

**SELECTION AND DEVELOPMENT OF AN EVIDENCE-BASED PEDIATRIC WEIGHT  
MANAGEMENT PROGRAM FOR THE DAN RIVER REGION**

Margaret Berrey Hooper

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Human Nutrition, Foods and Exercise

Madlyn I. Frisard, Chair

Paul A. Estabrooks

David E. Berry

Brenda M. Davy

Jamie M. Zoellner

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# SELECTION AND DEVELOPMENT OF AN EVIDENCE-BASED PEDIATRIC WEIGHT MANAGEMENT PROGRAM FOR THE DAN RIVER REGION

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## **Abstract**

*Background:* Efficacious pediatric weight management (PWM) programs have existed for over two decades, but there is limited evidence that these programs have been translated into regular practice. There is even less evidence that they have reached communities experiencing health disparities where access to care is limited. The purpose of this project was to use a community-engaged approach to select an evidence-based PWM program that could be delivered with the available resources in a community that is experiencing health disparities.

*Methods:* The project was developed by the Partnership for Obesity Planning and Sustainability Community Advisory Board (POPS-CAB) in the Dan River Region of southwest Virginia. The POPS-CAB included representatives from a local pediatric health care center, the Danville/Pittsylvania Health Department, Danville Parks & Recreation, the Boys & Girls Club, and the Fralin Center for Translational Obesity Research (n=15). Three PWM programs were identified that met the criteria of demonstrating short and longer-term efficacy, across multiple studies and diverse populations, in reducing childhood obesity for children between the ages of 8 to 12 years across multiple studies. The programs included the Traffic Light Diet, Bright Bodies, and Golan and colleagues' Home Environmental Change Model. All three programs included a high frequency of in-person sessions delivered over a 6-month period, but one included an adapted version that delivered the content via interactive technology and could be delivered with far fewer resources (Family Connections adapted from the Home Environmental Change Model). A mixed-methods approach was used to determine program selection. This approach included individual POPS-CAB member rating of each program, followed by small group discussions, a collective quantitative rating, and, once all programs were reviewed a rank ordering of programs across characteristics. Finally, a large group discussion was conducted to come to agreement on the selection of one program for future local adaptation and implementation. All small and large group discussions were audio recorded and transcribed verbatim to identify themes that influenced the program selection decision. The quantitative results were averaged across individuals and across the groups. Qualitative results were reduced to meaning units, and then grouped into categories, and lastly, themes.

*Results:* Individual ratings across Bright Bodies, Family Connections, and Traffic Light were 3.9 (0.3), 3.6 (0.5), and 3.4 (0.4), respectively. The ratings differed slightly between community and academic partners demonstrated by a higher rating for Bright Bodies by community members and a higher rating for Family Connections by academic members. After small group discussions the average group ratings across the programs was 3.8 (0.4) for Bright Bodies, 3.5 (0.6) for Family Connections, and 3.4 (0.6) for Traffic Light. Finally, the rank order of programs for potential implementation was Bright Bodies, Family Connections, and Traffic Light. Qualitative information for each program was broken down into four main themes of discussion, (1) the importance for the chosen program to have a

balance of nutrition and physical activity, (2) negative perceptions of calorie counting, (3) a desire to target both the parent and the child, as well as (4) the need for practicality and usability the target settings. During the final large group discussion, the above themes suggest that the primary reasons that Bright Bodies was selected included the availability of nutrition information, structured physical activity sessions, presence of a usable workbook, as well as the balance of parent and child involvement.

*Conclusion:* Key considerations in program selection were related more to the program content, delivery channel, and available resources for replication rather than simply selecting a program that was less resource intensive.

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## I. Introduction

In the United States, the prevalence of obesity among children and adolescents has more than tripled in the past 30 years, reaching approximately 17%<sup>1,2</sup> and this is expected to reach 30% by 2030<sup>2</sup>. Evidence shows that overweight children are twice as likely to become overweight adults and are at an increased risk for adult diseases, such as diabetes, cardiovascular disease, sleep apnea, and fatty liver disease both as children and adults<sup>3</sup>. Unfortunately, childhood obesity continues to persist and is more impactful on some portions of population than others (e.g., rural and low socioeconomic status populations with less access to health care).

One example is the Dan River Region (DRR), in southwest Virginia and North Carolina. Across the region, 50% of the population is female, 27% black, and approximately 17% of the population lives below the Federal Poverty Level<sup>4,5</sup>. The DRR is characterized by high rates of unemployment,<sup>4-6</sup> and low literacy with approximately one-quarter of the population lacking health insurance. In addition, those living in the DRR, when compared to the nation, are more likely to experience diabetes, hypertension, hypercholesterolemia, and obesity<sup>4</sup>. These disparities are also evident in the population of DRR children. Data collected by school nurses in one local school district in the DRR showed 17% of first graders to be overweight and 19% to be obese. By fifth grade, in the same cohort, the prevalence increased to 19% and 36%, respectively<sup>7</sup>. This rate of obesity in the DRR is three times higher than state averages which estimates approximately 11% of Virginia high school students to be obese<sup>7</sup>.

To address the high prevalence of obesity in the DRR, a community-academic partnership-- the Dan River Partnership for a Healthy Community (DRPHC)— was developed using a community-based participatory research (CBPR) approach<sup>8</sup>. The

mission of the DRPHC is to foster community partnerships to combat obesity in the DRR through healthy lifestyle initiatives. The members of the DRPHC share a vision of promoting an environment that supports opportunities for all DRR residents to make healthy food choices and to be physically active in order to achieve or maintain a healthy weight<sup>9</sup>. Specifically related to childhood obesity, and as a result of a lack of access to childhood obesity treatment resources, the DRPHC also developed a community advisory board to identify and develop an evidence-based pediatric weight management program that could reach high need families in the region and be sustained with local resources<sup>10</sup>.

While there is a lack of access to pediatric weight management in the DRR, there is a sufficient amount of evidence-based programs that have demonstrated short and longer-term efficacy across a number of research trials<sup>11-15</sup>. These pediatric weight management (PWM) programs most often include a multidisciplinary approach with interventions including medical care, nutrition education, physical activity, and behavioral counseling<sup>12,13,16-21</sup>. The approach typically requires personnel such as registered dietitians, exercise physiologists, and psychologists. The American Academy of Pediatrics recommends PWM programs of medium (26-75 hours of contact) or high (>75 hours of contact) intensity as those that will have the highest likelihood of success in reducing weight status<sup>22</sup>. Unfortunately, there is little evidence that this standard has been translated into widespread clinical practice and it may be that the same features of PWM programs that lead to efficacy are also those that reduce the likelihood of adoption or that significant adaptation may be necessary to make evidence-based programs generalizable to community or clinical settings<sup>23</sup>.

An emerging body of literature suggests that systems-based approaches may be ideal to support the identification, adaptation, and implementation of locally relevant,

evidence-based programs<sup>24,25</sup>. Systems-based approaches (1) acknowledge the role of the environment, context, and cost in obesity, (2) integrate research and practice to adapt evidence-based interventions, (3) focus on the underlying scientific principles of an intervention and organizational mission, expertise and resources, and (4) involve multi-levelled approaches<sup>24,25</sup>. Systems-based approaches include, but move beyond, determining efficacy and address broader contextual issues such as initiative adoption, implementation, and maintenance across settings as well as reach and maintenance at the individual level<sup>25</sup>.

