

## **Development and Evaluation of Nutrition Education Competencies and a Competency-Based Resource Guide for Preschool-Aged Children**

**Rachel E. Scherr, PhD; Heather Reed, MA, RD; Marilyn Briggs PhD, RD; Sheri Zidenberg-Cherr, PhD**

*Please note that this study was published before the implementation of Healthy, Hunger-Free Kids Act of 2010, which went into effect during the 2012-13 school year, and its provision for Smart Snacks Nutrition Standards for Competitive Food in Schools, implemented during the 2014-15 school year. As such, certain research may not be relevant today.*

### **ABSTRACT**

#### **Purpose/Objectives**

The purpose of this research was to develop and evaluate nutrition education competencies and a competency-based resource guide, Connecting the Dots . . . Healthy Foods, Healthy Choices, Healthy Kids (CTD), for preschool-aged children in California.

#### **Methods**

Nutrition education experts and California Department of Education staff participated in the development and revision of nutrition education competencies for preschool-aged children, through the use of a sequential review process, including focus groups. The resulting competencies were then used as a framework for development of the CTD resource guide, for use by child care center staff and family day care home providers. To evaluate the resource guide, field test sites were selected in five locations in California, and qualitative data were collected and analyzed.

#### **Results**

Results of the competency review process indicated that child care center staff and family day care home providers in California perceived a need for the competencies, and recommended the development of a competency-based resource guide. The CTD resource guide was created in response to this need. Results demonstrated that field test participants would recommend the use of the CTD to others serving preschool-aged children.

#### **Applications to Child Nutrition Professionals**

Results from this preliminary study indicated a need for nutrition education competencies and a competency-based resource guide for preschool-aged children. The competencies and CTD resource guide addressed this need in California, and may be useful to child nutrition professionals serving this age group and interested in adapting this resource for their population.

### **INTRODUCTION**

With obesity and chronic disease rates increasing, prevention should begin at a young age. According to National Health and Nutrition Examination Survey (NHANES) data from 2007-2008, over two-thirds of the adult population are overweight or obese (Flegal, Carroll, Ogden, & Curtin, 2010) and over 31% of children ages 2 through 19 are overweight or obese, defined as a BMI at or above the 85th percentile, or at or above the 95th percentile, respectively (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). While overall rates of obesity have leveled among all adult age groups since NHANES data were collected in 2005-2006, rates continue to rise for specific ethnic groups (Flegal,

et al., 2010). For example, among Mexican-American adults, data indicate large increases in rates of obesity in nearly all age groups and for both men and women (Flegal, et al., 2010). When focusing on preschool-aged children, disparities among differing ethnic/racial groups are also found (Anderson & Whitaker, 2009). In a 2005 study of four-year-old children from the Early Childhood Longitudinal Study, American Indian/Native Alaskan children were significantly more obese than Hispanic and Black, non-Hispanic children; White, non-Hispanic and Asian children had significantly lower prevalence of obesity than all three aforementioned groups (Anderson & Whitaker, 2009). An additional concern is data indicating that the amount of excess weight is increasing, possibly increasing the risk of metabolic syndrome in children and adolescents (Jolliffe, 2004). Duncan et al.

reported that over 46% of adolescents in the United States suffer from at least one symptom of metabolic syndrome (2004). These data have led to a growing interest in educating children about nutrition and health at an early age in order to promote optimal health and prevent overweight, obesity, and related chronic diseases.

Several studies demonstrate that dietary habits adopted by young children will be maintained as they age, and that children develop new food preferences more easily than adults (Birch & Fisher, 1998; Skinner, Carruth, Bounds, & Ziegler, 2002). The Centers for Disease Control and Prevention recognizes that the school environment may influence children's health-related behaviors, and provides resources to promote nutritious food choices and physical activity in the school setting (Centers for Disease Control and Prevention, 2011). In addition, the most recent Report of the Dietary Guidelines Advisory Committee suggests that the school environment, from preschool through high school, provides many opportunities to improve children's health, including: increasing health, nutrition, and physical activity programs and curricula; reducing sugar-sweetened beverage consumption; and improving school food choices (United States Department of Agriculture [USDA], Center for Nutrition Policy and Promotion, 2010). This report reinforced a White House task force report to the President highlighting the importance of targeting children at an early age and partnering with child care agencies to reduce obesity (White House Task Force on Childhood Obesity, 2010).

