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Creating a Sustainable Model for Establishing Youth Gardens in Schools and Childcare Centers

William Wright, BA; Bettina Friese, PhD; Aaron Carrel, MD; Amy Meinen, MPH, RD

Please note that this study was published before the SY2014-15 implementation of the Smart Snacks Nutrition Standards for Competitive Food in Schools, as required by the Healthy, Hunger-Free Kids Acts of 2010. As such, certain research relating to food in schools may not be relevant today.

ABSTRACT

Purpose/Objectives
The goal of the program was to establish youth gardens across Wisconsin by conducting workshops for school staff and childcare providers on how to start and sustain a youth garden with limited resources.

Methods
Evaluation utilized an end-of-workshop questionnaire and follow-up survey. The end-of-workshop questionnaire focused on participants' experience and satisfaction with training. Retrospective pre – and post-questions assessed changes in understanding concerning garden related issues and confidence in establishing and maintaining a youth garden. The follow-up survey focused on number and characteristics of gardens, use of gardens, and characteristics of youths involved. Descriptive statistics and paired t-tests were used to analyze the data.

Results
Three hour workshops held at 32 sites were attended by 672 participants. A total of 606 respondents completed the end-of-session questionnaire. Even though most participants had prior gardening knowledge, they perceived that training increased understanding and confidence related to youth garden tasks. A total of 180 participants completed the follow-up survey. Gardens were established at 122 sites, serving primarily youths in pre-K to 5th grade. Overall, 89% of respondents planned to continue their garden. Responses indicated that different reasons influenced the type of garden that was established (in ground/raised bed, container, microfarm, and cold frame). Providing school staff with gardening options to address barriers supported the establishment of gardens. Container gardens and microfarms were appealing because of their low cost and low maintenance. Perceived effectiveness of gardens did not differ by garden type.

Applications to Child Nutrition Professionals
Child nutrition professionals may be more likely to become involved in establishing a youth garden if it can be accomplished in a manner that is compatible with their time and resources. This effort illustrates an efficient and cost effective means of disseminating and establishing youth gardens in educational settings.

INTRODUCTION

The prevalence of excessive weight among children in the U.S. has increased dramatically over the past 25 years. Data from the National Health and Nutrition Examination Survey (NHANES) (1976-

1980 and 2003-2006) showed the prevalence of obesity increasing from 5% to 17.6% for those 6-19 years of age (Centers for Disease Control and Prevention, 2009). Unhealthy eating is known to negatively impact a child's physical development, as well as mental, social, and academic development (Bejar, Mendoza, Rizal, & Shetty, 2009). A diet including fruits and vegetables is important for normal growth and development of children.

Research reveals that school gardens can influence children to eat healthier and can increase their nutritional knowledge. Studies have indicated that when children grow their own vegetables it encourages them to try new foods, which in turn improves their eating habits (Bejar et al., 2009; Blair, 2009; Nanney, Johnson, Elliott, & Haire-Joshu, 2007). One study demonstrated that fourth grade children increased their preference for some vegetables when exposed to garden activities and nutrition education (Morris & Zidenberg-Cherr, 2002). Another study's findings indicated that gardening increased middle school-aged students' consumption of vegetables (Ratcliffe, Merrigan, Rogers, & Goldberg, 2011). Similar studies confirmed that garden-based nutrition education can be effective at enhancing children's eating habits (Graham & Zidenberg-Cherr, 2005; Hermann et al., 2006; McAleese & Rankin, 2007; Meinen, Friese, Wright, & Carrel, 2012). There is also evidence that the availability and accessibility of fresh produce was associated with fruit and vegetable consumption among children (Heim, Stang, & Ireland, 2009; Nanney et al., 2007; Ratcliffe et al., 2011). Another study found that hands-on garden-based learning experiences can increase low-income children's ability to identify vegetables correctly and willingness to try, as well as their consumption of vegetables (Hermann et al., 2006).

