit program, which was developed in California and shown to be effective shortly before passage of the No Child Left Behind Act. To adapt nutrition education to the new

TABLE 7-1 Benefits and Challenges of Integrated and Stand-Alone Nutrition Education Formats

Format	Benefits	Challenges
Integration	Teachers are willing to teach nutrition once the other education standards (e.g., math, reading) are met	Teachers are not trained in nutrition
	Minimal cost	Lack of time
	Existing models that can be followed	Obtaining approval/buy-in from those involved (e.g., teachers, principals, curriculum specialists, Wellness Committee), varies by school and district
	More sustainable if implemented as part of existing structures (e.g., Cooperative Extension)	
Standalone	Teacher has nutrition training	Classroom time taken away from other subjects
	Dedicated lab space (e.g., cooking facilities)	Additional costs
		Requires dedicated lab space
		Finding teachers with nutrition training
		Questions of sustainability during budget cuts

focus on education standards created by the legislation and provide credibility to the effort, an independent curriculum expert aligned the nutrition content with standards in mathematics, science, English, physical education, and health for each lesson. The result was a set of content standards identified in areas where there is state-mandated testing, and a set of challenge standards where local adoption of standards is optional. Content standards are mandated by the state for all schools and are the basis for standardized testing in subjects such as math and English. Challenge standards are not mandated nor included in standard testing; this pertains to subjects like health, nutrition or physical education. In a second approach, a nutrition curriculum is developed in conjunction with the standards in other curriculum areas. These other standards did not drive the nutrition

objectives but did affect the design of activities. "With a creative mind, you can tap into those other standards with relative ease."

Teachers are under great pressure to focus on the basics, Townsend emphasized. They also typically are not trained in nutrition. In addition, the gatekeepers for the curriculum in schools vary from district to district, which can make it difficult to disseminate a nutrition curriculum widely.

However, if standards in mathematics and reading can be met, teachers are willing to teach nutrition. Furthermore, the cost of integrating nutrition into the existing curriculum is minimal, and the integration of science and social studies into mathematics and reading provides a model for the integration of nutrition. Tapping into the Land Grant University's Cooperative Extension System in each state and other structures for teacher training can make such integration sustainable.

In standalone nutrition classes, separate class time is devoted to the subject. Nutrition education could even be handled like physical education, with an entire class going to cooking, tasting, and food storage facilities for instruction by a specialist teacher. However, the standalone option also has challenges. Without an extension of the school day, a class in nutrition takes time away from other classes. A dedicated nutrition teacher and special facilities also create additional costs and a demand for space. A pool of credentialed teachers with nutrition coursework does not necessarily exist, and when budget cuts become imperative, which teachers and subjects would be the first to go? "In terms of sustainability I have these cost concerns about the standalone approach" to nutrition education in the public schools, Townsend said.

With a combined approach, a separate and formal nutrition class would exist while nutrition activities and content also are incorporated into existing coursework such as mathematics, English, physical education, and science. When considered together with the integrated and standalone approaches, the combined approach provides schools with a range of options. This may be most appropriate in the United States, where the range of variation among schools is great. "With the combined approach," said Townsend, "schools would have access to more options. And the more choices we can give schools, the better."

Townsend briefly touched upon the fact that knowledge in nutrition is transient. She gave an example of changes in the U.S. Dietary Guidelines every 5 years, and the food guides developed to represent those guidelines to consumers. Eating recommendations have progressed from the basic four food groups to the food wheel to the food guide pyramid to MyPyramid to MyPlate, with concomitant changes in the recommended food group name and serving size of, for example, meat and beans. Townsend implied that an essential question is what is most important to teach students about a food guide such as MyPlate?. Remembering the accurate names of food

groups? Memorizing the 5.5-ounce equivalents? Or being able to apply the concepts to meals in real life?

She also called attention to the lack of research on nutrition education's impact on either education standards or academic performance, which is what most interests educators. To address this lack, Townsend and several colleagues created a protocol and designed a study to examine nutrition education's impact on academic performance (Horowitz et al., 2008). The study showed that nutrition education can improve academic performance measured by achievement of specific mathematics and English education standards (Shilts et al., 2009). "We could help with adoption of nutrition education curricula if we have a few more studies to show that what we're recommending can impact academic standards," she said. "That would be a very important contribution to nutrition education."

8

Developing and Implementing K-12 National Nutrition Education Curriculum Standards

On the second day of the workshop, participants divided into six breakout groups to discuss the needs, design, challenges, and next steps in developing nutrition education curriculum standards. All six groups were asked to address two broad questions:

1. Why are nutrition education curriculum standards needed? Or are they?
2. What do we need to think about to ensure the development of implementable, effective standards?

In addition, three groups were asked to address the following question:

- What are the greatest challenges you see in developing and implementing nutrition education curriculum standards?

The other three groups were asked to address the question:

- How do we move forward?

Following the breakout discussions, Robert Crosnoe, professor in the Department of Sociology and the Population Research Center at the University of Texas at Austin, and other members of the planning committee synthesized the breakout groups' discussions, which were reported by Karen Cullen, chair of the planning committee. The observations summarized below should not be seen as consensus views of the workshop session

breakout groups or the workshop participants as a whole, but they provide a valuable review of the workshop deliberations and point to the potential of future action.

THE NEED FOR STANDARDS

In response to question 1, the moderators for the breakout groups noted that the participants suggested standards would affect nutrition behaviors across the lifespan, thus improving health in a number of areas. In essence, the same justification exists for nutrition education standards as for school health policies.

Some breakout group participants also thought standards would make nutrition issues more visible and accessible to a variety of audiences inside and outside of schools. They could provide consistency, be based on science, and be accurate and comprehensive. However, it was noted the states cannot be forced to adopt standards.

Some group members argued for standards organized by grade bands to increase flexibility. Others wanted standards to be grade specific, since having standards for each grade makes evaluation easier and provides for accountability. Some also urged that standards be developed for prekindergartners as well as K-12 students.

The overall goal would be to help children become adults who would choose foods for a healthy diet. One way to help achieve this goal would be to update the national health education standards and highlight nutrition within those standards. Many other resources are available that could spur and support action, but they need to be coordinated and used effectively.

DEVELOPING IMPLEMENTABLE AND EFFECTIVE STANDARDS

With regard to question 2, many of the breakout group participants suggested that nutrition education be linked to the Common Core standards currently available or being developed. However, some participants thought while nutrition education could be integrated with other subjects, the subject may also need to be treated on its own periodically to ensure that nutrition information does not get blurred and lost. Other participants suggested a major opportunity for integration with other subjects is to think about nutrition in the much larger context of food systems and policy.

Many participants opined that standards be flexible enough so that teachers and schools can decide how to meet the standards. Such flexibility also allows for the regional and socioeconomic differences among schools. The standards could be comprehensive but broad enough to be accessible to many stakeholders and implementers. They also noted teachers would need the resources to implement standards.