A systems-based approach also highlights the importance of cyclic priorities, cultural norms, and context associated with implementing new strategies<sup>26</sup>. This includes understanding tacit practice-based knowledge; relationships within a practice organization; and the strategic processes that influence decision-making<sup>26</sup>. Finally, when considering childhood obesity, systems-based approaches--within healthcare or public health settings—should obtain perspectives from vertical and horizontal components across, and within, the local organizations that identify and interact with obese children<sup>27</sup>.

Vertical components of a systems-based approach can be operationalized as both the staff that interact with the potential recipients of a PWM program and the organizational decision-makers who can approve such a program. For example, Estabrooks and colleagues engaged multiple levels of a managed care organization and found that engaging organizational decision makers as well as health educators and registered dietitians in a systems-based approach to obesity treatment resulted in a novel integration of practice and research knowledge. The partnership produced an adapted evidence-based program that was effective, led to sustained changes, and was integrated into standard practice<sup>28,29</sup> providing initial evidence for the sustainability of interventions developed using a systems-based approach.



Horizontal components of a systems-based approach include the engagement of several sectors within a local region that can aid in addressing childhood obesity<sup>27</sup>. Indeed, the key to success for childhood obesity treatment within healthcare settings is the presence of a strong and engaged community partner<sup>30</sup>. Community-based participatory research (CBPR) partnerships<sup>31,32</sup> are ideal settings for achieving horizontal engagement across local organizations. CBPR is a process that builds equitable community-academic partnerships and involves the community in all phases of the research process including assessments of the problem, identification and selection of potential interventions for the community, planning and development of the intervention, as well as monitoring and evaluation<sup>9,33</sup>. In the DRR, the DRPHC includes strong and engaged healthcare, public health, and community organizations<sup>8</sup>. Collectively, these organizations reach a broad and high need cross-section of obese children in the DRR and provide the opportunity to engage both the staff that will interact with the families and the decision-makers who could provide approval for such strategies to be implemented and sustained.

Although systems-based approaches hold promise in identifying, adapting, and implementing evidence-based PWM programs, there are no published reports, to our knowledge, that have documented the process by which decisions are made relative to the specific evidence-based program that is selected, the degree and process of adaptation, and the feasibility and outcomes of implementing newly adapted PWM programs. The purpose of this project is to describe the decision making process of the Partnership for Obesity Planning and Sustainability Community Advisory Board (POPS-CAB) of the DRPHC when selecting an evidence-based PWM program for possible translation into clinical and community practice.

## II. Methods

The POPS-CAB was established in January 2013. The membership of the POPS-CAB during the intervention selection phase of the project included 15 members (n=8 community; n=7 academic) ranging across six organizations. The POPS-CAB was made up of organizational decision makers and practitioners who could ultimately implement a PWM program for 8 to 12 year old children, including Pittsylvania/Danville Health District, Children's Healthcare Center, Danville Parks Recreation and Tourism, Boys & Girls Club, and research team members from the Fralin Translational Obesity Research Center at Virginia Tech with expertise in the development and delivery of PWM programs, nutrition and exercise, and health economics. These organizations were strategically identified, to include a mix of clinic-based and community-based partners. In addition, all four non-academic organizations have a mission specific to youth and can provide local knowledge related to the unique needs of the targeted youth and family population in the DRR. Of the 15 POPS-CAB members, seven had participated in and have continued involvement with the DRPHC, while the other eight members were beginning their work in Danville for the first time. An external consultant facilitated all POPS-CAB meetings to ensure that there was equal input across community and academic partners across the planning process, including the intervention selection process.

Over the course of 3 monthly meetings (February, March, & April 2013), the POPS CAB met to develop a shared vision for the project as well as identify and select an evidence-based program for implementation in the region using the National Cancer Institute's "Using What Works - Guide to Choosing an Evidence Based Program" process<sup>34</sup>. This protocol for identifying, and potentially adapting, evidence-based programs includes five modules, three of which are reported in this manuscript—(1) defining evidence-based

programs, (2) assessing resources and need in the community, and (3) choosing an evidence-based program.

### *Defining the characteristics of Evidence-Based Pediatric Weight Management Interventions*

As part of in the initial module, academic partners used the RE-AIM framework (reach, efficacy, adoption, implementation, maintenance)<sup>35</sup> to summarize the PWM intervention literature. The goal of this summary was to demonstrate a range of outcomes on evidence-based interventions that had demonstrated efficacy, so that findings could be discussed with POPS-CAB. The RE-AIM framework, developed by Glasgow and colleagues, was designed as a model to assist researchers and practitioners in the planning, evaluation, reporting, and review of translational research and practice<sup>35-38</sup> ([www.re-aim.org](http://www.re-aim.org)). RE-AIM has two categories based at the individual level (reach and efficacy), two categories based at the settings level (adoption and implementation) and one category that can measure at the individual and the setting level (maintenance)<sup>37</sup>.

The first meeting with the POPS-CAB in the program selection process included the presentation of the findings through a systematic RE-AIM review of the literature on pediatric weight management programs conducted by three academic members of the POPS-CAB. This review took place between July 2011 and May 2012 using two databases (PubMed, and Web of Science). In addition, the National Cancer Institute's repository of Research Tested Intervention Programs (R-TIPS) was examined to supplement the review of literature. The primary goal of the review was to identify 3 to 4 PWM programs that had been (a) tested in multiple published studies across a range of samples, (b) provided data on efficacy and maintained results for a period of time after the intervention had been completed, and (c) varied in the need for delivery resources. Seven initial PWM programs

from 1980-2012 were identified including the Traffic Light diet, Trim Kids, Bright Bodies, Golan and colleagues Home Environmental Change Model, Obeldicks, ShapeDown, and Cardiac Kinder. ShapeDown, Cardiac Kinder, and Trim Kids were excluded due to limited data on effectiveness and maintenance of effects or had an R-TIPs rating of ‘weak’ evidence. The Obeldicks program was excluded because it had only been tested in Germany and had no English program materials. Three programs were identified for further consideration based on the availability of multiple published studies across a range of samples and data on efficacy and maintained results for a period of time after the intervention had been completed—Traffic Light Diet, the Home Environmental Change Model, and Bright Bodies. All three programs included a high frequency of in-person sessions delivered over a 6-month period, but one included an adapted version that delivered the content via interactive technology (Family Connections adapted from the Home Environmental Change Model). This adaptation also demonstrated efficacy and maintenance effects<sup>28</sup> and was selected for review to provide options that included fewer resources to deliver. Each program also aligned with the American Academy of Pediatrics recommendations for PWM (Appendix Table 1A).<sup>39</sup> For each of the three programs, the following information was presented to the POPS-CAB: (1) who delivered the program, (2) program characteristics (content, duration, number of sessions), (3) the characteristics of the participants (i.e., demographics of those who participated), and (4) available program materials and components.

The Traffic Light Diet<sup>11,12,16</sup> consists of a total of 20 sessions, broken down into 16 weekly, 2 biweekly, and 2 monthly sessions. Each session targets both the parent and the child and focuses on nutrition, behavior, and physical activity. The nutrition approach is based on a color-coded calorie based food system. Foods are classified into categories, red,

yellow, or green. Red foods include those that are full of energy but have little or no nutritional value and should only be consumed once or twice a week, such as potato chips and desserts. Yellow foods do have some nutritional value but do not necessarily need to be consumed at each meal, such as breakfast cereals and full-fat dairy. Finally green foods are the most nutritious and should be seen at almost every meal, including fruits, vegetables, and whole grains. The physical activity portion of this program provides families with information on aerobic exercise and stretching as well as ways to keep track of calories burned during exercise.

