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Peer Reviewed

## Development of a Culturally Appropriate, Home-Based Nutrition and Physical Activity Curriculum for Wisconsin American Indian Families

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## Abstract

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We designed an obesity prevention intervention for American Indian families called Healthy Children, Strong Families using a participatory approach involving three Wisconsin tribes. Healthy Children, Strong Families promotes healthy eating and physical activity for preschool children and their caregivers while respecting each community's cultural and structural framework. Academic researchers, tribal wellness staff, and American Indian community

mentors participated in development of the Healthy Children, Strong Families educational curriculum. The curriculum is based on social cognitive and family systems theories as well as on community eating and activity patterns with adaptation to American Indian cultural values. The curricular materials, which were delivered through a home-based mentoring model, have been successfully received and are being modified so that they can be tailored to individual family needs. The curriculum can serve as a nutrition and physical activity model for health educators that can be adapted for other American Indian preschool children and their families or as a model for development of a culturally specific curriculum.

## Introduction

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Childhood overweight and obesity rates in the United States are increasing (1), with American Indian (AI) children having the highest rates (2,3). Nearly 37% of AI children aged 2 to 5 years are overweight or obese compared with 30% of the same-aged children in all ethnic groups combined (1). The Wisconsin Nutrition and Growth Study (WINGS), our previous research on this topic, showed that the prevalence of overweight for Wisconsin AI children aged 5 to 8 years was 27% and that an additional 19% are at risk for being overweight (4). Compared with a national sample of children aged 6 to 11 years (5), the prevalence of overweight for WINGS children was almost 8% greater.

We observed several health-related behaviors among WINGS children that are hypothesized as being associated with overweight in children, including low fruit and vegetable intake, high soda and candy consumption, low levels of physical activity, and watching television more than 2 hours per day (6). These observations highlight the need for risk factor modification early in life to prevent the development of overweight in children. Additional qualitative research conducted in WINGS showed that most caregivers of AI children did not recognize the link between excess weight and chronic disease later in life (4), underscoring the need for education and awareness building in families.

Our current study, Healthy Children, Strong Families (HCSF), focuses on obesity prevention in early childhood in three Wisconsin AI tribal communities. Early childhood is a critical period, both

physiologically and psychologically, as children are growing rapidly and developing their own food consumption and physical activity patterns. A child's diet is determined by the food environment that the parent provides, which in turn shapes the child's preferences and food acceptance patterns (7). For children, parents are the primary mediators of change in adopting healthy eating habits (8-12) and reducing sedentary behaviors (13,14). Research has also found that parental involvement is important to both prevention and treatment of childhood obesity (8,15,16). This finding is also true in AI communities where the sphere of influence includes the extended family (12,17).

HCSF is a family-based intervention guided by trained AI community mentors through home visits. It will test the effectiveness of an early childhood obesity prevention program that directly involves primary caregivers of preschool-age children in three Wisconsin AI communities. This paper presents the process of the development of a nutrition and physical activity curriculum and delivery of the curriculum in a home-based setting with the participation of academic and tribal researchers, tribal community members, and tribal wellness staff.

## Description of HCSF Intervention

[Go to:](#)

### Background

The Great Lakes Inter-Tribal Council, three Wisconsin AI tribes, and researchers at the University of Wisconsin–Madison have formed an ongoing academic and community partnership that is in its seventh year of research (18). WINGS was the first research project conducted by this research partnership. Its primary goal was to document the prevalence of obesity and cardiovascular risk factors and familial and environmental factors contributing to obesity in children aged 3 to 8 years at three Wisconsin tribal sites (4,6).

Another goal of WINGS was to design and implement an obesity prevention intervention (18). Thus, WINGS served as the formative research for the HCSF project, which was jointly designed by the academic and community partners: Great Lakes Inter-Tribal Council, University of Wisconsin–Madison researchers, and tribal wellness staff. The Great Lakes Inter-Tribal Council obtained initial funding

for HCSF, with University of Wisconsin–Madison researchers and the three tribal communities as subcontracted partners.