Many of the breakout group participants felt that evaluation is critical, with many people involved in discussions about evaluation to get buy-in and cooperation. While the participants thought that evaluation should include behaviors, some breakout group participants expressed concern that teachers not be held accountable for what students choose to eat in a cafeteria. School report cards or other incentives may be a way to foster behavioral changes.

Some participants argued for including nutrition in standardized tests so that it does not get lost. Others opposed standardized testing on nutrition.

It would be important to consider the effects of food marketing on student eating behaviors. In general, many stakeholders have an interest in the school environment, from the food service staff to educators to policy makers. For example, one participant worried about the possibility of lawsuits and other kinds of pushback if students are told what to eat and what not to eat.

CHALLENGES IN DEVELOPING AND IMPLEMENTING STANDARDS

Three of the breakout groups addressed the question about challenges in developing and implementing nutrition education curriculum standards. Various group participants identified costs and resources, political will, and time, along with who will deliver and implement standards where and when, as possible obstacles.

According to some breakout group participants, strategies to overcome these obstacles include providing educators with information and training and ensuring that implementation of standards is reasonable and doable. They believe standards need to reflect current concerns and constraints, especially with regard to the amount of time available to teachers over the course of a school year. However, several participants observed that obesity is a costly problem for schools and that nutrition education would rank high in any list of potential curriculum topics.

MOVING FORWARD

The other three breakout groups considered the question of how best to move forward. Among federal agencies, U.S. Department of Agriculture (USDA), the Department of Health and Human Services, and the Department of Education would be the major drivers of change, according to these breakout group participants. Some breakout group members thought the Department of Education should take the lead, while others thought USDA should do so. Many participants believed the curriculum standards should be linked to the dietary guidelines to improve eating patterns. Also, it was

suggested that the development of standards may need to be undertaken by a group outside government, much as the Common Core standards are being developed by an independent organization.

Those interested in the development of nutrition education standards could examine how other topical groups—such as those working on health education or sex education—have developed and updated standards. The framework developed by the National Research Council (NRC, 2012) for the development of the Common Core science standards was cited as a particularly valuable model for the development of standards.

References

California Department of Education. 2011. *Nutrition Education Resource Guide for California Public Schools, Kindergarten Through Grade Twelve*. Sacramento: California Department of Education.

Carr, D., A. Schaible, and K. Thomas. 2012. *Health in Mind: Improving education through wellness*, edited by R. Davis and J. Levi. Healthy Schools Campaign and Trust for America's Health. http://healthyschoolscampaign.org/content/uploads/Programs/Health%20in%20Mind/Documents/Health_in_Mind_Report.pdf (accessed June 10, 2013).

CDC (Centers for Disease Control and Prevention). 1997. Guidelines for school health programs to promote lifelong healthy eating. *Journal of School Health* 67(1):9-26.

CDC. 2007. *Health Education Curriculum Analysis Tool*. Atlanta, GA: CDC. http://www.cdc.gov/HealthyYouth/hecat (accessed May 16, 2013).

Celebuski, C., and E. Farris. 1996. *Nutrition Education in Public Elementary and Secondary Schools*. Washington, DC: U.S. Department of Education, National Center for Education Statistics. http://nces.ed.gov/pubs/96852.pdf (accessed June 17, 2013).

Celebuski, C., and E. Farris. 2000. *Nutrition Education in Public Elementary School Classrooms, K-5*. Washington, DC: U.S. Department of Education, National Center for Education Statistics. http://nces.ed.gov/pubs2000/2000040.pdf (accessed June 17, 2013).

Cerin, E., A. Barnett, and T. Baranowski. 2009. Testing theories of dietary behavior change in youth using the mediating variable model with intervention programs. *Journal of Nutrition Education and Behavior* 41(5):309-318.

Chase Huegli, C. 2013. *The California experience*. Presented at the IOM Workshop on National Education in the K-12 Curriculum: The Role of National Standards, March 11-12. Washington, DC. http://www.iom.edu/Activities/Nutrition/NutritionEducationStandards/2013-MAR-11.aspx (accessed May 17, 2013).

Chipman, H. 2013. *Expanded food and nutrition education program and SNAP-Ed in schools*. Presented at the IOM Workshop on National Education in the K-12 Curriculum: The Role of National Standards, March 11-12. http://www.iom.edu/Activities/Nutrition/NutritionEducationStandards/2013-MAR-11.aspx (accessed May 17, 2013).

Chriqui J. F., E. A. Resnick, L. Schneider, R. Schermbeck, T. Adcock, V. Carrion, F. J. Chaloupka. 2013. *School District Wellness Policies: Evaluating Progress and Potential for Improving Children's Health Five Years after the Federal Mandate.School Years 2006-07 through 2010-11*. Vol. 3. Chicago, IL: Bridging the Gap Program, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago. http://www.bridgingthegapresearch.org/_asset/13s2jm/WP_2013_report.pdf (accessed June 17, 2013).

Connell, D. B., R. R. Turner, and E. F. Mason. 1985. Results of the School Health Education Evaluation: Health promotion effectiveness, implementation, and costs. *Journal of School Health* 55(8):316-321.

Contento, I. R. 2010. *Nutrition Education: Linking Research, Theory, and Practice*. Sudbury, MA: Jones and Bartlett Publishers.

Contento, I. R., G. I. Balch, Y. L. Bronner, L. A. Lytle, S. K. Maloney, S. M. Olson, and S. S. Swadener. 1995. Nutrition education for school-aged children. *Journal of Nutrition Education and Behavior* 27(6):298-311.

Contento, I. R., J. S. Randell, and C. E. Basch. 2002. Review and analysis of evaluation measures used in nutrition education intervention research. *Journal of Nutrition Education and Behavior* 34(1):2-25.

Fox, M. K., E. Condon, M. K. Crepinsek, K. Niland, D. Mercury, S. Forrestal, C. Cabili, V. Oddo, A. Gordon, N. Wozny, and A. Killewald. 2012. *School Nutrition Dietary Assessment Study IV*. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service. http://www.fns.usda.gov/Ora/menu/Published/CNP/cnp.htm (accessed June 17, 2013).

Hirschman, J. 2013. *Findings from SNDA-IV and Other USDA/FNS Studies on Nutrition Education in Schools and Schools Participating in the HealthierUS School Challenge*. Presented at the IOM Workshop on National Education in the K-12 Curriculum: The Role of National Standards, March 11-12. http://www.iom.edu/Activities/Nutrition/NutritionEducationStandards/2013-MAR-11.aspx (accessed May 17, 2013).

Horne P. J., K. Tapper, C. F. Lowe, C. A. Hardman, M. C. Jackson, and J. Woolner. 2004. Increasing children's fruit and vegetable consumption: A peer modeling and rewards-based intervention. *European Journal of Clinical Nutrition* 58(12):1649-1660.