Family Connections<sup>28</sup> represents the least resource intensive program. This program consists of only two in-person sessions, where parents receive an introduction to nutrition, behavioral lifestyle change, and physical activity. After the two sessions, the remainder of the program is delivered via an Interactive Voice Response (IVR) system. Children are not involved in the Family Connections program. Its emphasis is entirely on the parents to encourage healthy lifestyle changes for their families.

The Bright Bodies program<sup>15,20</sup> is considered the most intensive of the three programs presented to the POPS-CAB. It consists of three weekly sessions, which include one-40 minute session focused on nutrition and behavior modification targeted at both the parent and the child. The additional two-50 minute sessions are structured physical activity sessions designed specifically for the child. For Bright Bodies, the main focus is on a balanced healthy lifestyle change for the entire family.

#### *Assessing available resources*

At the second meeting (March 2013), the POPS-CAB community partners each presented on the resources that were available to support a PWM program in the region. Resources were identified that included access to the target population of high need

families, personnel that could provide program sessions for families, and physical resources available to support a pediatric weight management program. Specifically, both the Department of Health and Children's Healthcare Center reported seeing a high proportion of low-income families while also documenting height and weight in a high proportion of children who had clinical visits. Parks and Recreation and the Boys and Girls clubs presented a number of physical (e.g., multiple community buildings and gymnasium space that could be used to house a pediatric weight management program) and human resources (e.g., youth leaders with training in positive youth development) that currently engage youth in physical activity and other recreation pursuits.

### *Selecting an Evidence-Based Pediatric Weight Management Intervention*

During the third meeting, the POPS-CAB revisited the definition of evidence-based programs and reviewed findings from each of the Traffic Light, Golan Model, and Bright Bodies Interventions. To provide a range of intervention scalability, Family Connections, an adaptation of Golan's Model that was delivered using automated telephone calls was presented<sup>28</sup>. The objective was to evaluate these programs to ensure that the program selected could be adapted for the DRR, is appropriate for the age of the audience, is likely to help families reduce their BMI status, can reach a large number of families that need the program, and can be adopted, implemented, and sustained in the community once grant funding was complete. The POPS-CAB also discussed modifiable aspects of evidence-based programs (e.g., changing names of health care centers and systems, pictures of people/places and quotes, reading level of the program materials, ways to reach your audience, incentives for participation, timeline, and cultural indicators based on population) and aspects that were not considered modifiable (e.g., the health topic, deleting whole sections of the program, adding strategies that were inconsistent with the

intervention model, the health communication model or theory used as the basis for the evidence-based intervention, and the underlying principles of the intervention).

After the review of the programs and open discussion, the POPS-CAB was divided into three groups with representation across the community organizations and academic partners. Each group used a comparison chart of the focus and components of each program (See Table 1).

Table 1. Program Comparison Chart

In addition, the program materials and objectives were summarized and an example of available session materials was presented for each evidence-based program. All

	Bright Bodies	Family Connections	Traffic Light
<b>Nutrition Plan</b>			
Calorie counting			✓
Healthy eating	✓	✓	✓
<b>Physical Activity</b>			
Structured exercise	✓		
General information		✓	✓
<b>Topics</b>			
Home environment		✓	✓
Self-monitoring	✓	✓	✓
Motivation	✓		
Self-esteem	✓	✓	
Praise & rewards		✓	✓
Role modeling		✓	✓
Goal setting	✓	✓	✓
Stimulus/cue control	✓		✓
Special occasions	✓		✓
Relapse prevention	✓	✓	
Maintenance behavior	✓	✓	✓
Lesson quizzes			✓
<b>Delivery method (Sessions)</b>			
Individual	✓		✓
Group	✓	✓	
In-person	✓	✓	✓
Telephone		✓	
Parent	✓	✓	✓
Child	✓		✓
<b>Workbook/Resource</b>			
Parent	✓	✓	✓
Child	✓		✓

individuals provided ratings for each program across characteristics related to reach, effectiveness, adoption, implementation, and maintenance. The small groups reviewed the materials from each intervention for 30 minutes each, discussed the advantages and disadvantages of each, and provided a group rating of each of the programs.

### *Quantitative Assessments*

During the second half of the April meeting, all POPS-CABS members completed a rating sheet for each program before their group discussions. As each of the programs had demonstrated individual level effectiveness and maintenance, the rating sheets focused on the organizational level RE-AIM dimensions of adoption and implementation and included 16-17 items that focused on the program characteristics that the POPS-CAB had identified as important, potential for adoption in the health department and children's healthcare center, and implementation/adaptation possibilities. Each of the rating sheets was adapted for the specific program components (E.g., Golan's model is a parent only intervention, so ratings on child materials was not included) (Appendix Tables 2A-4A). After 30 minutes of discussion the small groups then developed a collective rating of each program. After each small group had reviewed each of the three programs, they met for an additional 30 minutes to identify the top program for each item on the rating sheet domain and identify the program that they considered the 'best' option for testing in the DRR.

### *Qualitative Assessments*

Qualitative data was also collected during the April meeting from each of the small groups during the program rating process described above. First, to facilitate small group discussions, open-ended questions were also included on the rating sheet to allow POPS-CAB member's to record their perceptions about the program. These two questions included, "what do you like most about the program?" and "what would you most like to adapt?". Second, each of the small group discussion periods (i.e., priory to initial group ratings and during rank ordering) were audio-recorded and transcribed verbatim to provide information on the features of the PWM programs that were considered when



generating group ratings and rank orders. Finally, once all small groups had completed the rank order and program selection process the full POPS-CAB discussed the findings to make a decision on the program that would be tested in the DRR. This discussion was also audio-taped and transcribed verbatim to provide information on areas that were discussed that contributed to the final program selection.

### *Analyses*

The quantitative ratings were averaged across the individuals as well as the groups to determine the highest rated program. The ratings of the programs were also averaged across community and academic members. All quantitative data was examined descriptively and compared across programs. Because the sample size is small, inferential statistics was not used to compare if the ratings of programs statistically different. The transcripts from each small group and large group discussion were reduced to meaning units (a word, phrase, or paragraph with a single meaning) and inductively categorized across the areas used to rate each program<sup>40-42</sup>.

## **III. Results**

### *Individual and Small Group Quantitative Ratings*

Individual quantitative ratings of the three programs are provided in Table 2. The highest rated physical activity component, as well as nutrition component, was seen in the Bright Bodies program by the community members with a score of 4.1 (0.7) and 4.3 (0.5), respectively. Bright Bodies was also the program that received the highest score for the balance of physical activity and nutrition, rated 4.3 (0.5) by the academic members and 4.1 (0.4) by the community members. On the other hand, the balance of physical activity was rated the lowest by community members for Family Connections with a score of 2.7 (0.5)

and lowest by the academic members for Traffic Light with a score of 3.8 (0.5). Traffic Light also demonstrated the lowest score by community and academic members in the area of topics ensure a healthy approach to reducing child weight with a score of 3.7 (0.5) by community members and 3.5 (0.6) by academic members. Both community and academic members agreed that the focus on the parents was an appealing part of the program for both Bright Bodies with an individual score of 4.3 (0.6) and for Traffic Light with an individual score of 3.9 (0.7). Bright Bodies Bright Bodies ranked the highest on the individual (T) rating level with an overall average score of 3.9 (0.3), followed by Family Connections, with a score of 3.6 (0.5), and lastly Traffic Light, with a score of 3.4 (0.4). There was a slight difference in the program rating between research members and community members of the POPS-CAB. Both research and community members rated Bright Bodies with the highest score, academic members averaging a score of 3.8 (0.4) and community members averaging a score of 4.0 (0.4). When evaluating Family Connections, academic members (A) scored this program higher than compared to the community (C) members, with overall average scores of 3.7 (0.3) and 3.5 (0.6), respectively. Once again, Traffic Light demonstrated the lowest score amongst both community and academic members, with scores of 3.4 (0.4) and 3.3 (0.6), respectively (Table 2).