Child care centers and family day care homes provide ideal settings for nutrition and healthy lifestyle education. In California, over 1.7 million children under the age of six require child care (National Association for Child Care Resources and Referral Agencies [NACCRRRA], 2011). In the United States, over 14 million children under the age of six require child care (NACCRR, 2007). The conceptual framework of the social cognitive theory (SCT) suggests that the child's environment is an important factor in influencing dietary practices; the high numbers of young children requiring child care highlight the importance of the young child's environment within child care settings

To address this need, the goal of this preliminary study was to create and evaluate a set of nutrition education competencies for preschool-aged children. In response to suggestions during the evaluation of the competencies, a resource guide using the nutrition education competencies as a framework was also developed and evaluated.

## **METHODOLOGY**

### **Competency Development and Evaluation**

A document entitled Nutrition Competencies for California's Children, Pre-Kindergarten through Grade 12 was developed in 2007; however, the competencies for preschool-aged children needed updating and integration with current educational guidelines for this age group (Kirkpatrick, Briggs, & Zidenberg-Cherr, 2007). The first stage of the project was to expand the benchmarks and expectations targeted for pre-kindergarten in the original document.

The expansion and finalization of the nutrition education competencies followed a sequential review process as follows: 1) alignment with national nutrition and child development documents (California Department of Education [CDE], 2000, 2006b); 2) professional input by nutrition and child development experts; 3) review and input from California Department of Education (CDE) nutrition staff; 4) review by the Child and Adult Care Food Program (CACFP) Roundtable Advisory Committee members (USDA, Food and Nutrition Service, 2010); 5) assessment by focus groups throughout California; and 6) submission of the final competencies to the CDE.

The revised prekindergarten competencies were aligned with current nutrition science guidelines (USDA, 2005) and appropriate preschool-age level developmental guidelines (CDE, 2000, 2006b). Additionally, the competencies were consistent with the Desired Results Developmental Profiles, designed to identify the measures demonstrating the achievement of desired results across developmental areas for children from birth to age 13 in child care and development programs (CDE, 2006a).

Focus groups were comprised of family day care home providers and child care center staff. Focus group participants were recruited via convenience sampling. Members of the CACFP Roundtable Advisory Committee recommended providers/center staff from their counties who then recruited attendees for the focus groups. Focus groups were conducted in Northern (San Jose), Southern (Encinitas, Santee, Los Angeles) and Central (Modesto) California to encompass the diversity in care found in the state. Focus groups contained as few as four to as many as 19 providers/center staff members. At each focus group, the participants were asked a series of questions pertaining specifically to the competencies and a series of questions regarding the need for a resource guide. Focus groups were conducted until strong convergence was seen in the responses (Lumeng, Kaplan-Sanoff, Shuman, & Kannan, 2008). Competency revisions suggested by the focus groups were incorporated and evaluated by the CDE.

Additionally, a recommendation for the development of a resource guide to enhance the use of the competencies resulted from the focus group interviews. As a result, a resource guide was developed for use by child care center staff and family day care home providers, to promote nutrition education by providing examples of curricula and resources supporting the use of the newly-developed competencies.

### **Resource Guide**

Results from focus groups informed the development of the resource guide. The goal of the resource guide was to incorporate selected, evaluated curricula into one document while satisfying the breadth of the competencies. Based on focus group comments, useful curricular materials were already available, and the development of a new curriculum was not recommended. Instead, assistance was needed with organizing and demonstrating how to integrate existing materials with daily educational opportunities and support the nutrition education competencies. Participants suggested that materials be divided in the following sections: a teacher guide; activities; recipes; parent materials; field trip ideas; gardening materials; additional resources; and resources for children less than two years of age.

The competencies were included in the resource guide to create a comprehensive document containing the competencies and a variety of supporting activities. Each material in the guide was matched with the appropriate competencies, and the materials were linked to each other using a color-coded system. The resulting document was entitled *Connecting the Dots . . . Healthy Foods, Healthy Choices, Healthy Kids* (CTD). The concept of "Connecting the Dots" was selected because each material used is represented by a colored dot, and teachers and providers may use this coding system to "connect" the materials to the competency framework. CACFP Roundtable Advisory Committee members and the CDE staff evaluated the initial compilation of the CTD resource guide, and the edited version was field tested as described below.