Since environmental interventions like school-based gardens appear to play a role in increasing fruit and vegetable consumption, the establishment of school and community gardens may provide an opportunity to improve children's health through experiential learning. Additionally, identifying, engaging, and strengthening local champions to provide guidance and expertise are needed to sustain an initiative over time (Scheirer,2005). Several efforts have been made to create a system to establish school gardens. For example, California's $15 million California Instructional School Garden Program (Assembly Bill 1535) provided $2,500 and $5,000 grants which supported schools in hiring a gardening coordinator to oversee garden activities. An evaluation of this initiative concluded that a lack of time and resources are major barriers in implementing and sustaining youth gardens, as well as teachers' interest, knowledge, experience and training related to gardening (Hazzard, Moreno, Beall, & Zidenberg-Cherr, 2011). Furthermore, the evaluation found that success was dependent on having part-or full-time garden coordinators. The need for additional staff might make youth gardens difficult to establish and maintain in sites without additional funding.

The goal of Got Dirt?, a Wisconsin youth garden initiative, was to conduct workshops for school staff and childcare providers across Wisconsin on how they could start and sustain a youth garden with limited resources. Got Dirt? was developed in collaboration with Brown County University of Wisconsin Extension, the Wisconsin Department of Health Services, and the University of Wisconsin School of Medicine and Public Health's Department of Pediatrics. Workshop participants learned about gardening, strategies to overcome barriers frequently encountered, and how to establish collaborative partnerships with parents, volunteers, and master gardeners in the community. The project team responsible for the state-wide Got Dirt? Initiative was limited to three individuals whose involvement in the project was staggered in order to optimize the use of their time. The hours devoted to the project by the three individuals, project manager, education coordinator, and marketing coordinator, equaled a full time equivalent (FTE) of 1.75. The purpose of this paper is to describe how we effectively implemented a statewide youth garden initiative with limited resources.

METHODS

A previous pilot study conducted in 2006 identified numerous barriers to establishing youth gardens in schools. These included lack of time, lack of funding, lack of support from others, lack of knowledge, Wisconsin's short growing season, and the variability of the growing season between the northern and southern parts of the state. Because no single solution existed to overcome all of these barriers, a multifaceted approach was needed. As a result, the project team developed a three-hour,

face-to-face workshop and four gardening manuals and adopted a train-the-trainer approach to develop workshop leaders.

The workshop provided participants with information about the barriers which could be encountered, strategies for dealing with these barriers, knowledge about how to select the type of garden best suited for their needs, how to plan and plant a garden, and how to care for the garden throughout the growing season. Recognizing that participants would have additional questions as they proceeded with the project, information was provided regarding additional sources of information and technical assistance available in their geographic area. In addition, the workshop addressed how gardening is different for children than for adults, the benefits of gardening for children, ideas for integrating gardening into classroom activities, and suggestions about finding funding. Each workshop also contained a hands-on component such as transplanting seedlings into a pot or participating in a seed planting demonstration. When tomato seedlings were available for purchase at garden centers, the seedlings were used for a transplanting demonstration. If seedlings were unavailable, instructors guided participants through a seed planting demonstration. Furthermore, a number of workshops were held in locations with an existing youth garden, and participants were able to tour the garden.

Potential workshop leaders, including UW-Extension agents, Wisconsin Master Gardener volunteers, and gardeners with a background in vegetable gardening were contacted throughout the state by phone and invited to act as workshop leaders. The responsibilities of workshop leaders were discussed with each potential leader. Responsibilities included securing a site in their area to hold the workshop, securing necessary equipment (LCD projector, screen, etc.), following the provided workshop outline, and the collecting end-of-workshop questionnaires from participants. To implement the workshops with fidelity across the state, all trainers participated in a telephone training session and received a PowerPoint presentation to use at the workshops. The PowerPoint presentation was developed by Got Dirt? staff with input from Master Gardener volunteers and the Wisconsin Department of Health Services.

