



# Advancing Family Health Through the Garden of Eatin': On-site Food Gardens in Early Childhood Education

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Nutritional practices develop over the life course. Developing healthy habits at an early age can contribute to combating increasing child obesity rates. Through a range of activities that rely on the presence of an on-site food garden, North Bay Children's Center (NBCC), an early childhood education program, has enacted a "culture of health" into all aspects of the curriculum to promote healthy eating practices among children, families, teachers and staff. NBCC's garden program serves as a model in early childhood education and as a community-based intervention to improve family health and prevent child obesity. (*Am J Public Health*. Published online ahead of print February 25, 2015. doi:10.2105/AJPH.2014.302422.)

## KEY FINDINGS

- Overall, participants reported good health, healthy eating practices, and full awareness of the importance of healthy eating to health. They also reported that the program encouraged them to adopt healthier eating practices. Exercise practices remained overall unchanged, but were not an explicit focus of the program.
- Participants reported that the school's regular provision of fruits and vegetables, whether from the garden or the local food bank, supported their ability to eat more healthfully.
- In-depth interviews suggested underreport of structural challenges to healthy eating and lifestyles and a more diverse range of meanings of health and healthy lifestyles.
- The qualitative evaluation helped explain some conflicts between participants' report of eating practices through surveys and through more structured instruments (e.g., Block questionnaires for fat intake), which revealed less healthy eating practices (e.g., high consumption of fats).
- The societal tendency to individualize the causes of poor health to the neglect of structural causes may discourage participants, especially from disadvantaged backgrounds, to share with researchers the barriers to healthy lifestyles they encounter and confound findings in public health attempts to improve nutritional and other health-relevant practices.

## AS OBESITY RATES AMONG

US children aged 2 to 5 years have more than doubled over the last 3 decades,<sup>1</sup> adopting healthy eating habits at an early age has become critical to health.<sup>2</sup> Engaging children in growing fruits and vegetables may increase their consumption over the life course.<sup>3</sup> Because nearly two thirds of preschool-aged children are cared for outside the home,<sup>4</sup> childcare settings offer the opportunity to influence eating habits in early childhood.<sup>5</sup>

## THE GARDEN OF EATIN'

Founded in 1986 at the former Hamilton Air Force base, the North Bay Children's Center (NBCC) in Marin County, California, is a nonprofit organization that provides childcare to infants, toddlers, and preschool children, and before- and after-school care for

school-age children. It serves 167 ethnically diverse families, 60% of which qualify for free or reduced lunches under the State Food Program. Since 2004, NBCC has incorporated the Garden of Eatin', an early childhood education program featuring on-site food gardens, in each of its 6 sites, curriculum alignment, healthy eating policies for students and staff, and family and community components that include weekly distribution of fresh produce from its own gardens and the local food bank. Staff includes a master gardener and educator who works with 25 teachers developing lesson plans for children and activities for parents. The underlying principle of the program is that early, continuing exposure to fresh produce will increase the preference for, and thus consumption of, these foods over the life course.

## KEY ELEMENTS OF SUCCESS FOR HEALTHY EATING

The University of California, San Francisco (UCSF), partnered with NBCC to assess the program's potential to serve as a model in early childhood education and as a community-based

**TABLE 1—Parent, Teacher, and Staff Demographic Descriptions, Percentages and Means: North Bay Children's Center, Marin, CA**

Demographics	Teachers and Staff (n = 14)	Parents (n = 15)
Gender, %		
Men	7	7
Women	93	93
Mean age, y	48	35
Ethnicity, %		
Non-Hispanic	86	60
Hispanic	14	40
Race, %		
White (non-Hispanic)	85	40
White (Hispanic)	8	33
Black or African American	–	13
Asian	8	7
Native Hawaiian or Pacific Islander	–	–
American Indian or Alaska Native	–	–
Other	–	7
Education, %		
< elementary school	–	–
Elementary school complete	–	7
< high school	7	–
High school complete (or GED)	–	13
Technical or junior college; vocational training	7	7
Some college (incomplete)	36	27
College complete (e.g., bachelor's degree)	36	27
Graduate school (e.g., master's degree)	14	20
Mean no. of persons in household	3	4
Household Income, \$, %		
< 10 000	–	7
10 000–20 000	21	13
20 001–30 000	7	47
30 001–40 000	–	–
40 001–50 000	7	–
50 001–70 000	21	–
70 001–100 000	14	13
> 100 000	29	20
Overall health, %		
Excellent	36	13
Good	50	87
Fair	14	–
Poor	–	–
Food security in last 12 mo, %		
We have enough food and of the type and quality we like.	79	80
We have enough food but not always of the type and quality we'd like.	14	13
Sometimes, we don't have enough food.	7	7
Frequently, we don't have enough food.	–	–
Rely on food pantry, %		
Never	86	53
Sometimes	–	33
Frequently	14	13
Always	–	–

Note. GED = graduate equivalency diploma.

intervention to improve family health and prevent child obesity. The pilot, mixed-methods, and cross-sectional study recruited a convenience sample of 45 participants including parents, teachers, staff and children, and included surveys, food records, in-depth interviews with key informants, and field observations (Table 1). The UCSF institutional review board approved the study.