### **Field Test**

Center staff and providers from a total of five child care centers and family day care homes were recruited to participate in the field test. Recruitment of participants and the study protocol were approved by the Institutional Review Board at the University of California, Davis. Two family day care homes were recruited using convenience sampling based on recommendations made by CACFP

Roundtable Advisory Committee members. Three child care centers were selected from a list of centers generated by CDE staff and CACFP Roundtable Advisory Committee members. Each center was assigned a number and a random number generator was used to select the participating centers and homes. The five centers and homes were located throughout California in Chico, Antioch, Davis, Dixon, and San Bernardino. At baseline, a staff member or provider from each site was interviewed regarding nutrition education, followed by training in the usage of CTD, including assignment of one or two competencies to guide the CTD selections used. Providers and staff were provided with a copy of the resource guide and based their usage on their own needs. This was important because an underlying goal of the field tests was not only to determine how much the providers/staff found the CTD resource guide useful, but also if they would use it without prompting. A follow-up visit was conducted eight to ten weeks following the baseline visit; providers and staff were asked the same questions that were asked during the baseline interview, to assess changes in behavior over the course of the test period. In addition to the baseline questions, the providers and staff were asked a series of questions pertaining specifically to the CTD resource guide. Responses were collected and analyzed, and changes suggested as a result of the field tests, and approved by CDE staff, were incorporated into the final version of the resource guide.

## RESULTS AND DISCUSSION

### Nutrition Education Competency and Resource Guide Focus Groups

Results of the focus groups indicated that child care center staff and family day care home providers perceived a need for a comprehensive resource with educational materials that used the competencies as a framework. The majority of the focus group discussion was concentrated on the content of the competencies and resource guide, followed by comments regarding: inclusion of parents' activities; ideas for incorporating cooking into the daily routine; dietary restrictions and allergies; and cultural sensitivity. Each of these concepts was incorporated into the final CTD resource guide.

After CDE approval, the competencies were finalized. Table 1 provides the final competencies and benchmarks resulting from this project. Table 2 provides a sample competency with associated benchmarks and expectations for preschool-aged children. The final version of the competencies is available on the Center for Nutrition in Schools (CNS) website at <http://cns.ucdavis.edu> by selecting the CNS resources tab and then the curriculum category.

Table 1: *Final Competencies and Benchmarks*

Competency I
<p>Students will know and understand the relationship between the human body, nutrition, and energy balance.</p> <p>A: Know the six nutrient groups and their functions</p> <p>B: Describe how nutritional needs vary throughout the life cycle</p> <p>C: Know the physiology of the human body as it relates to nutrition and physical activity</p>
Competency II
<p>Students will know current nutrition and physical activity recommendations and how to apply them.</p> <p>A: Know nutrition guideline</p> <p>B: Assess personal dietary needs</p> <p>C: Understand the influence of nutrition on health</p> <p>D: Assess the relationship of physical activity and nutrition to health</p> <p>E: Establish personal goals and make healthy food and fitness choices</p>

Competency III
Students will identify and explore factors influencing food choices. A: Identify influences on food choices B: Explore factors that contribute to achieving and maintaining a healthy body and positive body image
Competency IV
Students will demonstrate proper food handling and storage to maximize the nutritional quality of food and personal hygiene to prevent food borne illness.
Competency V
Students will identify valid nutrition information and advocate for positive health policies and practices. A: Access valid nutrition information and nutrition services B: Advocate for positive health policy and practices
Competency VI
Students will identify and explore influences of local, national and global factors on the quantity and quality of food. A: Identify foods that come from particular regions B: Understand the factors (local, regional, statewide, national, global) that influence food availability, production and consumption
Competency VII
Students will identify and explore a variety of food-related careers.

Table 2: *Sample Competency, Benchmarks, and Expectations*

<b>Competency I: Students will know and understand the relationship between the human body, nutrition, and energy balance.</b>
(A) Know the six nutrient groups and their functions
Say or agree that people should eat a variety of foods every day. Say or show that there are a wide variety of foods that can be divided into different food groups. Name or show the foods in a simple recipe or food item (e.g., Cheese Sandwich). Identify, show, point to or sequence foods or food pictures into smallest, larger, and largest sizes. Identify the tools used to measure servings of food and understand that some are small and some are big.
(B) Describe how nutritional needs vary throughout the life cycle
Point or show which foods babies might eat compared to foods preschoolers or adults might eat.
(C) Know the physiology of the human body as it relates to nutrition and physical activity

Explain, with prompting, that we need healthy food to maintain healthy bodies (in response to being asked).

Show two ways to move your body (e.g., skipping, running, stretching, jumping).

Show or describe how it feels to move your body.