*Table 2: Average of Individual Program Rating Scores by Community and Academic Members.*

	Bright Bodies			Family Connections			Traffic Light		
	C	A	T	C	A	T	C	A	T
<b>Program Characteristics</b>									
1. The physical activity component of the program is very good	4.1 (0.7)	3.8 (0.5)	4.0 (0.6)	2.2 (0.4)	3.3 (0.6)	2.5 (0.7)	3.3 (0.8)	3.5 (0.6)	3.4 (0.7)
2. The nutrition component of the program is very good	4.3 (0.5)	4.0 (0.8)	4.2 (0.6)	3.8 (0.4)	4.0 (0.8)	3.9 (0.6)	4.0 (0.0)	3.8 (0.5)	3.9 (0.3)
3. The program balances physical activity and nutrition well	4.1 (0.4)	4.3 (0.5)	4.2 (0.4)	2.7 (0.5)	4.0 (0.8)	3.3 (0.9)	3.4 (0.8)	3.8 (0.5)	3.6 (0.7)

4. The program has a strong focus on changing parenting behaviors that could reduce childhood obesity	4.0 (0.6)	4.3 (0.5)	4.2 (0.4)	4.5 (0.5)	4.3 (0.5)	4.6 (0.5)	3.9 (0.9)	3.5 (1.0)	3.8 (0.8)
5. The program has strategies that will help families stick with their goals.	4.1 (0.4)	4.0 (0.8)	4.0 (0.6)	3.8 (0.4)	4.3 (0.5)	4.1 (0.3)	4.0 (0.0)	3.8 (0.5)	3.9 (0.3)
6. The topics covered ensure a healthy approach to reducing child weight	4.0 (0.6)	4.3 (0.5)	4.1 (0.5)	4.0 (0.6)	4.3 (1.0)	4.1 (0.7)	3.7 (0.5)	3.5 (0.6)	3.6 (0.5)
7. The focus on parents is an appealing part of this program.	4.4 (0.5)	3.8 (1.3)	4.3 (0.6)	3.6 (1.0)	3.5 (1.0)	3.6 (1.0)	3.9 (0.9)	4.3 (0.5)	3.9 (0.7)
<b>Implementation/Adaptation</b>									
8. The types of sessions are practical for our setting (e.g., classes, telephone)	3.2 (0.8)	2.8 (1.0)	3.1 (0.9)	3.7 (0.5)	3.5 (1.3)	3.7 (0.8)	3.3 (1.0)	2.3 (1.0)	2.9 (0.9)
9. The 3 month(or 6 month) program fits well with what we do in our system	3.3 (1.2)	3.5 (0.6)	3.4 (0.8)	4.0 (0.0)	3.5 (0.6)	3.8 (0.4)	3.4 (0.8)	2.8 (0.5)	3.2 (0.9)
10. The educational (or class) sessions could be done with limited adaptation	4.1 (0.4)	3.5 (1.3)	3.9 (0.8)	4.0 (0.0)	4.0 (1.0)	4.0 (0.5)	3.4 (0.8)	3.3 (0.8)	3.2 (0.8)
11. The workbook materials can be used with limited adaptation	4.0 (0.0)	3.8 (1.0)	3.9 (0.5)	4.0 (0.0)	3.8 (1.3)	3.9 (0.7)	2.9 (0.9)	2.0 (0.8)	2.8 (1.2)
12. The physical activity sessions (or telephone scripts) can be used with limited adaptation	3.9 (0.4)	3.0 (1.2)	3.5 (0.8)	4.0 (0.0)	3.8 (1.0)	3.9 (0.5)	N/A	N/A	N/A
<b>Adoption</b>									
13. Overall the program really makes sense	4.3 (0.5)	4.3 (1.2)	4.3 (0.7)	3.0 (0.7)	3.3 (0.5)	3.3 (0.6)	3.6 (0.5)	3.5 (0.6)	3.5 (0.5)
14. This program is intuitively appealing	4.3 (0.4)	3.8 (1.3)	4.1 (0.8)	3.2 (0.8)	3.3 (0.5)	3.0 (0.9)	3.1 (0.7)	3.5 (0.6)	3.3 (0.7)
15. With enough training this program could be used at the Health Department	3.7 (0.5)	4.0 (0.0)	3.8 (0.5)	3.2 (0.8)	3.5 (1.3)	3.4 (0.9)	3.0 (0.8)	3.7 (0.6)	3.3 (0.8)
16. With enough training this program could be used at the Children's Health Center	3.8 (0.4)	4.0 (0.0)	3.9 (0.4)	3.2 (1.0)	3.5 (1.3)	3.4 (1.0)	3.2 (0.8)	3.7 (0.6)	3.4 (0.7)
17. If we chose this program our colleagues would be happy with our selection.	3.6 (0.8)	3.6 (0.6)	3.6 (0.7)	2.8 (0.9)	3.5 (1.0)	3.3 (0.9)	2.8 (0.8)	2.7 (0.6)	2.9 (0.8)
Overall Rating	4.0 (0.4)	3.8 (0.4)	3.9 (0.3)	3.5 (0.6)	3.7 (0.3)	3.6 (0.5)	3.4 (0.4)	3.3 (0.6)	3.4 (0.4)

Table 2 displays the average rating across programs for the academic members (A) and the community members (C) of the team as well as the average of the individual (T) scores. Ratings were based on a 5-point Likert Scale – 1 being “strongly disagree” and 5 being “strongly agree.”

When comparing the three small group ratings, Bright Bodies rated the highest in the program’s balance of physical activity and nutrition, with each group giving the program a 4.0 (0.0). Two out of the three groups gave Family Connections a 5.0, the

highest rating, followed by a 4.0 by the third group, in the area of a strong focus on changing parenting behaviors that could reduce childhood obesity. All groups agreed that each PWM program had strategies that help families stick with their goals demonstrated by a 4.0 (0.0) rating across all groups. Bright Bodies was rated as the most intuitively appealing program with a score of 4.0 (0.0), followed by Traffic Light with a score of 3.3 (0.6), and finally Family Connections with a score of 2.7 (0.6). When comparing an overall group rating score based on the three smaller group discussions, Bright Bodies also rated the highest across all three small groups as the program to be the best fit for the DRR, with an overall average score of 3.8 (0.4). Group 2 rated Bright Bodies the highest with an overall average score of 4.2 (0.6), followed by Group 1 with a score of 3.9 (0.4), and lastly Group 3 with a score of 3.5 (0.6). Family Connections received an overall average group score of 3.5 (0.6) and Traffic Light received the lowest overall average score of 3.4 (0.6) (Table 3).