Horowitz, M., M. K. Shilts, C. Lamp, and M. S. Townsend. 2008. A standards-driven evaluation of academic performance: An 8-step process for nutrition educators. *Journal of Nutrition Education and Behavior* 40(6):401-403.

Howerton, M. W., B. S. Bell, K. W. Dodd, D. Berrigan, R. Stolzenberg-Solomon, and L. Nebeling. 2007. School-based nutrition programs produced a moderate increase in fruit and vegetable consumption: Meta and pooling analyses from 7 studies. *Journal of Nutrition Education and Behavior* 39(4):186-196.

IOM (Institute of Medicine). 2007. *Nutrition Standards for Foods in Schools: Leading the Way Toward Healthier Youth*. Washington, DC: The National Academies Press.

IOM. 2009. *School Meals: Building Blocks for Healthy Children*. Washington, DC: The National Academies Press.

IOM. 2012. *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*. Washington, DC: The National Academies Press.

Jago, R., J. S. Harrell, R. G. McMurray, S. Edelstein, L. El Ghormli, and S. Bassin. 2006. Prevalence of abnormal lipid and blood pressure values among an ethnically diverse population of eighth-grade adolescents and screening implications. *Pediatrics* 117(6):2065-2073.

Jensen, B. J., K. Kattelmann, C. Ren, and H. Wey. 2009. The efficacy of KidQuest: A nutrition and physical activity curriculum for 5th and 6th grade youth. *Journal of Extension* 47(3).

Johnson B.T., L. A. J. Scott-Sheldon, M. P. Carey. 2010. Meta-synthesis of health behavior change meta-analyses. *American Journal of Public Health* 100(11):2193-2198.

Kann, L., S. K. Telljohann, and S. F. Wooley. 2007. Health education: Results from the School Health Policies and Programs Study 2006. *Journal of School Health* 77(8):408-434.

Katz, D. L., M. O'Connell, V. Y. Njike, M. C. Yeh, and H. Nawaz. 2008. Strategies for the prevention and control of obesity in the school setting: Systematic review and meta-analysis. *International Journal of Obesity* 32(12):1780-1789.

Knai, C., J. Pomerleau, K. Lock, and M. McKee. 2006. Getting children to eat more fruit and vegetables: A systematic review. *Preventive Medicine* 42(2):85-95.

Lauer, P. A., and C. B. Dean. 2004. *Teacher Quality Toolkit*. Aurora, CO: Mid-continent Research for Education and Learning. http://www.eric.ed.gov/PDFS/ED484546.pdf (accessed June 17, 2013).

Liquori, T., P. D. Koch, I. R. Contento, and J. Castle. 1998. The Cookshop program: Outcome evaluation of a nutrition education program linking lunchroom food experience with classroom cooking experiences. *Journal for Nutrition Education* 30(5):302-313.

National Academy of Education. 2009. *Standards, Assessments, and Accountability*. Education Policy White Paper. L. Shepard, J. Hannaway, and E. Baker (Eds.). Washington, DC: National Academy of Education.

Nelson, R. A., and A. A. Bremer. 2010. Insulin resistance and metabolic syndrome in the pediatric population. *Metabolic Syndrome and Related Disorders* 8(1):1-14.

NRC (National Research Council). 2012. *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press.

NSCH (National Survey of Children's Health). 2007. *Data query from the Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health website*. http://www.childhealthdata.org (accessed May 21, 2013).

Ogden, C. L., M. D. Carroll, B. K. Kit, and K. M. Flegal. 2012. Prevalence of obesity and trends in body mass index among U.S. children and adolescents, 1999-2010. *Journal of the American Medical Association* 307(5):483-490.

Roseman, M. 2013. *Findings from the Literature: School-Based Nutrition Interventions*. Presented at the IOM Workshop on National Education in the K-12 Curriculum: The Role of National Standards, March 11-12. Washington, DC. http://www.iom.edu/Activities/Nutrition/NutritionEducationStandards/2013-MAR-11.aspx (acccessed May 17, 2013).

Roseman, M. G., M. C. Riddell, and J. N. Haynes. 2011. A content analysis of kindergarten-12th grade school-based nutrition interventions: Taking advantage of past learning. *Journal of Nutrition Education and Behavior* 43(1):2-18.

Sexton, J. S. 2013. *Supplemental Nutrition Assistance Program-Education (SNAP-Ed) through the Land-Grant University System for FY 2010: A retrospective review*. Starkville, MS. http://www.csrees.usda.gov/nea/food/fsne/pdfs/lgu_final_rep_2012.pdf (accessed May 16, 2013).

Shilts, M. K., C. Lamp, M. Horowitz, and M. S. Townsend. 2009. Pilot study: EatFit impacts sixth graders' academic performance on achievement of mathematics and English education standards. *Journal of Nutrition Education and Behavior* 41(2):127-131.

Stewart, S. T., D. M. Cutler, and A. B. Rosen. 2009. Forecasting the effects of obesity and smoking on U.S. life expectancy. *New England Journal of Medicine* 361(23):2252-2260.

U.S. Census Bureau. 2011. *Table 1. Enrollment Status of the Population 3 Years Old and Over, by Sex, Age, Race, Hispanic Origin, Foreign Born, and Foreign-Born Parentage: October 2011. School Enrollment*. http://www.census.gov/hhes/school/data/cps/2011/tables.html# (accessed May 13, 2013).

USDA and HHS. 2010. (U.S. Department of Agriculture and U.S. Department of Health and Human Services) *Dietary Guidelines for Americans*. 7th ed. Washington, DC: U.S. Government Printing Office. www.health.gov/dietaryguidelines/dga2010/dietaryguidelines2010.pdf (accessed May 14, 2013).

USDA-FNS (U.S. Department of Agriculture Food and Nutrition Service). 2013a. *Local School Wellness Policy*. http://teamnutrition. usda.gov/healthy/wellnesspolicy_requirements.html (accessed June 17, 2013).

USDA-FNS. 2013b. *State SNAP-Ed Allocations—FY2006-FY2014*. http://snap.nal.usda.gov/snap/Guidance/StateSNAP-EdAllocations.pdf (accesed May 23, 2013).

USDA-NIFA (U.S. Department of Agriculture National Institute of Food and Agriculture). 2013. *2012 Impacts: The Expanded Food and Nutrition Education Program*. http://www.nifa.usda.gov/nea/food/efnep/pdf/impact_data_report_2012.pdf (accessed May 16, 2013).

Waters, E., A. de Silva-Sanigorski, B. J. Hall, T. Brown, K. J. Campbell, Y. Gao, R. Armstrong, L. Prosser, and C. D. Summerbell. 2011. Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews* (12):CD001871.

Whitehead, F. 1973. Nutrition education research. *World Review of Nutrition and Dietetics* 17: 91-149.

Wisconsin Department of Public Instruction. 2009. *Wisconsin's Model Academic Standards for Nutrition Education*. Madison: Wisconsin Department of Public Instruction. http://ne.dpi.wi.gov/files/ne/pdf/nestandards.pdf (accessed May 17, 2013).