### Intervention design

HCSF is a 12-month randomized trial for AI children aged 2 to 5 years and their primary caregivers. The goal of the project is to evaluate the effectiveness of a series of targeted home visits and group sessions on obesity reduction and healthy lifestyle behaviors for caregivers and their children. Families from each community that enroll in HCSF are randomly assigned according to the child's body mass index (BMI) percentile (i.e., 85th percentile and <85th percentile) into either an intervention or a control group. Tribal wellness staff and tribal health directors decided to randomly select by family rather than by community because all tribal communities wanted to be part of the intervention.

Over the course of 12 months, intervention families will receive 12 lessons on nutrition and physical activity delivered by a home-visiting mentor, and control families will receive the same 12 lessons by mail. In addition, the intervention families will receive three group-activity lessons designed to help intervention families support one another in making and sustaining healthy lifestyle choices. Group activity lesson topics reinforce the curriculum topics from the lessons.

### Target population and recruitment strategy

The intervention was approved by tribal councils, Head Start site directors, and tribal health directors at each of the three reservation sites. The University of Wisconsin–Madison Human Subjects Review Board approved HCSF prior to recruitment. Recruitment began in April 2006 and focused on Head Start programs in all communities. Academic and tribal research staff attended school meetings and functions to generate interest among Head Start teachers, staff, and families. Each family that enrolled in HCSF included at least one child aged 2 to 5 years and one primary caregiver.

## Theoretical framework

HCSF educational materials are based on psychological theories that support lifestyle behaviors for obesity prevention, including social cognitive theory (19) and family systems theory (20). Cognitive-behavioral approaches, such as goal setting, incentives, interactive delivery of educational material, and reinforcement, have been shown to be effective in family-based obesity interventions (21,22). Several studies using combinations of this theoretical framework within family-based intervention models showed improvement in physical risk factors in children (23) as well as behavioral changes in both children (24) and their parents or caregivers (25). By using this theoretical framework, HCSF curriculum designers created a learning model to involve both caregiver and child and to improve self-efficacy of parents to model healthy eating and physical activity behaviors for their children. During the WINGS project, many parents were anxious for an assessment of their own health risks. In addition, during WINGS focus groups, parents described an interest in more education and information on healthy eating and activity for their families (26). Thus, we combined our community-based knowledge with theoretical frameworks to assist in intervention design and curriculum development.

## Curriculum development process

A curriculum for AI children aged 2 to 5 years and their primary caregivers was designed by academic researchers, tribal researchers, child development specialists, dietitians who had experience working with AI children, and a home-visiting expert experienced in working with underserved communities. The curriculum consists of 12 lessons that are distributed to families during the 12-month intervention. The lessons are delivered in front-loaded frequency during the first 3 months; that is, we distribute the first six lessons approximately every 2 to 3 weeks and the last six lessons every four to six weeks thereafter. The process for curriculum development included 1) creating a framework for each lesson, 2) brainstorming ideas and activities, 3) drafting each lesson, 4) evaluating and modifying the lessons, and 5) finalizing each lesson. The process is illustrated in the Figure. This participatory

process was used to maximize early community input before intervention delivery and to allow for modifications by community members in an ongoing process as the intervention is delivered to families and feedback is received.