Table 3: Group Scores and Average Across Groups

	Bright Bodies				Family Connections				Traffic Light			
	G1	G2	G3	Avg	G1	G2	G3	Avg	G1	G2	G3	Avg
<b>Program Characteristics</b>												
1. The physical activity component of the program is very good	4	4	3	3.7 (0.6)	2	3	2	2.3 (0.6)	4	4	3	3.7 (0.6)
2. The nutrition component of the program is very good	4	4	3	3.7 (0.6)	4	4	3	3.7 (0.6)	4	4	4	4.0 (0.0)
3. The program balances physical activity and nutrition well	4	4	4	4.0 (0.0)	2	3	3	2.7 (0.6)	4	4	3	3.7 (0.6)
4. The program has a strong focus on changing parenting	4	4	4	4.0 (0.0)	5	5	4	4.7 (0.6)	3	4	4	3.7 (0.6)

behaviors that could reduce childhood obesity												
5. The program has strategies that will help families stick with their goals.	4	4	4	4.0 (0.0)	4	4	4	4.0 (0.0)	4	4	4	4.0 (0.0)
6. The topics covered ensure a healthy approach to reducing child weight	4	5	4	4.3 (0.6)	3	4	4	3.7 (0.0)	3	4	4	3.7 (0.6)
7. The focus on parents is an appealing part of this program.	4	5	4	4.3 (0.6)	3	4	2	3.0 (1.0)	3	5	4	4.0 (1.0)
<b>Implementation/ Adaptation</b>												
8. The types of sessions are practical for our setting (e.g., classes, telephone)	3	4	2	3.0 (1.0)	4	4	3	3.7 (0.6)	2	3	3	2.7 (0.6)
9. The 6 month (or 3 month) program fits well with what we do in our system	3	3	3	3.0 (0.0)	4	4	4	4.0 (0.0)	3	4	3	3.3 (0.6)
10. The class sessions (or educational sessions) could be done with limited adaptation	4	5	4	4.3 (0.6)	4	4	4	4.0 (0.0)	2	4	4	3.3 (1.2)
11. The workbook materials can be used with limited adaptation	4	5	3	4.0 (1.0)	4	4	3	3.7 (0.6)	2	2	2	2.0 (0.0)
12. The telephone scripts (or physical activity sessions) can be used with limited adaptation	4	4	3	3.7 (0.6)	4	4	4	4.0 (0.0)	N/A	N/A	N/A	N/A
<b>Adoption</b>												
13. Overall the program really makes sense	4	5	4	4.3 (0.6)	3	4	2	3.0 (1.0)	3	4	3	3.3 (0.6)
14. This program is intuitively appealing	4	4	4	4.0 (0.0)	3	3	2	2.7 (0.6)	3	4	3	3.3 (0.6)
15. With enough training this program could be used at the Health Department	4	4		4.00 (0.0)	3	4	4	3.67 (0.6)		4		4.00 (0.0)

16. With enough training this program could be used at the Children's Health Center	4	4	3	3.67 (0.6)	2	4	4	3.33 (1.2)	2	4	4	3.33 (1.2)
17. If we chose this program our colleagues would be happy with our selection.	4	4	4	4.00 (0.0)	2	4	2	2.67 (1.2)	2	3	3	2.67 (0.6)
Overall Rating	3.9 (0.4)	4.2 (0.6)	3.5 (0.6)	3.8 (0.4)	3.3 (0.9)	3.9 (0.5)	3.2 (0.9)	3.5 (0.6)	2.9 (0.8)	3.8 (0.7)	3.4 (0.6)	3.4 (0.6)

*Table 3 displays the rating decided upon in small groups, with representation of both academic and community partners. Also contained in this figure is the average rating of the programs across all three groups. (Group 1 – G1; Group 2 – G2; Group 3 – G3)*

### *Qualitative Assessment of Programs*

An inductive qualitative approach<sup>40-42</sup> was used in order to determine themes of discussion for each of the programs based on the transcriptions from each of the small group discussions. Table 4 below depicts the common themes, separated into positive, negative, and neutral themes, which were identified based on the group discussions. Sample quotes are also provided which give insight into these themes. Beginning with Bright Bodies, there were four main themes of discussion. First, overall, the groups perceived the program in a positive light. Specifically, all groups valued the balance of a healthy eating approach and structured exercise. The groups also valued the focus on a healthy lifestyle change as opposed to a calorie counting methods as well the weekly physical activity sessions to get kids moving. All groups also identified the need for partnerships and resources to implement and sustain the program. Discussions centered on the need for transportation in order to get families to the weekly sessions as well as staff and a building for the physical activity sessions. Lastly, it was also expressed that there would need to be certain adaptations made to the program. These included combining at

least one physical activity sessions per week with the nutrition and behavioral session for a total of two meetings per week instead of three and addressing the health literacy and readability of the program workbooks. Finally, there was some concern for the need of a motivated parent to keep families engaged in the high frequency program meetings.

During the review of Family Connections, there were also four main themes of discussion. First, the groups expressed negative perceptions towards the automated telephone calls. There was a common concern for being able to reach participants by the telephone given previous community partner experience with phone numbers changing on a regular basis as well as phones being disconnected. Community partners were not hopeful that this type of program would work in the given population. Secondly, the groups conveyed concern over the lack of physical activity component that included face-to-face sessions. A third theme of discussion was the parent-only approach. Groups discussed the benefits of using a parents-only approach including the fact that parents are usually the ones responsible for making changes to the home environment as well as training the child in a new lifestyle behavior. However, groups also discussed that this program would require a motivated parent that would attend sessions and complete phone calls in order to teach the child. The groups agreed that to a certain degree, children should be involved in the PWM program. There was an expressed concern that at a certain age, the child should be involved in the program and begin making their own lifestyle decisions. Lastly, overall the groups agreed that this program offered an approach that could be delivered through most organizations. There would only need to be enough staff and space for two weekly sessions, the remainder of the program would be delivered via phone calls and it would most likely be sustainable—with the caveat that sustainability is contingent on if the participants were receptive to this type of program delivery.

The overwhelming topic expressed by the group concerning Traffic Light was the concern for the nutrition plan as well as the lack of balance of physical activity. All groups commented that they did not like the calorie restriction approach for a PWM program. There was also group confusion towards the traffic light approach for classifying foods as red, yellow, or green. This included foods not actually being classified according to their color but according to their nutrient composition as well as the need for both calorie counting and the color system to be used in the same program. There was also little information regarding physical activity and the information that was available involved counting calories burned while exercising, which many expressed as a negative aspect of this program. Some of the other themes discussed by the groups were the need for adaptation of tracking materials and the intensity of the program, as well as the lack of usability of the workbook materials. As also seen with the Bright Bodies program, there was, however, a positive reaction towards the program being focused both on the parent and child.

Table 4: Program Themes and Group Discussion Examples

<b>POSITIVE THEMES</b>
<b>Bright Bodies</b>
<b>Most positive attitude expressed towards this program</b>
<i>"Which program intuitively appealing? I say bright bodies again because of how the book is set up for both parents and children with the pictures."</i>
<b>Enjoyed balance of healthy eating approach &amp; structured exercise</b>
<i>"Well the fact that is incorporates it almost equally."</i>
<i>"Bright bodies had the best balance. It was strong in both."</i>
<i>"Agree, the healthy eating approach which I liked and it looked easy to follow."</i>
<i>"Understanding nutrition and PA, understanding how you function together, how that would impact."</i>
<b>Program focused on both parent &amp; child</b>



<i>"If I was a parent, I would be more encouraged to go through that one with my child. As a result that would probably change my parenting behavior."</i>
<b>Family Connections</b>
<b>Benefits of parents-only approach for certain children</b>
<i>"The first thing that I thought about was younger children and kids aren't involved and if you are working with kids 3-6 this may be most appropriate. Because they won't really be able to comprehend the program."</i>
<i>"I like that it's retraining the parents. And we know that's a big part of it with a child that's obese because they were raised in that environment."</i>
<b>Systems-neutral approach</b>
<i>"I actually strongly agree but only because I was thinking that there was 2 sessions and that seemed practical to me."</i>
<i>"You can have 2 meetings anywhere."</i>
<b>Traffic Light</b>
<b>Program focused on both parent &amp; child</b>
<i>"It is geared to the parents rather than the child, but I'm going to advocate that the children take responsibility."</i>
<i>"I like that...the parent child focus"</i>