Four manuals were supplied to workshop participants to provide in-depth information about gardening and reinforce the newly acquired skills and knowledge. The*Got Dirt? Manual* was previously developed by a team led by the Wisconsin Department of Health Services. The other three manuals were developed specifically for this project by Got Dirt? project staff. Drafts of the manuals were reviewed by University of Wisconsin Extension horticulturalists to ensure accuracy. The four manuals included:

1. The *Got Dirt? Manual* contains information about starting and caring for a garden, examples of successful youth gardens, and gardening related resources.
2. The *Container Gardening Manual* shows participants an alternative to the traditional in-ground garden and includes detailed instructions on the creation and care of a container garden.
3. The *Cold Frame Manual* shows participants how to provide frost protection for their plants and extend their growing season. It also provides plans for building, planting, and caring for a cold frame. This could be especially useful for school gardens because it allows gardening to start earlier in the spring and extends gardening into the fall.
4. The *Microfarm Manual* provides participants with details on building and maintaining a garden inside the classroom using artificial lighting. The garden, built on a wagon, provides portability, allowing it to be shared with other classrooms and offers the quickest harvest with some micro-greens being available to harvest in as little as three weeks.

Workshop participants were asked to complete two surveys, one survey immediately following the workshop and a second web-based survey at least four months after the workshop. The end-of-workshop survey asked closed and open-ended questions about participants' experience with the training. This survey also asked respondents about their garden-related knowledge and self-efficacy using a retrospective pre- and post- design. Paired t-tests were used to analyze the retrospective pre-post questions.

Participants who completed the workshop surveys and provided contact information were invited to complete a web-based survey. This follow-up survey was used to determine workshop participants'

level of success in starting a youth garden, how the garden was utilized, the type of garden established, and barriers encountered by those who did not establish a garden.

RESULTS AND DISCUSSION

Workshop Surveys

Thirty-two workshops were held throughout Wisconsin between September 2009 and April 2010. A total of 672 participants attended the workshops with attendance ranging from 5 to 39 participants per workshop. At the end of each workshop, participants were asked to complete a questionnaire. A total of 606 participants completed the questionnaire. The overall response rate was 90%, and response rates for individual workshops ranged from 63% to 100%. Eighty-nine percent of respondents were female. The vast majority (88%) of respondents were White. About two thirds (65%) of respondents reported having a college degree or higher. About half of the participants were childcare providers and elementary school teachers (Table 1). Participants were primarily from facilities that served younger (childcare and elementary school) children. There was minor participation from after-school programs. The vast majority of respondents (82%) reported having prior gardening experience.

The survey asked participants how likely they were to recommend this workshop to others interested in starting a youth garden. Response choices ranged from 1 (not at all likely) to 3 (very likely). Participants indicated that they were very likely to recommend this workshop. The mean rating was 2.8 (SD = .42), and the individual workshop ratings ranged from 2.5 to 3.0.

Table 1. *Workshop participant occupation (N = 602)*

	n	%
Childcare provider	201	33
Elementary school teacher	107	18
Other	96	16
Middle school teacher	43	7
Childcare facility director	37	6
Preschool teacher	28	5
After-school program coordinator	25	4
Childcare facility owner	21	4
After-school program director	12	2
School administrator	8	1
High school teacher	24	4

Participants also rated the workshop as a whole, the usefulness of the subject matter, the presenters' knowledge, the presentation, the hands-on activities, and the distributed materials. The response choices ranged from 1 (poor) to 4 (excellent). The mean rating of the workshop was 3.6 (*SD* = .54), usefulness of the subject matter was 3.5 (*SD* = .59), presenters' knowledge was 3.8 (*SD* =

.45), and presentation was 3.6 (*SD* = .57). The *Got Dirt? Manual, Microfarm Manual*, and *Container Gardening Manual* each received an average rating of 3.7 (*SD*s= .50, .51, and .49, respectively), and the *Cold Frame Manual* received a rating of 3.6 (*SD* = .52).