Say that our bodies need energy which we obtain from food.

Recognize, draw, or say that plants and animals need food and water for energy and growth.

### **Field Test of the CTD Resource Guide**

The five test sites represented a total of 93 children, ages three through five. During a qualitative interview at follow-up, staff from all five sites noted that nutrition education should begin in pre-kindergarten and was a good use of school time. Also, all five sites included nutrition-related activities such as cooking activities, gardening activities, and field trips, as part of their programs.

Center staff and providers indicated that the CTD resource guide provided adequate materials to encompass the scope of the competencies. Additionally, all center staff and providers indicated that the resource guide provided a benefit to teachers, providers, and children and would recommend its use by other child care center staff and family day care home providers. One provider mentioned that “the organization [of CTD was] good, no need to go hunting because everything [was] clearly labeled.”

Some of the following observations were made in response to the question “In your opinion, has the use of *Connecting the Dots...* affected or influenced the children’s behavior in any way?” One provider responded that “the children seemed to be articulating their thoughts on fruits and vegetables more clearly.” At another site, the provider stated that “the children were very excited about gardening.” Another staff member commented that the children were beginning to “wash their hands without prompting and . . . seemed to know more about fruits and vegetables.” In addition, a child care provider noted that children were beginning to ask more questions about fruits and vegetables which in turn, provoked the child care provider to discuss fruits and vegetables in more depth. The inclusion of material for parents in child nutrition education programs may lead to more successful adoption of healthy behaviors and self-efficacy to maintain these behaviors for the child (Bandura, 1986). The field test results demonstrated that when parents become more involved with activities occurring at child care sites, discussions about nutrition may be generated at home. In response to the question “In your opinion, after the use of *Connecting the Dots...* have parents showed more of an interest in nutrition?” one provider noted that parents were curious about how the provider was motivating children to eat healthier foods, and asked how the parents could continue this behavior at home. At one child care center, a staff member noted that, “Parents were asking, ‘Do they eat everything at school?’” Another provider noted that the “parents were very excited to help out in the gardening project;” this provider implemented a garden after exposure to the CTD resource guide.

The results of the field tests suggest that the CTD resource guide is a useful resource for child care center staff and family day care home providers. In a study examining an earlier version of the nutrition competencies, pre-kindergarten through twelfth grade teachers who participated in a field-test of the document believed that the competencies were of great value, but that it was important to incorporate the competencies into the school curriculum (Kirkpatrick, et al., 2007). As a result of this project, the CTD resource guide provides both a nutrition education competency framework and supporting instructional materials designed for integration into educational programs for preschool-aged children.

## **CONCLUSIONS AND APPLICATIONS**

Results of this preliminary study indicate that child care center staff and family day care home providers find the nutrition education competencies and the CTD resource guide useful for incorporating nutrition education in child care settings in California. In addition, results suggest that parent involvement in nutrition education was also improved. A follow-up project assessing the effectiveness of implementation of a program based on the CTD resource guide at improving

nutrition knowledge and health behaviors in children, parents, child care center staff, and family day care home providers is currently under review (Scherr, Schneider, Donohue, Mendoza, & Zidenberg-Cherr, 2010).

Although this study was conducted in California, the nutrition education competencies are consistent with the 2010 Dietary Guidelines for Americans (USDA & U.S. Department of Health and Human Services, 2010) and the CTD resource guide was developed with the intention to allow for adaptability to preschool populations outside of California.

## ACKNOWLEDGEMENTS

This project was funded in part by The California Department of Education. The authors would like to thank CACFP Roundtable Advisory Committee members for their invaluable support on this project. Special appreciation is also given to staff at the family day care homes and child care centers participating in the focus groups and field tests of this project. We would also like to thank the expert panel members, including Drs. Emily Cena, Karrie Henneman, Lenna Ontai, Julie Schneider, and Lynette Haynes-Brown. Additionally, we are thankful to the contributions of Lucrecia Farfan-Ramirez and Sharon Junge.