<b>NEGATIVE THEMES</b>
<b>Bright Bodies - none noted</b>
<b>Family Connections</b>
<b>Telephone Calls</b>
<i>"One of the disadvantages, a lot of our parents their phone number changes and we can't even call them back the next day with lab results."</i>
<i>"I work with a study now that does calls and it's a struggle to get people to complete them. We have some that are no problem, complete all of them and then there are others who just hang up."</i>
<b>Concern over lack of PA component</b>
<i>"This one appeared to be more suggestion. Whereas the other one, if you came you knew what you were going to do."</i>
<b>Traffic Light</b>
<b>Nutrition plan &amp; lack of PA</b>
<i>"I am curious on calorie restriction. Parents are receptive to that? To start that way?"</i>
<i>"I am worried about intensity of calorie counting and logging that for 6 months. If that is</i>

*the intent, that they are logging and counting for 6 months. Most people don't do it for more than 6 or 7 days. I am worry about that from a burden perspective."*

*"One reason we picked that one was because traffic light, the calorie content, 900-1200, it was so limited."*

*"I could see a person having an obese child being confused by these colors and saying I thought that was a healthy food."*

*"I'm looking at the exercise option, it actually has a calorie burning goal and now just time limits. Much more specific than some we just looked at."*

*"For the PA component, I am confused about even writing down a number. Because I am not sure how people are going to convert that to calories. With height, weight, etc."*

#### **Lack of usability of workbook materials**

*"When thinking about some of these families, I am not sure it will make sense to them."*

### **NEUTRAL THEMES**

#### **Bright Bodies**

#### **Need for partnerships & resources in order to implement**

*"We would have to partner, with something like parks and rec. for the child group we would have to focus on people who live within the city because of transportation issues."*

#### **Need for certain adaptations to PA program, health literacy, etc.**

*"I think it [PA] would be ok if it were a little more structured. Such as week 1 this is what they will be doing. So at the end of the 12 weeks we know where the kids are going to be."*

*"I just wonder the challenge of that age group understanding some of this material. But I don't really know. (RE: 3rd grader- 8 yr old)"*

*"Just being concerned about what kind of parents are we dealing with, what is their reading level. We feel like even bright bodies would have to be modified, but that was the best."*

#### **Family Connections - none noted**

#### **Traffic Light**

#### **Adaptation of tracking materials & intensity of program**

*"So what do you think? I think they are a little technical."*

*"Best as ensuring healthy approach to reduce child weight? I don't think that traffic light was it. It was too ruley."*

### *Selection of the “best” program*

After a review of the individual programs, the groups were asked to compare their ratings against all three programs and determine a “best” program (Table 5). From the 16 items sought for in a PWM program, at least two out of the three groups ranked Bright Bodies as the best in 9 out of the 16 items. Family Connections was ranked the best by two out of three small groups in the single category of colleagues would be happiest if we selected this program. Traffic Light was only ranked best by Group 3 in the area of the nutrition component, but was not present in any other areas. In 2 out of the 16 items, including length of the program and program delivery within the Children’s Healthcare Center, each group chose a different program. Two of the three groups said no program was best in the three areas, including the focus on changing parenting behaviors that could reduce childhood obesity, sessions could be done with limited adaptation, and program delivery within the Health Department.

*Table 5: Selection of “Best” Program*

	<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>
<b>Program Characteristics</b>			
Physical activity component	BB	No Best	BB
Nutrition component	BB	BB	TL
Balance of physical activity and nutrition	BB	BB	BB
Focus on changing parenting behaviors that could reduce childhood obesity	BB	No Best	No Best
Strategies that will help families stick with their goals.	BB	BB	BB
Ensures a healthy approach to reducing child weight	No Best	BB	BB
The parents / children focus	BB	FC	BB
<b>Implementation/Adaptation</b>			
The types of sessions are practical for our settings	No Best	FC	No Best
The length of the program	No Best	FC	BB
Sessions could be done with limited adaptation	No Best	No Best	FC

Workbook and other materials can be used with limited adaptation	BB	No Best	BB
<b>Adoption</b>			
Which program makes the most sense?	BB	FC	BB
Which program is most intuitively appealing?	BB	FC	BB
With enough training which program could be best used at the Health Department?	No Best	No Best	BB
With enough training which program could be best used at the Children's Health center?	No Best	FC	BB
Which program would our colleagues be happiest about if we selected it?	FC	FC	BB

Table 5 displays the results of groups' decision on the "best" program that displays each of the given components of an effective childhood obesity program.

Note: BB=Bright Bodies; FC=Family Connections; TL=Traffic Light

During the small group discussion of the "best" program for the DRR, four themes that emerged in the initial program rating discussions were reinforced. First, it was important for the program to have a balance of nutrition and physical activity. All groups saw the presence of a structured exercise program along with the nutrition and behavioral sessions as a benefit. Second, there was a strong dislike for calorie counting. Groups wanted the chosen program to emphasize a healthy eating approach. Third, there was a desire for the program to target both the parent and the child in order to work towards a family lifestyle change. Fourth was the practicality and usability of the program in the target setting.

No new themes emerged in the large group discussion of the group rank ordering of the programs. The focus of the discussion was primarily on distinguishing between Bright Bodies and Family Connections. Ultimately, the POPS-CAB reached consensus that an adaptation of Bright Bodies would be the best fit for the DRR.

#### **IV. Discussion**

The initial objective of the POPS-CAB was to select an evidence-based program for translation into community practice within the DRR. In the process of selecting between a number of evidence-based programs it was evident that representatives from community organizations have strong perceptions of the type of programs that will or will not work with their populations. It may be surprising that Family Connections, was not more appealing for adoption by the DRR based on the limited amount of resources needed, the ease of delivery, and the options for sustainability. This program only requires two in-person meetings and the rest of the intervention is delivered via an automated Interactive Voice Response (IVR) system, which delivers at least ten phone calls to the participant. When considering all three evidence-based programs, Family Connections is the least intensive and could be easily sustained by Danville healthcare, public health, and community organizations, while still demonstrating success at reducing childhood obesity.

The POPS-CAB to choose to adapt and implement the most intensive of the three programs. While this program does require a numerous amount of resources to operate, Bright Bodies appeared to be the program that would receive the best response and obtain the greatest reach from participants the POPS-CAB would be trying to recruit in the future. It meets many of the recommendations for a PWM program based on suggestions from the AAP<sup>39</sup> (Appendix Table 1A) and the POPS-CAB found appeal in the balance of healthy eating and physical activity, structure of physical activity classes, workbook materials, and the focus on both the parent and the child. In light of the community organizations that were involved in the process and the resources available across partners within the POPS-CAB, Bright Bodies was seen as a challenging but realistic program that could be implemented if all partners were willing to contribute some resources to the initiative (e.g., space and

exercise leadership from Parks & Rec and the Boys & Girls club; participant identification and recruitment from the Children's healthcare center and department of health; and nursing expertise to deliver behavioral and nutrition sessions for parents and children.

The Traffic Light Diet was the program that received the least amount of interest. While there was a positive reaction towards the program focusing on both the parent and the child, the program contents contained little information in regards to physical activity and the workbook materials were not user friendly. One of the most discussed themes was the concern for the nutrition plan. Many of the POPS-CAB members did not like the idea of a calorie restriction approach, especially for children. Both Bright Bodies and Family Connections included lessons on calorie counting, but the main nutrition focus remained on a healthy eating approach. Many health and community professionals understand that in order to lose weight, an individual must burn more calories than he or she is taking in, also known as the energy balance equation. However, in order for an individual to fully understand this equation, it is crucial to understand calories. The importance of teaching about calories was noted, but calorie restriction was seen as a negative aspect of the program.