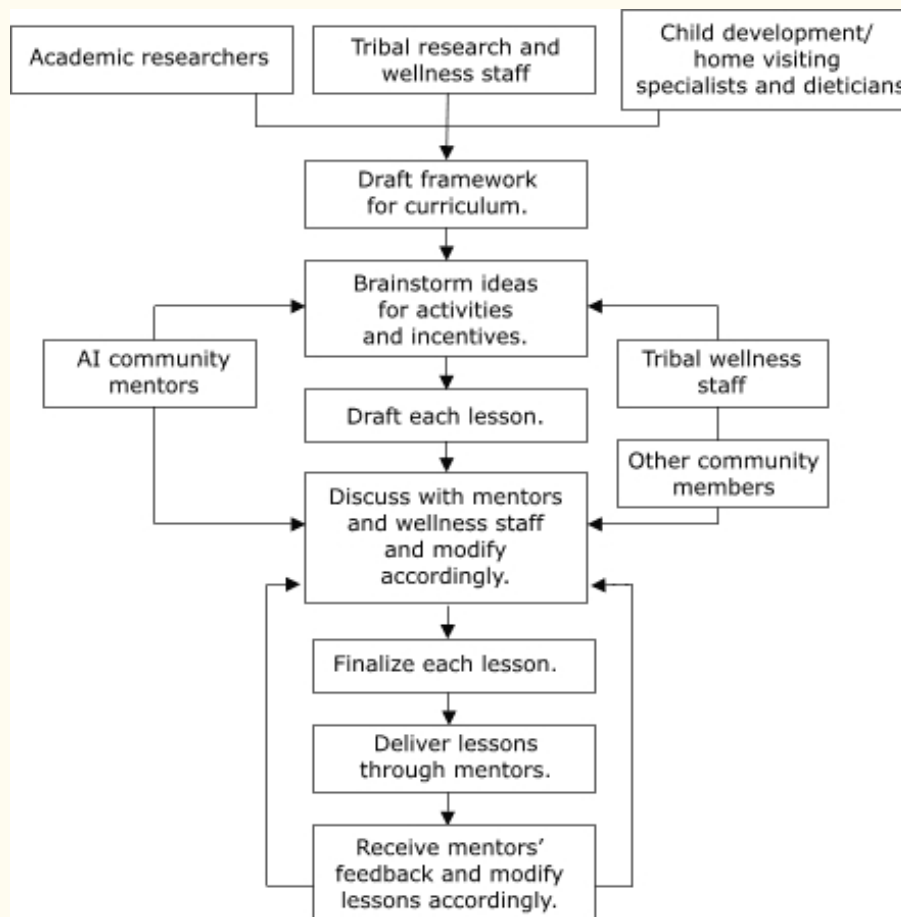


Figure.

Participatory process for curriculum development in the Healthy Children, Strong Families intervention, Wisconsin, 2005.

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The Figure is a flow chart describing the participatory process used in developing the curriculum for the Healthy Children, Strong Families (HCSF) intervention. The figure consists of eight levels of boxes arranged vertically, flowing top to bottom and connecting downward with arrows. Three parallel boxes at the first level of the graph are labeled as follows: "academic researchers," "tribal research and wellness staff," and "child development and home visiting specialists and dietitians." Lines flow downward from each of these three boxes to connect at one point with a single second-level box labeled "draft framework for curriculum." This box connects by a downward line to the third-level box labeled "brainstorm ideas for activities and incentives with community." A line flows downward from this box to a single fourth-level box labeled "draft each lesson." This box is in turn connected by a downward flowing line to a single fifth-level box labeled "discussions and modifications with mentors and wellness staff."

At this point, two-way lines on either side of the box labeled "discussions and modifications with mentors and wellness staff" connect this box back up to the third-level box labeled "brainstorm ideas for activities and incentives with community." The line on the left flows through an outer box labeled "American Indian community mentors." The line on the right flows through two outer boxes, the lower one labeled "other community members," and the upper labeled "tribal wellness staff."

A downward flowing line connects the fifth-level box, "discussions and modifications with mentors and wellness staff," with the sixth-level box below it, which is labeled "finalize each lesson." This box in turn connects downward with a seventh-level box labeled "lesson delivery by mentors." Finally, the seventh-level box connects downward to the eighth and final level box labeled "mentor feedback and lesson modification."

This final, eighth-level box has two lines flowing out and up from either side, connecting it with the fifth-level five box labeled "discussions and modifications with mentors and wellness staff."

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## Curriculum objectives and framework

Our previous research in these tribal communities showed that children had low fruit and vegetable intake, consumed high levels of soda and candy, and watched television excessively (6). Meal patterns were similar to those found in the general U.S. population, and diets included few traditional AI foods and a high proportion of processed foods. Therefore, we chose to use the following nutrition and physical activity behaviors as objectives for the curriculum: 1) increasing fruit and vegetable intake; 2) increasing physical activity; 3) decreasing consumption of candy, soda, and other sweetened beverages; and 4) decreasing television viewing time. The primary aim of the curriculum is to educate and enable caregivers to make healthier food and activity choices for themselves and for their children. The curriculum involves and teaches caregivers and children simultaneously in a series of fun, experiential home lessons delivered by a knowledgeable community member.

In developing the framework for each lesson, the HCSF team emphasized traditional AI learning through storytelling, family activities, reflecting on lessons learned, and goal setting. The lesson format has five components: 1) a topic introduction with lesson objectives, 2) a review of the last lesson to reinforce previously learned skills, 3) new material and a learning activity, 4) a brainstorming session to identify ways to change behavior and to discuss barriers and strategies for overcoming those barriers, and 5) reflection on the lesson and goal setting for behavior change between lessons [Table 1](#). We decided that introducing each lesson topic in the form of storytelling would be most effective as this is a culturally acceptable method of learning from elders. Therefore, we developed a segment within each lesson that focused on traditional AI physical activity and eating patterns compared with today's patterns. This segment focuses on bringing a balance of traditional AI eating and activity into family life today.