Table 2. *Understanding of youth garden related issues*

	n	Pre-Test *M* (*SD*)	Post-Test *M* (*SD*)	*t*
Current fruit and vegetable recommendations for children	582	2.59 (.87)	3.47 (.61)	-27.60***
Mechanisms through which youth gardens can affect fruit and vegetable consumption	584	2.41 (.83)	3.42 (.63)	-30.90***
How to integrate gardening into other subjects	583	2.43 (.81)	3.40 (.63)	-28.43***
How to get buy-in from parents and school officials	577	1.90 (.81)	3.03 (.77)	-31.76***
What alternatives exist to traditional in-ground gardens	580	2.13 (.88)	3.56 (.57)	-38.04***

Note: Scale ranged from 1=very little to 4=a lot. ***p= .001

A retrospective pre- and post-test methodology was used to assess whether there was an increase in understanding concerning garden-related issues. These questions asked respondents to rate their understanding before the workshop and after the workshop. Findings indicated that respondents' ratings of their understanding on five important aspects of youth gardens increased significantly. Response categories ranged from 1 (very little) to 4 (a lot). Respondents' scores showed significant increases on all five items (Table 2). All scores improved to 3.0 and higher at post-test.

Table 3. *Confidence in accomplishing youth garden related tasks*

	n	Pre-Test *M* (*SD*)	Post-Test *M* (*SD*)	*t*
Getting parents involved in a youth garden	570	2.50 (1.03)	3.70 (.91)	-30.61***
Getting children excited about gardening	571	3.17 (1.07)	4.31 (.74)	-28.68***
Getting children to try new fruits and vegetables	570	3.09 (1.05)	4.15 (.79)	-27.11***
Using the youth garden as part of the nutrition education	566	2.96 (1.05)	4.17 (.83)	-30.29***
Integrating gardening into other subjects	569	2.98 (1.04)	4.18 (.77)	-30.37***

	n	Pre-Test *M* (*SD*)	Post-Test *M* (*SD*)	*t*
Making gardening age-appropriate for children	571	2.92 (1.06)	4.15 (.81)	-28.87***
Starting a youth garden	569	2.74 (1.12)	4.21 (.79)	-33.81***
Planting seeds	571	3.41 (1.18)	4.37 (.74)	-23.76***
Transplanting seeds	566	3.16 (1.24)	4.26 (.04)	-25.33***

Note: Scale ranged from 1=not confident at all to 5=very confident. ***p= .001

Web-based Follow-up Survey

In Fall 2010, a web-based follow-up survey was conducted with Got Dirt? workshop participants. The focus of the survey was to determine how many gardens were established, the characteristics of the gardens, and the characteristics of the youths involved. The survey also explored barriers that may have prevented the establishment of a garden. Emails were sent to 415 respondents. Respondents who did not provide an email address in the end-of-session questionnaire and those whose emails were returned were contacted via phone if a phone number had been provided. Seventy-five of those emails were undeliverable and 79 respondents were called. Overall, 419 respondents with working phone or email addresses were contacted. Repeated follow-up and incentives resulted in 180 completed surveys (43% response rate). Respondents indicated that 122 schools and childcare sites established gardens after the Got Dirt? workshops with many sites establishing more than one type of garden. Seventy sites established one type of garden, 39 sites established two types, 12 sites established three types, and one site had all four types of gardens. Across the 122 garden sites, respondents established 101 in-ground/raised bed gardens, 25 microfarm gardens, 57 container gardens, and four cold frame gardens. Respondents were asked to check all that applied on a list of potential reasons for selecting a certain type of garden. The list of reasons was based on responses from the pilot study which was conducted prior to this study. Reasons for selecting a certain type of garden are detailed in Table 4.