This work highlights the importance of using a systems-based approach and engaging key members from the community organizations and public health departments<sup>27,43</sup> when selecting an evidence-based program for adoption. The research members of the POPS-CAB were able to provide their expertise in the areas of selecting evidence-based programs and narrowing the search from seven to three programs in order to provide the POPS-CAB with a more manageable number for review. In return, the community members were able to offer their expertise on the availability of their resources, predict the acceptance of the program details by their community, as well as help identify

the potential target population who would benefit from this program. These members are critical when it comes to assessing and developing a contextually relevant and sustainable intervention.

The ultimate goal of this project is to develop a childhood obesity prevention program that has broad reach, is effective, feasible, sustainable, and minimal cost. After implementation of the adapted program, the POPS-CAB will have the opportunity to review the results from the initial program delivery. At this point they will reevaluate if this program continues to be the best fit for the DRR community and make any additional adaptations as necessary.

### *Limitations*

Our project is limited to a local community advisory board and may not be generalizable to other communities or to advisory boards with different compositions. However, this limitation is balanced with the having representatives from each organization that could ultimately be involved in the delivery of the program and a representative with decision making authority related to resources available for the program. Finally, the iterative process of rating programs individually and then with input from other community and academic partners allowed for in depth consideration of each program. Another limitation of this project included the lack of statistical comparisons across community and academic members of the POPS-CAB. However, the data provided through the individual and group ratings help to provide context for the small group discussion and decision making process by the POPS-CAB.

## **V. Conclusion**

In summary, after presentation and review of three evidence-based PWM programs, Bright Bodies proved to be the most appealing intervention for the DRR by the POPS-CAB, even though this program represented the most intensive of the three programs. The hypothesized program for selection chosen by the researchers was not the program selected by the community members of the POPS-CAB. The community representatives were able to communicate the needs of the community, its resources, and its representative population who may be involved in this program.



## References

1. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA : the journal of the American Medical Association*. Apr 5 2006;295(13):1549-1555.
2. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Prevalence of high body mass index in US children and adolescents, 2007-2008. *JAMA : the journal of the American Medical Association*. Jan 20 2010;303(3):242-249.
3. Reilly JJ, Methven E, McDowell ZC, et al. Health consequences of obesity. *Archives of disease in childhood*. Sep 2003;88(9):748-752.
4. *Virginia Health Statistics 2008 Annual Report* Virginia Department of Health Division of Health Statistics;2008.
5. U.S. Census Bureau State & County 2008; <http://quickfacts.census.gov>. Accessed April 2010.
6. Regional and State Unemployment. *U.S. Department of Labor* 2011. Accessed May 2011
7. State and Regional Obesity Data: Centers for Disease Control and Prevention (CDC) *US Department of Health and Human Services* 2008; <http://apps.nccd.cdc.gov/BRFFS>. Accessed April 2010.
8. Zoellner J, Motley M, Wilkinson ME, Jackman B, Barlow ML, Hill JL. Engaging the Dan River Region to reduce obesity: application of the Comprehensive Participatory Planning and Evaluation process. *Family & community health*. Jan-Mar 2012;35(1):44-56.
9. Dan River Region Partnership for a Health Community *Healthy Choices, Healthy Future* <http://www.drhealthycommunity.org/>. Accessed October 2013.
10. Estabrooks P, Zoellner J. Dan River Region: Partnering for Obesity Planning & Sustainability (POPS): National Institutes of Health National Institute for Minority Health and Health Disparities 2009.
11. Epstein LH, Wing RR, Koeske R, Valoski A. Long-term effects of family-based treatment of childhood obesity. *Journal of consulting and clinical psychology*. Feb 1987;55(1):91-95.
12. Epstein LH, Wing, R., Penner, B.C., Kress, M.J., Koeske, R. Effects of Family-Based Behavioral Treatment on Obese 5-to-8 Year-Old Children. *Behavior Therapy*. 1985(16):205-212.
13. Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. *Am J Clin Nutr*. Jun 1998;67(6):1130-1135.
14. Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res*. Feb 2004;12(2):357-361.
15. Savoye M, Nowicka P, Shaw M, et al. Long-term results of an obesity program in an ethnically diverse pediatric population. *Pediatrics*. Mar 2011;127(3):402-410.
16. Epstein LH, Wing RR, Koeske R, Andrasik F, Ossip DJ. Child and parent weight loss in family-based behavior modification programs. *Journal of consulting and clinical psychology*. Oct 1981;49(5):674-685.
17. Golan M, Kaufman V, Shahar DR. Childhood obesity treatment: targeting parents exclusively v. parents and children. *Br J Nutr*. May 2006;95(5):1008-1015.
18. Reinehr T, Andler W. Thyroid hormones before and after weight loss in obesity. *Archives of disease in childhood*. Oct 2002;87(4):320-323.

19. Reinehr T, Brylak K, Alexy U, Kersting M, Andler W. Predictors to success in outpatient training in obese children and adolescents. *International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity*. Sep 2003;27(9):1087-1092.
20. Savoye M, Shaw M, Dziura J, et al. Effects of a weight management program on body composition and metabolic parameters in overweight children: a randomized controlled trial. *JAMA : the journal of the American Medical Association*. Jun 27 2007;297(24):2697-2704.
21. Sothorn MS, Hunter S, Suskind RM, Brown R, Udall JN, Jr., Blecker U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *South Med J*. Jun 1999;92(6):577-584.
22. Slusser W, Staten K, Stephens K, et al. Payment for obesity services: examples and recommendations for stage 3 comprehensive multidisciplinary intervention programs for children and adolescents. *Pediatrics*. Sep 2011;128 Suppl 2:S78-85.
23. Estabrooks PA, Smith-Ray RL. Piloting a behavioral intervention delivered through interactive voice response telephone messages to promote weight loss in a pre-diabetic population. *Patient education and counseling*. Jul 2008;72(1):34-41.
24. Estabrooks PA, Glasgow RE. Translating effective clinic-based physical activity interventions into practice. *American journal of preventive medicine*. Oct 2006;31(4 Suppl):S45-56.
25. Glasgow RE, Klesges LM, Dzewaltowski DA, Estabrooks PA, Vogt TM. Evaluating the impact of health promotion programs: using the RE-AIM framework to form summary measures for decision making involving complex issues. *Health education research*. Oct 2006;21(5):688-694.
26. Best A. *NCIC Working Group on Translational Research and Knowledge Integration*. . Toronto: National Cancer Institute of Canada 2005.
27. Maclean LM, Clinton K, Edwards N, et al. Unpacking vertical and horizontal integration: childhood overweight/obesity programs and planning, a Canadian perspective. *Implementation science : IS*. 2010;5:36.
28. Estabrooks PA, Shoup JA, Gattshall M, Dandamudi P, Shetterly S, Xu S. Automated telephone counseling for parents of overweight children: a randomized controlled trial. *American journal of preventive medicine*. Jan 2009;36(1):35-42.
29. Kaiser Permanente <http://www.etpcolorado.org>. Accessed January 2014.
30. Pomietto M, Docter AD, Van Borkulo N, Alfonsi L, Krieger J, Liu LL. Small steps to health: building sustainable partnerships in pediatric obesity care. *Pediatrics*. Jun 2009;123 Suppl 5:S308-316.
31. Minkler M, Vasquez VB, Tajik M, Petersen D. Promoting environmental justice through community-based participatory research: the role of community and partnership capacity. *Health education & behavior : the official publication of the Society for Public Health Education*. Feb 2008;35(1):119-137.
32. Israel B, Eng E, Schulz A, Parker E. *Methods in Community-Based Participatory Research for Health* San Francisco: Jossey-Bass; 2005.
33. Wallerstein N, Duran B. Using Community-Based Participatory Research to Address Health Disparities *Health Promot Pract*. 2006;7(312):311-323.
34. Using What Works: Adapting Evidence-Based Programs to Fit Your Needs *National Cancer Institute* <http://cancercontrol.cancer.gov>. Accessed October 2013.

35. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health*. Sep 1999;89(9):1322-1327.
36. Glasgow RE, Lichtenstein E, Marcus AC. Why don't we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. *American journal of public health*. Aug 2003;93(8):1261-1267.
37. Glasgow RE, Goldstein MG, Ockene JK, Pronk NP. Translating what we have learned into practice. Principles and hypotheses for interventions addressing multiple behaviors in primary care. *American journal of preventive medicine*. Aug 2004;27(2 Suppl):88-101.
38. Kessler RS, Purcell EP, Glasgow RE, Klesges LM, Benkeser RM, Peek CJ. What Does It Mean to "Employ" the RE-AIM Model? *Eval Health Prof*. May 21 2012.
39. Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. Dec 2007;120 Suppl 4:S164-192.
40. Elo S, Kyngas H. The qualitative content analysis process. *Journal of advanced nursing*. Apr 2008;62(1):107-115.
41. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse education today*. Feb 2004;24(2):105-112.
42. Downey SM, Wages J, Jackson SF, Estabrooks PA. Adoption decisions and implementation of a community-based physical activity program: a mixed methods study. *Health promotion practice*. Mar 2012;13(2):175-182.
43. Strolla LO, Gans KM, Risica PM. Using qualitative and quantitative formative research to develop tailored nutrition intervention materials for a diverse low-income audience. *Health education research*. Aug 2006;21(4):465-476.

## Appendix

Table 1A: Program Components as based on American Academy of Pediatrics Recommendations.

<b>American Academy of Pediatrics Recommendations</b>	<b>Bright Bodies</b>	<b>Family Connections</b>	<b>Traffic Light</b>
Program should include, at minimum, food monitoring, short-term diet & PA goal setting & contingency management	Program topics include motivational assessment, food & activity recording, meal planning, eat right & exercise, & staying on track	Program topics include healthy habits for healthy families, changes to home environment, helpful parenting skills, self-monitoring, & FITT principle	Program topics include recommended calorie ranges, self-monitoring, setting a good example, praise & rewards, exercise, & maintenance
Negative energy balance resulting from structured dietary and PA changes is planned	Nutrition plan teaches about calories, but focus is on a healthy lifestyle approach	Nutrition plan teaches about calories, but focus is on a healthy lifestyle approach	Nutrition plan & PA focused on calorie restriction & calories <u>burdened</u> .
Parental participation in behavior modification techniques is needed for children	Parents attend their own behavior modification session focused on how to help their children, handling difficult & situations, identifying triggers	Parents attend their own behavior modification sessions focused on changing parenting behaviors, action planning, & barriers & strategies	Parents attend their own behavior modification sessions focused on modeling behaviors, setting boundaries, using appropriate rewards, & creating a supportive structure
Parents should be trained regarding improvement of the home environment	Environmental engineering techniques	Home environment quizzes & assessments	Home environment assessments & action plans
Systematic evaluation of body measurements, diet, and PA should be performed at baseline and at specified intervals throughout the program	Weight, height, BMI, body fat percentage, food & PA records measured at baseline & end of treatment	Weight, height, BMI, body fat percentage, food & PA records measured at baseline & end of treatment	Weight, height, BMI, body fat percentage, food & PA records measured at baseline & end of treatment
Multidisciplinary team with experience in childhood obesity	Registered Dietitian, Exercise Physiologist, & Social Worker	Registered Dietitian & Behavioral Therapist	Physician, Registered Dietitian, Behavioral Therapist
Frequent office visits should be scheduled; weekly for a minimum of 8-12 weeks followed by monthly visits	Weekly nutrition/behavior modification sessions & twice weekly child structured PA sessions for 12 weekly sessions	2 in-person sessions for parents with remainder of intervention delivered via 8-10 automated telephone calls	16 weekly sessions focused on nutrition, behavior, & PA followed by 2 biweekly, & 2 monthly sessions
Group visits may be more cost-effective and have therapeutic benefit	Weekly nutrition & PA sessions conducted in group format	2 in-person parent sessions conducted in group format	Weekly/monthly sessions conducted in group format; parents & children seen separately

*Stage 3: AAP Comprehensive Multidisciplinary Intervention Recommendations*

Notes: PA = physical activity; BMI = Body Mass Index

Table 2A: Program Rating Evaluation Sheet-Family Connections

Program Characteristics
1. The physical activity component of the program is very good
2. The nutrition component of the program is very good
3. The program balances physical activity and nutrition well.
4. The program has a strong focus on changing parenting behaviors that could reduce childhood obesity
5. The program has strategies that will help families stick with their goals.
6. The topics covered ensure a healthy approach to reducing child weight
7. The focus on parents is an appealing part of this program.
Implementation/Adaptation
8. The types of sessions are practical for our setting (e.g., classes, telephone)
9. The 6 month program fits well with what we do in our system
10. The class sessions could be done with limited adaptation
11. The workbook materials can be used with limited adaptation
12. The telephone scripts can be used with limited adaptation
Adoption
13. Overall the program really makes sense.
14. This program is intuitively appealing
15. With enough training this program could be used at the Health Department
16. With enough training this program could be used at the Children's Health center
17. If we chose this program our colleagues would be happy with our selection.

Table 3A: Program Rating Evaluation Sheet-Traffic Light

Program Characteristics
1. The physical activity component of the program is very good
2. The nutrition component of the program is very good
3. The program balances physical activity and nutrition well.
4. The program has a strong focus on changing parenting behaviors that could reduce childhood obesity
5. The program has strategies that will help families stick with their goals.
6. The topics covered ensure a healthy approach to reducing child weight
7. The focus on parents is an appealing part of this program.
Implementation/Adaptation
8. The types of sessions are practical for our setting (e.g., weekly meetings)
9. The 6 month program fits well with what we do in our system
10. The weekly meetings could be done with limited adaptation
11. The workbook materials can be used with limited adaptation
Adoption
12. Overall the program really makes sense.
13. This program is intuitively appealing
14. With enough training this program could be used at the Health Department
15. With enough training this program could be used at the Children's Health center
16. If we chose this program our colleagues would be happy with our selection.

Table 4A: Program Rating Evaluation Sheet-Bright Bodies

Program Characteristics
1. The physical activity component of the program is very good
2. The nutrition component of the program is very good
3. The program balances physical activity and nutrition well.
4. The program has a strong focus on changing parenting behaviors that could reduce childhood obesity
5. The program has strategies that will help families stick with their goals.
6. The topics covered ensure a healthy approach to reducing child weight
7. The focus on parents is an appealing part of this program.
Implementation/Adaptation
8. The types of sessions are practical for our setting (e.g., classes, exercise sessions)
9. The 3 month program fits well with what we do in our system
10. The educational meetings could be done with limited adaptation
11. The workbook materials can be used with limited adaptation
12. The physical activity sessions can be used with limited adaptation
Adoption
13. Overall the program really makes sense.
14. This program is intuitively appealing
15. With enough training this program could be used at the Health Department
16. With enough training this program could be used at the Children's Health center
17. If we chose this program our colleagues would be happy with our selection.