### Increasing Exposure and Changing Attitudes

The gardens in each of the program's 6 sites vary in size, from a half acre to a series of raised beds 10 × 10 square feet. Throughout the year, children spend structured time in the garden growing, harvesting, and tasting fresh fruits and vegetables. Healthy eating themes are incorporated into classroom lessons, and meals and snacks are prepared by an on-site cook using seasonally grown fruits and vegetables from the garden or provided by the food bank. As children engage in these activities, they develop a preference for unprocessed foods. Taste-testing plays a critical role.

Eating “family style” school meals helps children learn to make decisions about food choices. A few plates of food are passed around the table, and each child takes portions of what they want. The school cook prepares dishes that are nutritionally appropriate for the age group. As children and teachers have lunch or snack together, teachers model healthy eating behavior. The program also involves parents through trips to local grocery stores where nutrition specialists help them identify healthy, nutritious, and affordable products.

**TABLE 2—Parents' Satisfaction With School Meals at North Bay Children's Center, Marin, CA**

Satisfaction Level	%
How often does your child eat food served by school?	
Always	67
Frequently	20
Sometimes	13
Never	-
How healthy do you think the meals/snacks at your child's school are?	
Very healthy	67
Somewhat healthy	27
Not healthy	-
Don't know	7
How tasty do you think the meals/snacks at your child's school are?	
Very tasty	60
Somewhat tasty	27
Not tasty	-
Don't know	13

Surveys indicated that parents perceive the school food as tasty and nutritious and believe that the school has a positive effect on their child's knowledge and attitudes toward food and social development (Tables 2 and 3). Surveys also indicated that the program has had an impact on teachers and staff (Table 4). While many staff members already had strong convictions about healthy eating prior to their NBCC jobs, many of these convictions were reinforced at NBCC. This was not the case for exercise habits, which remained overall unchanged and were not an explicit focus of the program.

### Community Partners

A partnership with the San Francisco/Marin Food Bank has greatly benefitted and supported healthier eating among children and families by making it possible to feed children fresh produce during the school day—the garden cannot supply enough produce to feed all the children at each site.

Produce from the garden is supplemented by contributions from the San Francisco/Marin Food Bank, which helps children connect the fact of growing their own food with meals served at school. Thus the garden has become symbolic as children are able to trace the origin of fruits and vegetables, even those in the grocery store, to gardens, and ultimately, to the earth.

Furthermore, because there is usually extra produce from the San Francisco/Marin Food Bank on a weekly basis, parents are encouraged to take some home and incorporate them into family meals, often with the help of recipes, in Spanish and in English, provided by the school. This in turn encourages children to discuss healthy food choices and preferences with their parents. Additionally, the main campus has implemented a distribution program through the San Francisco/Marin Food Bank, administered by parent volunteers, that provides food for center families and the local community every

**FIGURE 1—Children collecting and tasting produce at the Garden of Eatin'.**

Saturday morning. This appears to be especially useful to older adults in the area who are given priority selection of the food.

### A "Culture of Health"

The school has played an important role in facilitating healthy eating through integrating a "culture of health" into every aspect of its operations. As reported by parents, staff, and teachers, and confirmed through field observations, these activities include exposing children to the earth as the source of food production,

integrating healthy eating into other areas of the curriculum, having family style meals on the premises, providing parents with recipes and grocery shopping instruction, and overall, conveying to children and parents the joy and importance of producing one's own food. As one teacher put it, the program is not merely a nutrition project but also an "ethos," an attempt to "push back the tide of the American culture of obesity." Indeed, participants viewed attending a school embodying a "culture of health"

**TABLE 3—Parents' (n = 15) Satisfaction in the Past 3 Months With the Effects of the School on Their Child's Dietary Habits and Development: North Bay Children's Center, Marin, CA**

	Strongly Agree, %	Somewhat Agree, %	Somewhat Disagree, %	Strongly Disagree, %
My child's school has increased her knowledge about the relationship between food and the environment	60	40	-	-
My child's school has increased her knowledge about making healthy food choices	47	40	13	-
My child's school has changed her attitudes about what he or she eats	27	40	27	7
My child's school has increased her interest in taking care of the environment	47	40	7	7
My child's school has improved her social skills	67	27	7	-

**TABLE 4—Teachers and Staff Report (n = 14) of Food Practices and Program Influences on Their Lifestyles in the Last 3 Months: North Bay Children's Center, Marin, CA**

	Strongly Agree, %	Somewhat Agree, %	Somewhat Disagree, %	Strongly Disagree, %	Don't Know, %
I have made serious attempts to improve my health habits	29	57	-	7	7
My eating habits have improved overall	36	50	-	7	7
My exercise habits have improved overall	14	36	14	21	14
The health habits of my family have improved	21	27	21	21	7

as a facilitator of healthy eating that also linked with other areas of learning. In the words of one teacher, "you can also do art in the garden, and math. [The children] can monitor the growth, that's part of math."

## DISCUSSION AND IMPLICATIONS

Because preventing child obesity is a national policy priority,<sup>6</sup> community-based, quality, early childhood education programs that contribute to a healthy nutrition have the potential to support healthy family eating practices and to mitigate the burden of obesity and chronic disease. ■

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### Contributors

C. Chaufan was the principle investigator on this project. J Yeh was the research assistant in this project. Both worked on the design, implementation, data collection, analysis, and write-up of this project. B. Sigal was a community partner in this project and provided, support, access, and entrée to the field site and participants from which data were collected.

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### Human Participant Protection

The University of California, San Francisco institutional review board approved the study.

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