Table 1

## Components of Lessons for Healthy Children, Strong Families, Wisconsin, 2005

Lesson Component	Description
I. Objectives	Introduce lesson and learning objectives.
II. Review of goal from last lesson	Review concepts, build skills, reinforce behaviors, and promote discussion.
III. Looking back	<ul style="list-style-type: none"> <li>• Look back to traditional living as it relates to current topic.</li> <li>• Reinforce that American Indians once lived in a more balanced and healthy state.</li> </ul>
IV. Looking forward	<ul style="list-style-type: none"> <li>• Define balance then and now. How can we bring forward the pieces of the past into today and relate the pieces to the lesson topic?</li> <li>• Assist caregivers in thinking through what we can learn from the past and what we can continue or have similar today.</li> <li>• Assess family's knowledge of the lesson topic.</li> <li>• Introduce activity and briefly explain to families why the topic is important.</li> </ul>
V. Learning more	Learn more on lesson topic, and offer activities for a fun and interactive learning experience.
VI. Reflections	<ul style="list-style-type: none"> <li>• Reinforce concepts by respecting family's knowledge and ideas and by showing confidence in family members' ability to find solutions to problems that arise when they try to make changes.</li> <li>• Have family and mentor brainstorm</li> </ul>

Lesson Component	Description
	<p>possible ideas and goals for changes in lesson topics and discuss how to overcome barriers to implementing changes.</p> <ul style="list-style-type: none"> <li>• Have caregiver and family reflect on the various ideas for change they have discussed, and choose one idea as a goal to work on for the next session.</li> </ul>

Activity ideas for the four healthy-behavior objectives were developed as each lesson was drafted. After an initial draft, lessons were discussed with and peer reviewed by tribal wellness staff and AI community mentors. We modified lessons to accommodate cultural acceptability, ease of use in the home, and seasonal activities and foods (e.g., snow activities for the winter, berry picking in the summer). AI community mentors also contributed to the curriculum by adding activities that their communities participate in, such as basket making, beading, and snow games in the winter, and suggesting ways to incorporate those activities into the lessons. AI mentors further modified the curriculum by including their own stories of hunting, fishing, berry picking, and gathering wild rice and by adding favorite recipes for traditional foods. A sample lesson with objectives and activities is shown in [Table 2](#).

**Table 2**

Sample Lesson on Nutrition and Physical Activity for the Healthy Children, Strong Families, Wisconsin, 2005

Lesson	Objectives	Activity
Naturally Sweet	<p>Identify foods with a lot or a little sugar.</p> <p>Identify reasons why eating or drinking too much soda and candy is not healthy.</p> <p>Name healthy alternatives for soda and candy.</p> <p>Write at least one family goal to limit soda and candy consumption.</p>	<p><b>Sorting Game.</b> The caregiver and child sort pictures of foods with a lot of sugar and foods with little sugar.</p> <p><b>Apple Smiles.</b> The caregiver and child learn about healthy teeth and smiles while making a nutritious snack.</p>

Each lesson developed became part of a tool kit, which includes additional games, books, or recipes specific to that lesson for both child and caregiver. A tip sheet for each lesson is also included in the tool kit to give families ideas for achieving the corresponding objective (e.g., a tip for increasing fruit consumption is to add fresh fruit to cereals or muffins). Lastly, each family is given a 12-month calendar filled with pictures of local families engaging in healthy behaviors, such as playing lacrosse, dancing at a powwow, growing squash, sledding, and harvesting wild rice. The purpose of the calendar is to track family goals throughout the year.

### Description of Intervention Delivery by Community Mentors [Go to:](#)

The intervention arm of the HCSF includes home visits by an AI community mentor to review the curriculum with the families, assist families in setting healthy behavior goals, and track the families' progress throughout the intervention. A fundamental goal for the HCSF intervention is to use the traditional AI model of elders

teaching life skills to the next generation by instilling values of healthy nutrition and exercise while reinforcing cultural values such as consumption of traditional foods. We hypothesize that AI families participating in HCSF will be most successful in behavior change using this learning model.