Wisconsin Department of Public Instruction. 2011. *Nutritious, Delicious, Wisconsin: Connecting Nutrition Education and Local Foods*. Madison: Wisconsin Department of Public Instruction. http://ne.dpi.wi.gov/files/ne/pdf/ndw.pdf (accessed May 28, 2013).

A

Statement of Task and Workshop Agenda

BOX A-1
Statement of Task

An ad hoc committee will organize a public workshop to discuss development of national nutrition education curriculum standards for use in elementary and secondary schools. Through presentations and discussions the workshop will explore the merits, potential uses, and attributes of a set of national standards and learning objectives for elementary and secondary school children, current and promising practices, and approaches to build acceptance and use among educators. An unedited transcript of the presentations and discussions will be prepared in accordance with institutional guidelines and will be provided to the sponsor, and a summary of the workshop will be prepared by a rapporteur and issued as an IOM Workshop Summary.

NATIONAL NUTRITION EDUCATION CURRICULUM STANDARDS WORKSHOP AGENDA

March 11-12, 2013
The National Academies Keck Center
500 Fifth Street, NW, Room 100
Washington, DC

DAY 1: Monday, March 11, 2013

8:00 AM **Registration**

OPENING SESSION

8:30 **Welcome, Introductions, and Purpose**
Karen Weber Cullen, Chair, Planning Committee
Baylor College of Medicine

8:35 **Healthy Foods Plus Nutrition Education—Effective Together:**
U.S. Department of Agriculture Perspective
Janey Thornton, Deputy Under Secretary
Food, Nutrition and Consumer Services, U.S. Department of Agriculture

9:10 **The Importance of Nutrition and Health for Education: U.S. Department of Education Perspective**
Norris Dickard
Office of Safe and Healthy Students, U.S. Department of Education

SESSION 1: SETTING THE CHARGE

9:40 *Patricia Crawford, Moderator*
University of California, Berkeley

9:45 Impact of Health on Learning and Development
Virginia Stallings
The Children's Hospital of Philadelphia, University of Pennsylvania

10:15 **Break**

10:30 **Lessons from the Past**
Isobel Contento
Columbia University

SESSION 2: LESSONS LEARNED FROM FEDERAL PROGRAMS

11:00 *Karla P. Shelnutt, Moderator*
University of Florida

11:05 **Expanded Food and Nutrition Education Program and SNAP-Ed in Schools**
Helen Chipman, National Institute of Food and Agriculture, USDA

11:35 **Team Nutrition and the HealthierUS School Challenge**
Eileen Ferruggiaro, Child Nutrition Division, Food and Nutrition Service, USDA
Jay Hirschman, Office of Research and Analysis, Food and Nutrition Service, USDA

12:05 PM **Panel Discussion**

12:15 **Lunch Break**

SESSION 3: IDENTIFYING CURRENT AND BEST PRACTICE—STATE AND LOCAL EXPERIENCES

1:15 *Karen Chapman-Novakofski, Moderator*
University of Illinois at Urbana-Champaign

1:20 **Findings from the Literature: School-Based Nutrition Interventions**
Mary Roseman, University of Mississippi

1:40 **California Experience**
Carol Chase Huegli, California Department of Education

2:00 **Wisconsin Experience**
Susan Nitzke, University of Wisconsin–Madison

2:20 **Washington, DC, Experience**
Anastasia Snelling, American University

2:40 **Panel Discussion**

3:00 **Break**

SESSION 4: CHALLENGES AND OPPORTUNITIES FOR NUTRITION EDUCATION CURRICULUM STANDARDS IN SCHOOLS

3:15 *Carol Olander, Moderator, Food and Nutrition Service, USDA (Retired)*

3:20 **Perspective of a Board of Education Member**
Elaine Gantz Berman, Colorado State Board of Education

3:40 **Perspective of a Superintendent**
Steven Ladd, Superintendent, Elk Grove Unified School District, California

4:00 **Perspective of a Principal**
Fred Storti, Minnesota Elementary School Principals Association

4:20 **Perspective of a Teacher**
Jason Dane, Teacher, New Trier High School, Illinois

4:40 **Panel Discussion**

5:00 **Adjourn for the Day**
Karen Weber Cullen

DAY 2: Tuesday, March 12, 2013

SESSION 5: DEVELOPING K-12 NUTRITION EDUCATION CURRICULUM STANDARDS

8:30 AM *Robert Crosnoe, Moderator*
The University of Texas at Austin

8:35 **Setting the Stage—What Are the Challenges That Lie Ahead?**
Isobel Contento, Columbia University

8:55 **Breakout Session: What Should the Framework Look Like? Components, Ownership, and Challenges**

10:15	**Break**
10:45	**Report Back from Breakout Sessions and Large-Group Discussion**
12:00 PM	**Lunch Break**

SESSION 6: PANEL—ACHIEVING THIS FRAMEWORK: TRAINING AND PROCESS

1:00	*Carlette KyserPegram, Moderator* *U.S. Department of Education*
1:05	**Teacher Training—Undergraduate** *Esther C. Okeiyi, North Carolina Central University*
1:25	**Teacher Training—Certification and CEUs** *Phillip S. Rogers, National Association of State Directors of Teacher Education and Certification*
1:45	**Nutrition Education: Integration, Stand-Alone, or Both** *Marilyn Townsend, University of California, Davis*
2:05	**Panel Discussion**

CLOSING REMARKS

2:30	*Karen Weber Cullen, Moderator*
	Future Steps *Katie Wilson, National Food Service Management Institute*
3:00	Adjourn

B

Moderator and Speaker Biographical Sketches

Elaine Gantz Berman, M.S.P.H., a representative of the Colorado Congressional District 1, was appointed to the Colorado State Board of Education in January 2007 and was elected to a 6-year term in November 2008. Ms. Berman has dedicated her professional work and community service to improving the lives of Colorado's children. Prior to serving on the state board, she served for 8 years on the Denver Board of Education, including 4 years as president. As a member of the state board of education, Ms. Berman was instrumental in the adoption of the state's first Comprehensive Academic Health Education Standards. In her position as a state board member, she works to improve teacher effectiveness and revise state assessments to align with the newly adopted 10 model content standards. Ms. Berman is committed to revamping Colorado's education system to reflect the skills required for the 21st century. Ms. Berman received her M.S.P.H. from the University of North Carolina, Chapel Hill.