Table 4. *Reasons for establishing a selected type of garden (N=122)*

	%
In-ground/raised bed garden	
Wanting to grow vegetables throughout summer	61
Ability to grow wider variety of vegetables	54
Ability to share project with other classes	50
Ability to grow vine crops (e.g. pumpkin)	40
Ability to produce larger quantities of vegetables	36
Microfarm	

	%
Having the garden inside	72
Short duration of the gardening activity	60
Ability to share with other classes	44
Ability to garden throughout the school year	44
No need for large tools	28
Lack of suitable space for in-ground/raised bed garden	16
Container garden	
Portability	56
Little time required for garden maintenance	54
Low start-up costs	53
Lack of suitable space for in-ground/raised bed garden	35
No need for large tools	35
Cold frames	
Gardening during the school year	100
Gardening in limited space	50
Requiring less time for garden maintenance	50
No need for large tools	25

Note: Respondents with multiple types of gardens responded for each type of garden.

The survey asked respondents to describe how many youths assisted in the garden, their grade levels, how much time they spent in the garden, and the gardening activities in which they were involved. Overall, the majority (63%) of gardens engaged up to 30 children, primarily youths in pre-K to 5th grade. Only a small percentage of gardens engaged youths in grades 6-8. About two-thirds of respondents (69%) indicated that students were engaged in the garden for less than an hour each week. Only 10% of respondents indicated that they engaged students for more than two hours per week in the garden. Responses suggest that students were involved in three primary gardening activities: planting, maintaining the garden, and harvesting.

Workshop participants were asked how the produce grown in the garden was used. The vast majority of respondents (71%) indicated that they used the produce from the youth garden for classroom activities. The two most common uses were the use of produce as a snack during the day and as part of the lesson plan or service learning, followed by sending produce home with the students. In addition, open-ended comments suggested that some of the produce was used to cook meals for the children. Respondents also (83%) indicated that they used the garden for academic

instruction, and integrated it into lessons about science, nutrition education, health, math, language, art, and social studies.

The survey asked respondents how effective they thought the garden was in increasing children's access to fruits and vegetables and increasing children's interest in fruits and vegetables. On a scale of 1 (not at all effective) to 5 (extremely effective), respondents gave the effectiveness of the youth garden in increasing access to fruits and vegetables a mean score of 3.9 (SD=.84). Overall, 64% of respondents rated the garden as either very effective or extremely effective in increasing access to fruits and vegetables. This rating was consistent across different types of gardens with mean scores ranging from 3.5 to 4.0.

When asked how effective the garden was in increasing children's interest in fruits and vegetables, respondents rated the effectiveness on average a 4.0 (*SD*=.75). Overall, 76% of respondents answered that the youth gardens were either very effective or extremely effective in increasing children's interest in fruits and vegetables. This finding was also consistent across different types of gardens with mean scores ranging from 4.0 to 4.2.

Respondents who had started a garden were asked about their intentions to continue the garden. Overall, 89% of respondents answered that they were planning to continue their garden. Eighty-eight percent of in-ground/raised bed gardens were likely to be continued, as were 96% of microfarms, 95% of container gardens, and 100% of cold frame gardens. A small number of respondents (11%) said they were not sure whether they would continue. None of the respondents reported that they would not continue their garden.

Participants who planned on continuing their gardens were asked whether they were planning on expanding the garden. Overall, 71% of respondents were planning on expanding their garden. This included 88% of respondents with microfarms , 76% of respondents with container gardens, 71% with in-ground/raised bed gardens, and 25% with cold frame gardens. The most commonly planned expansions were increasing the variety of plants in the garden (47%) and increasing the size of the garden (36%).

Respondents who did not start a youth garden (n=58) were asked whether they were planning on starting a garden in the following year. About a third (33%) of respondents indicated that they would start a garden in the near future. Barriers that prevented respondents from starting a garden were time (45%), lack of funding (31%), lack of support from administrators/directors (21%), lack of space for a garden (21%), lack of assistance from teachers/providers (14%), lack of support/assistance from parents (7%) , and lack of gardening knowledge (2%).

