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Original Research

Process Evaluation of the Living Green, Healthy and Thrifty (LiGHT) Web-Based Child Obesity Management Program: Combining Health Promotion with Ecology and Economy

Maria Jogova BSc [a,d], Joshua Eun-Soo Song BSc [a,d], Audrey Clare Campbell MD, MHSc, FRCPC [a], Darren Warbuton PhD [b], Tom Warshawski MD, FRCPC [c], Jean-Pierre Chanoine MD, PhD [a,c,*]

[a] *Endocrinology and Diabetes Unit, British Columbia's Children's Hospital and University of British Columbia, Vancouver, British Columbia, Canada*
[b] *Cardiovascular Physiology and Rehabilitation Laboratory, Physical Activity Promotion and Chronic Disease Prevention Unit, Experimental Medicine Program, University of British Columbia, Vancouver, British Columbia, Canada*
[c] *Childhood Obesity Foundation, Robert H.N. Ho Research Centre, Vancouver, British Columbia, Canada*

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ABSTRACT

Objective: To conduct a process evaluation of the Living Green, Healthy and Thrifty (LiGHT) program, a novel virtual child obesity management program that combines health promotion with ecology and economy (Phase 1).
Methods: We carried out a mixed methods process evaluation involving qualitative and quantitative data collection in 3 phases: among 3 child–parent units, (group 1) that informed program development; 9 child–parent units (group 2) that tested the draft program and further aided program refinement; and 17 child–parent units (group 3) for a 4-week pilot of the program. In the program pilot, we assessed participants' knowledge and readiness to change pre- and postintervention and explored perceptions of the program.
Results: Participants generally felt that the online format for program delivery was convenient and accessible, the content was practical, and the integration of health-environment-economy was well received. Many parents also appreciated the involvement of the family. However, the lack of visual appeal and overabundance of text was identified as a challenge, and children/youth in particular requested assurance that their personal information (e.g. weight) was not seen by their parents. The online method of program delivery holds the unique challenge of requiring special efforts to create a sense of personal connection and community. The presence of a "Way-finder" to assist participants and discussion boards/forums are potential solutions.
Conclusion: The LiGHT online weight management program offers an accessible, convenient weight management resource that children and families appreciate for its availability, broader educational scope, and practicality. Outcome evaluation of LiGHT will be carried out in Phase 2 of the project.
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Mots clés:
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prise en charge du poids

RÉSUMÉ

Objectif : Procéder à une évaluation des processus du programme Living Green, Healthy and Thrifty (LiGHT), un nouveau programme de prise en charge virtuelle de l'obésité chez les enfants qui combine la promotion de la santé à l'écologie et l'économie (phase 1).
Méthodes : Nous avons réalisé une évaluation des processus par méthodes mixtes comportant la cueillette de données qualitatives et quantitatives en 3 phases de 3 couples parent-enfant (groupe 1) qui ont servi à l'élaboration du programme, 9 couples parent-enfant (groupe 2) qui ont testé l'avant-projet du programme et ont aussi aidé aux raffinements du programme, et 17 couples parent-enfant (groupe 3) qui ont participé à l'étude pilote du programme de 4 semaines. Dans le programme pilote, nous avons évalué la connaissance et la bonne volonté des participants à changer en préintervention et en postintervention, et exploré la perception qu'ils ont du programme.

* Address for correspondence: Jean-Pierre Chanoine, MD, PhD, Endocrinology and Diabetes Unit, Room K4-213, British Columbia's Children's Hospital, 4480 Oak Street, Vancouver, BC, V6H 3V4, Canada.
E-mail address: jchanoine@cw.bc.ca (J.-P. Chanoine).
[d] These authors contributed equally to this work.

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Résultats : Les participants ont généralement considéré que la version en ligne de l'exécution du programme était convenable et accessible, que le contenu était pratique; et l'intégration santé-environnement-économie était bien accueillie. Plusieurs parents ont également apprécié la participation de la famille. Cependant, le manque d'attrait visuel et la surabondance de textes ont été considérés comme problématiques, et les enfants et les adolescents en particulier ont demandé à ce que leurs informations personnelles (p. ex. le poids) ne soient pas vues par leurs parents. La méthode en ligne de l'exécution du programme comporte comme seul défi l'exigence d'efforts particuliers pour donner un sens à l'expérience personnelle et à la communauté. La présence du « Way-finder » pour aider les participants, les babillards et les forums de discussion sont des solutions potentielles.
Conclusion : Le programme de prise en charge du poids en ligne LiGHT constitue une ressource de prise en charge du poids convenable et accessible dont la disponibilité, la plus vaste portée éducative et le côté pratique sont appréciés par les enfants et les familles. L'évaluation des résultats du LiGHT sera réalisée à la phase 2 du projet.