Karen Chapman-Novakofski, Ph.D., R.D., L.D.N., is professor of nutrition in the Department of Food Science and Human Nutrition at the University of Illinois at Urbana-Champaign. She is well recognized in the field of nutrition education practice and research and has held leadership roles in the Academy of Nutrition and Dietetics, the American Society for Nutrition, the American Diabetes Association, and the Society for Nutrition Education and Behavior which have included organizing symposia, workshops, and webinars. As Editor in Chief for the *Journal of Nutrition Education and Behavior*, she knows the talents of a wide network of scientists, educators, and policy advocates working in schools in the area of nutrition education,

which is advantageous on this committee. Dr. Chapman-Novakofski has also worked with the state Board of Education standards of Texas, Illinois, and Tennessee as part of her research concerning web-based nutrition education in middle schools. She has also worked with Latina/Hispanic populations and cultural perspectives on both food and nutrition. Having worked in community nutrition since 1991, Dr. Chapman-Novakofski has worked with many local, state, and federal partners, including the state Nutrition Education and Training programs for teachers, land-grant university extension services, school wellness committees, and parent-teacher associations. Dr. Chapman-Novakofski received her B.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign, and her M.S. degree from Eastern Illinois University.

Helen Chipman, Ph.D., R.D., is the National Program Leader in the Nutrition Division of the National Institute of Food and Agriculture at U.S. Department of Agriculture. For more than a decade, Dr. Chipman has provided national leadership to land-grant universities that conduct low-income nutrition education. In this capacity, she has served as a liaison among universities and federal agencies and has fostered shared understanding across organizational systems and structures. She has led the development and implementation of a socioecological framework for nutrition education and paraprofessional core competencies, and the completion of four national reports. Previously, Dr. Chipman provided administrative leadership for the Expanded Food and Nutrition Education Program, Food Stamp Nutrition Education (FSNE, now SNAP-Ed) and its associated state nutrition network, and had teaching, advising, and research responsibilities as an extension specialist and professor at South Dakota State University. Dr. Chipman is a member of the Academy of Nutrition and Dietetics and the Society for Nutrition Education and Behavior. Her publications focus primarily on low-income nutrition education programming and risk communication. Dr. Chipman received a Ph.D. in food science and human nutrition from Colorado State University, Fort Collins, Colorado, with an emphasis in applied nutrition education.

Isobel Contento, Ph.D., is the Mary Swartz Rose Professor of Nutrition and Education and Coordinator of the Program in Nutrition, Teachers College Columbia University. Her research focuses on factors influencing food choice, particularly among children and adolescents, and the development and evaluation of school-based programs linking childhood obesity prevention to food system education. She is particularly interested in the use of theory and research evidence to design nutrition education programs. Recently completed is a study aimed to reduce the risk of overweight in middle school youth through an emphasis on personal agency and autono-

mous motivation in healthful food and activity choices through classroom and educational game formats. She is currently conducting a study that examines the impact of education and school food policy, individually and combined, in assisting fifth graders to eat well and maintain a healthy weight. She has been a member of several national advisory committees. She has published numerous articles, book chapters, and has served on the editorial boards of several journals. She also provides workshops to nutrition education practitioners. The second edition of her book, *Nutrition Education, Linking Research, Theory, and Practice*, was published in 2011. Dr. Contento received her B.Sc. from the University of Edinburgh in Scotland, and Ph.D. from the University of California, Berkeley.

Patricia Crawford, Dr.P.H., R.D., is director of the Dr. Robert C. and Veronica Atkins Center for Weight and Health, Cooperative Extension Nutrition Specialist in the Department of Nutritional Science and Toxicology, and adjunct professor in the School of Public Health at the University of California, Berkeley. Dr. Crawford directed the longitudinal National Heart, Lung, and Blood Institute's Growth and Health Study, a study of the development of cardiovascular risk factors in African American and white girls, as well as the Five-State FitWIC Initiative to Prevent Childhood Obesity. She has developed numerous obesity prevention materials, including the Fit Families novella series for Latino families and Let's Get Moving, an activity program for those who work with young children. Dr. Crawford has served on a number of advisory committees, including the California Legislative Task Force on Diabetes and Obesity. Her current studies include evaluations of large community-based obesity initiatives and school-based policy interventions. Dr. Crawford is currently a member of the Institute of Medicine (IOM) Standing Committee on Childhood Obesity Prevention and has served as a member or chair of three IOM obesity-related planning committees. She also served as a member of the IOM Committee on Accelerating Progress in Obesity Prevention. She earned a Ph.D. in public health and completed her training as a registered dietitian at the University of California, Berkeley.

Robert Crosnoe, Ph.D., is professor in the Department of Sociology and Population Research Center at the University of Texas at Austin. His main research area is the life course and human development—specifically, the connections among health, child and adolescent development, and education and how these connections can help us understand inequalities related to race, social class, and immigration. Dr. Crosnoe received his Ph.D. in sociology from Stanford University and he completed a postdoctoral fellowship at the Carolina Population Center and the Center for Developmental Science at the University of North Carolina at Chapel Hill.

Karen Weber Cullen, Dr.P.H., R.D., is professor of pediatrics at the U.S. Department of Agriculture (USDA)/Agricultural Research Service Children's Nutrition Research Center, Baylor College of Medicine. Her primary research interest is the prevention of obesity and diet-related chronic diseases. Her current research includes the evaluation of a website on healthy eating and physical activity for high school students; testing the use of "nudges" in the cafeteria to improve student selection of fruit and vegetables, and evaluating the impact of the new school meal guidelines on student consumption and costs. Dr. Cullen served as a member of the Institute of Medicine's (IOM's) Committees on Nutrition Standards for National School Lunch and Breakfast Programs and the Review of Child and Adult Care Food Program (CACFP) Meal Requirements. Dr. Cullen's professional memberships include the Society for Nutrition Education, the American Dietetic Association, the School Nutrition Association, the International Society of Behavioral Nutrition and Physical Activity, and the Texas Dietetic Association (Distinguished Scientist Award in 2001). Dr. Cullen has a master of science in nutrition from Case Western Reserve University and a doctorate of public health in health promotion and health education from The University of Texas School of Public Health.

Jason B. Dane is a teacher in the Kinetic Wellness Department and the course coordinator for freshman health curriculum at New Trier High School in Northfield, Illinois. Mr. Dane is an active member of the Illinois Association for Physical Education, Recreation, and Dance and the American Alliance for Association for Physical Education, Recreation, and Dance (AAHPERD). He is a leader in health education at New Trier High School in pioneering and implementing nutrition lessons and programs for students and staff. Mr. Dane has presented at numerous workshops on nutrition education at the local and national levels, and his creative and engaging lessons are seen as innovative by his peers. Educators around the country frequently use him as a resource to provide lesson ideas and curriculum guidance. Mr. Dane was recognized for his excellence in the classroom by being awarded the 2012 Illinois Health Educator of the Year. This award was given in recognition of his "high professional standards, his promotion of physical health and well-being, his dedication to teaching, and his service to the profession." In addition to the recognition from his state association, Mr. Dane was recently named as the 2013 Midwest District AAPHERD Health K-12 Teacher of the Year.