This study adds to the research on the infrastructure needed to establish and sustain youth gardens. Findings support the idea that youth gardens can be created with relatively few resources. As indicated in prior research (Scheirer, 2005), having local champions to provide guidance and expertise is essential. In this garden initiative, the local champions were UW-Extension agents, Master Gardeners and other garden enthusiasts with expertise in vegetable gardening who volunteered their time. Another study found that teachers' knowledge about gardening was a barrier to implementing youth gardens (Hazzard et al., 2011). This initiative overcame this barrier by providing hands-on, in-depth training in locations across Wisconsin to motivated teachers and other school staff. However, it is important to point out that, unlike the $15 million California Instructional School Garden Program which provided grants up to $5,000 to support hiring a garden coordinator, the youth garden initiative in Wisconsin relied solely on volunteers, both for training and for the establishment and maintenance of gardens. The findings suggest that even though lack of time and funding are common barriers, youth gardens can be established in a variety of sizes and made to fit modest budgets and time constraints by providing training and drawing on committed volunteers.

CONCLUSIONS AND APPLICATION

The current study described how a gardening initiative was taken to scale and how it helped to implement sustainable youth gardens in educational settings. Data showed that providing

educational staff and child care providers with different gardening options to address barriers supported the establishment of gardens. Even though many sites established the traditional in-ground/raised bed gardens, container gardens and microfarm gardens were also popular. The reasons given for selecting these types of gardens provide a strong indication that they addressed several of the barriers including lack of time, lack of funding, lack of available space, and growing season constraints. Furthermore, responses showed that different types of gardens fared equally well in terms of respondents' perceptions of how effective they were in increasing access to fruits and vegetables and increasing children's interest in fruits and vegetables. This suggests that benefits can be gained from low cost and low maintenance gardens, such as container gardens and microfarms.

Results indicated that the majority (89%) of respondents planned on continuing their garden. In addition, 71% indicated that they planned to expand their garden in the future. This suggests that those who started a garden were satisfied with its value as a learning tool at their facility.

The workshops were the primary tool for the dissemination of program information. By utilizing volunteers and master gardeners, the project was able to keep costs down. The train-the-trainer format allowed the project to have an extensive reach across the state by conducting 32 workshops that provided training to 672 participants which ultimately resulted in the establishment of gardens at 122 sites throughout the state. Even though many of the workshop participants indicated that they had prior gardening experience (82%), the surveys demonstrated significant increases in knowledge and confidence. This suggests that youth garden specific training may be important even for individuals who have garden experience through their home gardens.

This study is not without limitations. The Got Dirt? Garden Initiative was successful in establishing a statewide youth gardening program; however, additional evaluation is required to better understand why some program attendees did not start gardens. The responses received indicate lack of time, lack of funding, and lack of support as reasons for not establishing a garden. However, the low response rate from those who did not start a garden does not allow us to fully understand what the barriers were and what may have helped participants to overcome those barriers and establish a garden. Another limitation is that the gardens examined were only in their first year. Further research is needed to investigate how gardens can be sustained over time and address any issues involving the long-term sustainability of gardens.

Additional work will also be needed to increase the pool of qualified workshop leaders. The initial project relied heavily on Wisconsin Master Gardener volunteers and UW-Extension horticulture agents. It must be determined if the same results can be achieved by tapping into other sources such as gardening clubs or botanical garden members.

Recent studies have indicated that garden-based learning can have a variety of positive impacts, including increased ability to identify vegetables, willingness to try more vegetables, and increased variety of vegetables consumed (Meinen et al., 2012; Ratcliffe et al., 2011). Thus youth gardens could prove to be an effective tool in combating obesity. Results of this study illustrate an efficient and cost effective means of establishing and disseminating a garden based program for schools and childcare facilities across a state.

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