## REFERENCES

- Anderson, S. E., & Whitaker, R. C. (2009). Prevalence of obesity among U.S. preschool children in different racial and ethnic groups. *Archives of Pediatric and Adolescent Medicine*, 163(4), 344-348.
- Bandura, A. (1986). *Social foundations of thought and action a social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics*, 101(3), 539-549.
- California Department of Education. (2000). *Prekindergarten learning and development guidelines*. Sacramento, CA: CDE Press.
- California Department of Education. (2006a). *Desired results developmental profile*. Sacramento, CA: CDE Press.
- California Department of Education. (2006b). *Infant/toddler learning and development program guidelines*. Sacramento, CA: CDE Press.
- Centers for Disease Control and Prevention. (2011). *Promoting healthier foods and beverages in U.S. schools*. Retrieved from <http://cdc.gov/features/schoolnutrition/>
- Duncan, G. E., Li, S. M., & Zhou, X. H. (2004). Prevalence and trends of a metabolic syndrome phenotype among U.S. adolescents, 1999-2000. *Diabetes Care*, 27(10), 2438-2443.
- Flegal, K. M., Carroll, M. D., Ogden, C. L., & Curtin, L. R. (2010). Prevalence and trends in obesity among US adults, 1999-2008. *Journal of the American Medical Association*, 303(3), 235-241.
- Jolliffe, D. (2004). Extent of overweight among U.S. children and adolescents from 1971 to 2000. *International Journal of Obesity and Related Metabolic Disorders*, 28(1), 4-9.
- Kirkpatrick, N., Briggs, M., & Zidenberg-Cherr, S. (2007). California teachers support the Nutrition Competencies - New nutrition instruction guidelines. *California Agriculture*, 61(1), 40-46.
- Lumeng, J. C., Kaplan-Sanoff, M., Shuman, S., & Kannan, S. (2008). Head Start teachers' perceptions of children's eating behavior and weight status in the context of food scarcity. *Journal of Nutrition Education and Behavior*, 40(4), 237-243.
- National Association for Child Care Resources and Referral Agencies. (2007). *Number of children potentially needing care (based on the U.S. Census Bureau's American Community Survey, 2007)*. Retrieved from [http://www.naccrra.org/randd/docs/Children\\_Potentially\\_Needing\\_Care.pdf](http://www.naccrra.org/randd/docs/Children_Potentially_Needing_Care.pdf)
- National Association for Child Care Resources and Referral Agencies. (2011). *2011 child care in the state of: California*. Retrieved from <http://www.naccrra.org/publications/naccrra-publications/publications/California%20-%20ChildCareInAmericaFacts.pdf>
- Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., & Flegal, K. M. (2010). Prevalence of high body mass index in U.S. children and adolescents, 2007-2008. *Journal of the American Medical Association*, 303(3), 242-249.

Scherr, R. E., Schneider, J., Donohue, S., Mendoza, C., & Zidenberg-Cherr, S (2011). *The implementation and evaluation of nutrition competencies and a competency-based resource guide for preschool-aged children in rural california*. Manuscript submitted for publication.

Skinner, J. D., Carruth, B. R., Bounds, W., & Ziegler, P. J. (2002). Children's food preferences: a longitudinal analysis. *Journal of the American Dietetic Association*, 102(11), 1638-1647.

U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. (2005). *The Report of the Dietary Guidelines Advisory Committee on Dietary Guidelines for Americans, 2005*. Retrieved from <http://www.health.gov/dietaryguidelines/dga2005/report/>

U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. (2010). *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010*. Retrieved from <http://www.cnpp.usda.gov/dgas2010-dgacreport.htm>

U.S. Department of Agriculture, Food and Nutrition Service. (2010). *Child and Adult Care Food Program*. Retrieved from <http://www.fns.usda.gov/cnd/care/>

U.S. Department of Agriculture & U.S. Department of Health and Human Services. (2010). *Dietary Guidelines for Americans, 2010*. Washington, DC: U.S. Government Printing Office.

White House Task Force on Childhood Obesity (2010). *Solving the Problem of Childhood Obesity Within a Generation Report to the President*. Retrieved

from [http://www.letsmove.gov/sites/letsmove.gov/files/TaskForce\\_on\\_Childhood\\_Obesity\\_May2010\\_FullReport.pdf](http://www.letsmove.gov/sites/letsmove.gov/files/TaskForce_on_Childhood_Obesity_May2010_FullReport.pdf)

## BIOGRAPHY

Rachel E. Scherr is Postdoctoral Scholar, Department of Nutrition, University of California, Davis; Heather Reed is Nutrition Education Consultant, Nutrition Services Division, California Department of Education; Marilyn Briggs is Co-Director, Center for Nutrition in Schools, Department of Nutrition, University of California, Davis; Sheri Zidenberg-Cherr is Cooperative Extension Specialist and Co-Director, Center for Nutrition in Schools, Department of Nutrition, University of California, Davis.