Norris E. Dickard, M.A., directs the Healthy Students Group at the U.S. Department of Education. He leads a team with a portfolio of grant programs and technical assistance centers related to U.S. government strategic investments that support student success (substance abuse and violence preven-

tion, physical education, school mental health programs, and school-based health care). Mr. Dickard serves on numerous federal interagency working groups, including the demand reduction group of the White House, Office of National Drug Control Policy, National Prevention Council, and the National Forum on Youth Violence Prevention, and has over two decades of experience in public policy and public administration. He previously served in the Clinton Administration as a senior policy advisor at the U.S. Department of Education, and served on numerous White House taskforces where he played a key role in the development of national policy to enhance American competitiveness, including key components of the federal School-to-Career and Digital Opportunity initiatives. Mr. Dickard received his master's degree from Harvard University.

Eileen Ferruggiaro, R.D., Ph.D., is Chief of the Nutrition Promotion and Technical Assistance Branch at the U.S. Department of Agriculture's (USDA) Child Nutrition Division, Food and Nutrition Service. This branch is responsible for Team Nutrition resources and publications, the HealthierUS School Challenge, the Child Nutrition Labeling program, the Food Buying Guide, Nutrient Standard Menu Planning software, National Food Service Management Institute grants, and other educational and technical resources. She previously served as a nutrition information specialist at the Food and Nutrition Information Center working on the International Bibliographic Information on Dietary Supplements database and the USDA Nutrient Standard Menu Planning Software Evaluation Team projects. Dr. Ferruggiaro also served as a food service educator with the National Food Service Management Institute, as a technical information specialist with the USDA Meat and Poultry Hotline, and as a public health nutritionist and university faculty. She received her Ph.D. in human nutrition from Syracuse University.

Jay Hirschman, M.P.H., C.N.S., has worked in public health nutrition at the local, state, and federal levels, including 25 years at the U.S. Department of Agriculture (USDA) Food and Nutrition Service. In his current position as Staff Director, he is responsible for managing the staff conducting the evaluation studies and policy analysis for all domestic Special Nutrition Programs, including WIC (Special Supplemental Nutrition Program for Women, Infants, and Children), the National School Lunch Program, the School Breakfast Program, the Child and Adult Care Food Program and the other Child Nutrition Programs, and the Food Distribution Programs. Mr. Hirschman previously served as a State WIC Supervisor and as the first director for the nutrition policy and analysis staff at the then newly formed USDA Center for Nutrition Policy and Promotion. Mr. Hirschman is an American College of Nutrition board-certified nutrition specialist

and previously served as elected chair of the American Public Health Association Food and Nutrition Section (APHA/FN). In 2009 he received the APHA/FN Mary C. Egan award, which "goes to those public health nutritionists who pioneer fresh approaches to public health nutrition, nutrition education, and those groups with special dietary needs."

Carol Chase Huegli, M.S., R.D., is the associate director for the Nutrition Services Division at the California Department of Education. She oversees the administration of the Child Nutrition and U.S. Department of Agriculture Foods Programs in California, which includes the development of nutrition education and training programs for sponsoring agencies. Ms. Chase Huegli previously served for the California WIC (Special Supplemental Nutrition Program for Women, Infants, and Children) program and the Riverside County Department of Public Health Nutrition Services. During her tenure at WIC, Ms. Chase Huegli was responsible for managing the nutrition education, training, breastfeeding promotion, and outreach activities. She received her bachelor's degree in biology from the University of California, San Diego, and her master's degree in nutrition science from the University of California, Davis.

Steven M. Ladd, Ed.D., is Superintendent of the Elk Grove Unified School District in Elk Grove, California, the fifth largest district in California. The Elk Grove Unified School District has been recognized at both the state and national levels for the district's commitment to nutritional education. Superintendent Ladd has more than 40 years of experience as an educator across the United States, from Florida to California. His areas of interest include leadership development and improved academic achievement. In addition, Superintendent Ladd has made closing the achievement gap a key component of his agenda at Elk Grove Unified. He currently serves on the National Superintendents Roundtable and the California School Boards Association's Superintendents Advisory Council, and was recently appointed to the Board of Directors for the Horace Mann League of the USA. Mr. Ladd received a doctoral degree in educational leadership from Nova Southeastern University, and a master's degree in administration and supervision of vocational education and a bachelor's degree in industrial arts education from Florida International University.

Susan Nitzke, Ph.D., is Professor Emerita and Extension Specialist in Nutritional Sciences at the University of Wisconsin–Madison (UW–Madison). Dr. Nitzke's research and extension career at UW–Madison spanned almost three decades, and she served as chair for the Nutritional Sciences Department at UW–Madison from 2008 until she retired in 2011. Dr. Nitzke continues to work part-time on research and extension projects, and she

has provided leadership on many statewide and national projects in nutrition education. Her work as a member of the committee that developed nutrition education guidelines for the state of Wisconsin is one example. Dr. Nitzke received her Ph.D. from the University of Wisconsin–Madison.

Esther Chinyere Okeiyi, Ph.D., R.D., is a tenured professor and program director for the Dietetic Internship program and didactic programs in dietetics at North Carolina Central University. She previously taught and directed the nutrition programs at Morris Brown College in Atlanta, Georgia, and at East Carolina University in Greenville, North Carolina. Dr. Okeiyi has served as Chairperson of the North Carolina Board of Dietetics and Nutrition, and Liaison for the North Carolina Dietetic Association. She has also served on several committees at North Carolina Central University. Dr. Okeiyi is a registered dietitian, and she received her Ph.D. in nutrition from Mississippi State University.

Carol Olander, Ph.D., recently completed a career of more than 30 years at the U.S. Department of Agriculture (USDA) Food and Nutrition Service (FNS). She previously served as director of the Family Programs Staff in the Office of Research and Analysis. In that position, she was responsible for managing evaluation studies and policy analyses for USDA's largest domestic nutrition program, the Supplemental Nutrition Assistance Program (SNAP)—formerly the Food Stamp Program. Over the course of her career, Dr. Olander was responsible for a variety of nutrition education initiatives, including a rigorous evaluation of the agency's school-based Team Nutrition pilot. She also co-chaired the Inter-Agency Working Group on the Evaluation of Nutrition Education. A recipient of multiple awards for her contributions to the introduction of electronic benefit transfer systems to SNAP, Dr. Olander also worked with the Senate Agriculture Committee on the 2000 Farm Bill and consulted with the U.S. Agency for International Development on nutrition assistance initiatives in Brazil. Prior to joining FNS, she taught social psychology at Marshall University. Dr. Olander received her Ph.D. in psychology from Northwestern University.

Carlette KyserPegram, M.Ed., is an education program specialist at the U.S. Department of Education, Office of Safe and Healthy Students. She serves as competition manager for the Carol M. White Physical Education Program (PEP) which provide grants to local educational agencies and community-based organizations in the District of Columbia to initiate, expand, and improve physical education programs (including after school programs) for students in kindergarten through 12th grade. Ms. KyserPegram is a former teacher and has experience in the practical application of policy

and curriculum at the ground level. She received her M.Ed. from Howard University.