We chose home-mentored visits as the delivery method for the intervention group because previous research has shown that this approach has an overall positive impact on families and preschool children (27,28) and improves participation and retention (22). Home-based visiting was also successful in behavior change in one small study focusing on AI families (17). Furthermore, home visits in AI communities are appropriate because of the cultural preference for face-to-face contact, the tradition of elders teaching life skills to the next generation, and the familiarity of home visits for young families in these communities.

We hired eight mentors from the three tribal communities for the HCSF intervention. These mentors are experienced older parents, grandparents, and respected community members and are capable of delivering the intervention according to study protocol. Mentors were trained extensively by the University of Wisconsin Extension staff, tribal wellness staff (including nurses, diabetes educators, and dietitians), knowledgeable tribal elders, and HCSF research staff before beginning home visits. This training modified a well-developed home visiting program, Healthy Families America, to encompass the needs of the HCSF intervention and its objectives (29). Additional training was provided on child development, nutrition, and physical activity so that mentors have basic knowledge of the lesson topics they are presenting to the families.

## HCSF Evaluation

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Before randomization of families, baseline assessments are being collected from each primary caregiver and child to measure primary and secondary outcomes of the intervention. Primary outcomes of HCSF include measurements of child waist circumference and caregiver BMI. Secondary outcomes for children and caregivers include servings of fruit and vegetables and servings of sweetened beverages and candy consumed per day, hours per day of watching television, and percentage of day spent in sedentary activities.

Additional adult secondary outcomes include measures of cultural identity, health-related quality of life, self-efficacy for healthy behaviors, and biochemical markers of cardiovascular and diabetes disease risk. All primary and secondary measurements will be assessed again after completion of the 12-month intervention.

HCSF is currently recruiting families and collecting baseline data. Of the enrolled families, 92 have been randomly assigned to the control or the intervention group. Seventy-four percent of the families in the intervention group have completed two or more mentored home visits to date. Structured interviews with the HCSF mentors at the 6-month mark have revealed that the first few meetings are more focused on rapport and relationship building than on the lessons. The mentors report that families have been enthusiastic about the curriculum and particularly enjoy the active portions of the lesson. Mentors also report to HCSF staff about specific activities within the lessons that work well or do not work well during family visits. Modifications to lessons are being made throughout the intervention period so that the lessons are more acceptable and appropriate for the participating families.

## Discussion

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To our knowledge, few studies have developed a curriculum for preschool-aged children as part of an obesity intervention. The Hip Hop to Health Jr. program, which is similar to HCSF, developed a culturally specific nutrition and physical activity curriculum for preschool-aged children participating in Head Start programs that included a primary caregiver component (30). However, that program was delivered in Head Start classrooms with a separate adult component and did not involve adult–child interaction or mentoring. The Healthy Start study also developed a culturally sensitive curriculum for preschool-aged children that focused on healthy behaviors (31). However, the topics that Healthy Start focused on were different from those of HCSF (Healthy Start topics included dental hygiene and violence prevention); the program was conducted entirely within the school; and it involved parents only through take-home activities (31).

The HCSF intervention has several limitations. We did not conduct a pilot study because of the communities' desire to begin the

intervention immediately as well as time constraints related to study funding. In addition, the time frame for curriculum development did not allow for the full participation of all community members, specifically the community AI mentors, because they had to be hired after initial curriculum development.

Although we were limited by not involving all community members in the beginning phases of curriculum development, AI mentors and other community members were involved in revising and modifying lessons to ensure that they were culturally appropriate and acceptable for the families. A main strength of HCSF is that we are using a community-based participatory research approach that is both data driven and community driven. Tribal communities expressed their need for an obesity prevention project after academic researchers returned the results of WINGS to the participating communities.

We found that to successfully develop and deliver the HCSF curriculum in AI communities, strong participation from community members was needed. It was also important to foster and maintain relationships and develop trust with tribal wellness staff, AI community mentors, and other community members, including Head Start teachers and staff.

The HCSF curriculum provides a nutrition and physical activity model for health and nutrition educators that may be adapted for other AI preschool children and their families or may serve as a model for development of a culturally specific curriculum.

## Acknowledgments

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AI indicates American Indian.

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