Phillip S. Rogers, Ed.D., is executive director of the National Association of State Directors of Teacher Education and Certification (NASDTEC), an organization that represents professional standards boards and commissions and state departments of education in all 50 states and the District of Columbia which was founded in 1928 to exercise leadership in matters related to the preparation and certification of professional school personnel. Prior to NASDTEC, Mr. Rogers served as executive director of the Kentucky Education Professional Standards Board (EPSB), an organization that oversees professional certification of teachers and principals. Before his tenure at the EPSB, Mr. Rogers served as the founding director of the Allen County Schools Family Resource Center, recognized as Kentucky's Outstanding Family Resource Center by the Kentucky Association of Guidance Counselors. Prior to founding the Family Resource Center, he directed the Allen County public mental health clinic, where he specialized as a child and family therapist. Mr. Rogers has performed research and evaluations for a variety of organizations and programs, including the Kentucky Institute for Educational Research, the National Center for Family Literacy, the Kentucky Safe Schools Project, and the Kentucky Department for Juvenile Justice. He received a B.S. degree in counseling from Liberty University in Virginia, an M.A. in child development from Western Kentucky University, and a doctorate in education evaluation from the University of Louisville.

Mary Roseman, Ph.D., R.D., is an associate professor in the Department of Nutrition and Hospitality Management at the University of Mississippi. Previously, she held faculty appointments as associate and assistant professor at the University of Kentucky and instructor at the University of Central Oklahoma. Her primary undergraduate and graduate teaching areas include food service management, marketing, research methods, human resources, and strategic management. Dr. Roseman has published numerous articles in nutrition and hospitality journals and presented more than 70 peer-reviewed presentations and posters at national and international conferences in such areas as school nutrition, food safety, and healthy menus in restaurants and schools. Recently, she developed and participated in testing and piloting the Connect Chefs to Schools Training Program for the National Food Service Management Institute. Dr. Roseman is an active member of several national organizations, including the Academy of Nutrition and Dietetics and the International Council on Hotel, Restaurant and Institutional Educators. She has been awarded the Academy of Nutrition and Dietetics' Outstanding Dietetic Educator of the Year for Region V, Oklahoma State University's College of Human Environmental Sciences

Distinguished Alumnus of the Year, Kentucky Dietetic Association's Outstanding Dietitian of the Year, and Oklahoma's Outstanding Young Dietitian of the Year. Dr. Roseman received her Ph.D. in food service systems management from Oklahoma State University, an M.B.A. from University of Central Oklahoma, and a B.S. in food and nutrition from Western Kentucky University.

Karla P. Shelnutt, Ph.D., R.D., is an assistant professor and Extension Nutrition Specialist at the University of Florida. Her academic appointment is 70 percent extension in the Department of Family, Youth & Community Sciences and 30 percent teaching in the Food Science and Human Nutrition Department. She is a registered dietitian and works closely with first-year students in the Master of Science-Dietetic Internship Program as part of their Nutrition Education and Wellness Concentration, where they spend a year learning about extension and developing nutrition education materials. Since starting her current position, Dr. Shelnutt has provided statewide leadership for her extension program that focuses on obesity prevention in children, adolescents, and young adults. She has developed curricula and extension publications that teach families how to make better nutrition and physical activity choices to lead healthier lifestyles. These curricula incorporate Florida's Sunshine State Standards to increase utilization by Florida teachers. As a result she has worked on the Society for Nutrition Education and Behavior Nutrition Education Standards Committee to address the need for national nutrition education standards. She also works with a multistate research team using community-based participatory research to develop effective interventions designed to prevent weight gain in college students. Dr. Shelnutt received her B.S. and Ph.D. in food science and human nutrition from the University of Florida, and received a master's degree in clinical nutrition and completed her dietetic internship at the University of Alabama at Birmingham.

Anastasia Snelling, Ph.D., is an associate professor and the Associate Dean in the School of Education, Teaching, and Health at American University. Dr. Snelling has been a member of the Academy of Nutrition and Dietetics as a registered dietitian for more than 30 years and a fellow in the American College of Nutrition. Her current research is in the area of childhood obesity and the role of schools in promoting healthful foods and lifestyles. This work is primarily in Washington, DC, studying vulnerable student populations in the DC Public and Public Charter Schools. Dr. Snelling received her Ph.D. from American University.

Virginia A. Stallings, M.D., is professor of pediatrics at the University of Pennsylvania School of Medicine, and director of the Nutrition Center at

The Children's Hospital of Philadelphia. She is a pediatrician and a specialist in nutrition and growth in children with chronic illness. Her research interests are in areas of nutrition-related growth and body composition in healthy children and those with chronic disease, including obesity, sickle cell disease, osteoporosis, cystic fibrosis, cerebral palsy, Crohn disease, HIV, and congenital heart disease. Current research includes a longitudinal study of the impact of phytoestrogens from soy infant formula on growth and development of infants. She has been extensively involved in pediatric nutrition clinical care and research for more than 25 years. Dr. Stallings plays a broader role in the community of nutrition scientists and physicians as a member of the IOM of the National Academy of Sciences, the council of the American Society for Nutrition, and a past member of the IOM Food and Nutrition Board. She previously served as Chair of the IOM Committee on Nutrition Standards for Foods in Schools. Dr. Stallings also served as Chair of the IOM Committee on Nutrition Standards for National School Lunch and Breakfast Programs, which authored the 2010 recommendations to revise the school lunch and breakfast programs. She received her M.D. from the University of Alabama at Birmingham School of Medicine.

P. Fred Storti, M.S., is Executive Director of the Minnesota Elementary School Principals' Association (MESPA) in St. Paul, Minnesota. Prior to assuming this position of statewide and national advocacy, Mr. Storti gained 27 years of experience as a principal/superintendent in Minnesota urban, suburban, and rural schools. In his broad stewardship for elementary and middle level principals, Mr. Storti also serves on several statewide committees, including the Alliance for Student Achievement and the P-20 Committee. In addition, he has served as chair of the National Association of Elementary School Principals Executive Directors, the national elementary and middle level principal association. Mr. Storti received a bachelor of science in elementary education, and a master of science and specialist degrees from Minnesota State University.

Janey Thornton, Ph.D., was appointed by President Barack Obama as U.S. Department of Agriculture (USDA) Deputy Under Secretary for Food, Nutrition and Consumer Services (FNCS) on April 1, 2009. Dr. Thornton is responsible for improving the health and well-being of Americans by developing and promoting science-based dietary guidance and administering USDA's 15 nutrition assistance programs. FNCS programs work to end hunger in the United States and provide nutrition assistance, dietary guidance, nutrition policy coordination, and nutrition education. She previously served as School Nutrition Director for Hardin County Schools in Elizabethtown, Kentucky, worked with the Kentucky Department of Education, and taught vocational home economics. Dr. Thornton previously

served as president of the School Nutrition Association. She has also served as president of the School Nutrition Foundation and was an active member of the Global Child Nutrition Foundation. She received her bachelor of science degree in home economics from Western Kentucky University, her master of science degree in vocational education and school administration from the University of Kentucky, and her doctorate in hotel and restaurant management from Iowa State University.

Marilyn Townsend, Ph.D., R.D., is the Cooperative Extension Nutrition Specialist in the Department of Nutrition at the University of California, Davis. Dr. Townsend's obesity prevention research focuses on improving diets and physical activity of low-income families. She has extensive experience in intervention development, assessment tool validation, and program evaluation, having conducted randomized controlled trials and quasiexperimental evaluation studies in low-income communities. Dr. Townsend has conducted studies on mediators of behavior change and the relationships among obesity, food insecurity, and food costs. She has published her research in theory-driven program development and implementation, nutrition educational methodologies, behavior change strategies including goal setting, methods of assessing diet costs, and program evaluation. Serving as a consultant with numerous federal and state agency professionals and university researchers, Dr. Townsend is considered an expert on the development of valid assessment tools for risk assessment and program evaluation of USDA's food assistance and education programs with special attention to low-literate participants. She obtained her M.S. in nutrition science from the University of London (Kings College) and her Ph.D. in nutrition with emphasis on behavior from Pennsylvania State University.

Katie Wilson, Ph.D., is executive director of the National Food Service Management Institute, part of the School of Applied Science at the University of Mississippi. Previously, Dr. Wilson directed the school nutrition programs in Wisconsin for 22 years, and she is past president of the School Nutrition Association. She has a passion for school nutrition and has dedicated her career to enhancing school nutrition programs and improving program access to all children. Dr. Wilson is also credentialed as a School Nutrition Specialist and has shared her expertise with school nutrition employees, school administrators, school boards, and allied organizations across the United States, and internationally at the United Nations, in Japan and South Africa. She has a B.S. degree in dietetics, a master's degree in food science and nutrition from the University of Wisconsin–Stout, and a Ph.D. in food service and lodging management from Iowa State University.

C

Workshop Attendees

Barbara Ainsworth
American College of Sports Medicine

MaryBeth Alderman
University of Florida

Jan Barrett
U.S. Department of Agriculture
Food and Nutrition Service

Karen Basinger
Montgomery College

Donna Benton
Jefferson County Public Schools

Heidi Bishop
U.S. Department of Agriculture
Food and Nutrition Service

Erin Braunscheidel
University of Maryland Extension
SNAP-Ed

Jo Britt-Rankin
University of Missouri Extension

Katei Brown
Academy of Nutrition and Dietetics

Elizabeth Campbell
University of California, Berkeley
Center for Weight and Health

Virginia Carraway-Stage
East Carolina University

B. J. Carter
Healthy Children Healthy Futures

Rachelle Chiang
National Association of Chronic Disease Directors

Stephanie Cooks
U.S. Department of Agriculture
Food and Nutrition Service

Linda Drake
University of Connecticut

Melani Duffrin
East Carolina University

Caroline Dunn
University of Florida

Judy Dzimiera
Maryland State Department of Education

Jennifer Ernst
American University

Rebecca Feldman
Healthy Weight Commitment Foundation

Tab Forgac
National Dairy Council

Amy Frady
U.S. Department of Agriculture

Miecha Galbraith
National Education Association Health Information Network

Leigh Gantner
U.S. Senate

Lucy Gettman
National School Boards Association

Lisa Graves
Purdue University Extension

Brian Griffith
Maryland State Department of Education

Ann Hall
U.S. Department of Agriculture Food and Nutrition Service

Deborah Harris
Michigan Fitness Foundation

Yenory Hernandez
Clemson University

Ondrej Homola
Corinth, Ltd.

Cynthia Hormel
U.S. Department of Agriculture Food and Nutrition Service

Nora Howley
NEA Health Information Network

Dawanna James-Holly
Local Government

Barbara Jirka
U.S. Department of Agriculture Food and Nutrition Service

Hannah Jones
Center for Science in the Public Interest

Michelle Kalicki
American University

Lisa Katic
K Consulting

Nancy Katz
Office of the State Superintendent of Education for DC

Deborah Kennedy
Build Healthy Kids

Julie Knight
Strategic Conservation Solutions, LLC

Pam Koch
Teachers College Columbia University

Richard Lucas
U.S. Department of Agriculture
Food and Nutrition Service

Brittney Linton
Clemson University
Expanded Food and Nutrition Education Program

Lisa Lubin
U.S. Food and Drug Administration

Melissa Maitin-Shepard
American Cancer Society Cancer Action Network

Jerold Mande
U.S. Department of Agriculture
Food and Nutrition Service

Donna Martin
Academy of Nutrition and Dietetics

Janet McLaughlin
Share our Strength's Cooking Matters

Whitney Meagher
National Association of State Boards of Education

Carol R. Miller
University of Maryland
Food Supplement Nutrition Education

Michelle Miller
Arizona State University

Meredith Morrissette
U.S. Department of Health and Human Services

Sarah Murphy
School Nutrition Association

Valerie Newcomb
Healthy Weight Commitment Foundation

Lauren Niemes
Nutrition Council

Julie Obbagy
U.S. Department of Agriculture
Center for Nutrition Policy and Promotion

Jillian Panichelli
Share Our Strength

Joi Parks
U.S. Department of Agriculture
Food and Nutrition Service

Erika Pijai
U.S. Department of Agriculture
Food and Nutrition Service

Rachel Polon
U.S. Department of Agriculture
Food and Nutrition Service

Elizabeth Rahavi
U.S. Department of Agriculture
Center for Nutrition Policy and Promotion

Sylvia Rowe
SR Strategy, LLC

Leila Saldanha
NutrIQ, LLC

Sandra Schlicker
Government of the District of Columbia

Gabrielle Serra
Public Health Institute

Danielle Sobieski
Build Healthy Kids

Jayne Steinmetz
University of Wisconsin–Stevens Point

Eve Essery Stoody
U.S. Department of Agriculture
Center for Nutrition Policy and Promotion

Stephanie Sunderlin
American University

Retta Terry
Office on Women's Health
U.S. Department of Health and Human Services

Cheryl Toner
CDT Consulting, LLC

Alicia White
U.S. Department of Agriculture

Katherine Wilbur
Alliance for a Healthier Generation

Shannan Young
Dairy Council of California

Virginia Zoumenou
University of Maryland, Eastern Shore

D

Abbreviations and Acronyms

CAEP	Council on Accreditation of Educator Preparation
EFNEP	Expanded Food and Nutrition Education Program
FNS	Food and Nutrition Service
FY	fiscal year
IOM	Institute of Medicine
NIFA	National Institute of Food and Agriculture
NSCH	National Survey of Children's Health
SHAPE	Shaping Health as Partnerships in Education
SMART	specific, measurable, achievable, realistic, and time sensitive
SNAP	Supplemental Nutrition Assistance Program
SNAP-Ed	educational component of the Supplemental Nutrition Assistance Program
USDA	U.S. Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children