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Introduction

Childhood obesity is a serious public health challenge (1). The 2009–2011 Canadian Health Measures Survey (CHMS) revealed that approximately one third of children and adolescents are overweight (19.8%) or obese (11.7%) (2). Childhood obesity is associated with an increased risk of adult obesity, and obesity-related comorbidities such as type 2 diabetes mellitus can be seen in obese children and adolescents (3–5). Childhood obesity is difficult to treat once established (5). Therefore, in addition to population-level preventive interventions, there is an urgent need for locally available, comprehensive and effective pediatric weight management programs.

However, a recent environmental scan carried out in British Columbia (BC) revealed that there were few opportunities for pediatric weight management in the province. BC has a population of over 4 million people, scattered in a vast area of more than 9 million square kilometers that includes many small communities (6). Half of the population lives within and around the city of Vancouver (Greater Vancouver) (6), yet the only comprehensive and multidisciplinary obesity management program for children is located at BC Children's Hospital in Vancouver; this program sees about 150 families per year (7). Thus, large segments of the BC population do not have access to a pediatric weight management program.

In addition, retention is a common problem faced by pediatric weight management programs. For instance, in a large community-based program that included 129 centers in Germany, outcomes could only be measured in 8% of the participants after 2 years (8). The drop out rate in most programs is high, possibly reflecting that these programs do not adequately motivate participating children and families (9).

To improve access and retention, we have developed the Living Green, Healthy and Thrifty (LiGHT) program. First, LiGHT is web-based, meaning that it will be accessible to obese children/youth and their families in BC, irrespective of geographic location. Several on-line adult (11) and pediatric (12,13) weight management programs have been developed and have shown promising results. Second, LiGHT aims to promote program retention by emphasizing the effect of the obesogenic environment in which we live (a physical and social environment that encourages energy consumption and discourages energy expenditure) not only on health but also on the global environment (e.g. increased use of cars, food processing and packaging) and on the finances of families (e.g. cost of car commuting and take-out meals). This novel approach would be more attractive than that of existing programs and would lead to improved outcomes. To our knowledge, no web-based program that combines health promotion with global environment and economy has been released, although a pediatric weight management program that includes an environmental component is in a development phase in the Netherlands (14).

This article describes the first 4 steps of this project (Phase 1, development and process evaluation) (Fig. 1): curriculum development (step 1); integration of the program in a web-based format (step 2); emphasis on the relationship between obesity and health, environment and finances (step 3); and acceptance of the program by youth and families (step 4). Phase 2 (implementation and evaluation) will focus on large-scale implementation and evaluation of the program and is expected to be completed in 2014.

Methods

The LiGHT program was developed between March 2011 and October 2012. It is designed for children age 10–17 years with the support of their parents. It is primarily web-based (15) but also includes direct interaction through phone and e-mail with a "Way-finder", an exercise specialist trained in the area of child weight management to promote adherence to the goals and prevent drop out from the program. The Way-finder discusses the child's goals, explores barriers and enabling factors for goal attainment with the family, and offers suggestions and resources where needed. During 3 separate occasions, input was sought from children and their families to provide feedback on specific aspects of the program.

The study was approved by the University of British Columbia Research Ethics Board. Informed consent and assent were obtained from parents/guardians and their children, respectively.

Intervention

Figure 2 describes the overall flow of the program. Participants first do a preliminary assessment of their behaviour in 11 areas that include physical activity factors (active transportation to and from school, engaging in regular physical activity); nutrition factors (eating breakfast, fruit and vegetable consumption, sugar-sweetened beverages consumption, eating meals at home with family, and eating-out in restaurants/take-out food that includes consideration of portion sizes); and behavioral factors ("screen time," watching and responding to advertisements, sleep and artificial temperature regulation). The participants are then provided with online feedback about areas that they are doing well in, and areas that need improvement. They are then asked to select the areas they want to work on. Each area is designed to be covered over 4 weeks, and participants can simultaneously work on up to 3 areas. Within each module, participants are provided with information about the health, environment and economic impact of each lifestyle factor, are asked to select 1 goal from a list of 2 or 3 goal options relevant to the area, and are requested to contact the Way-finder. There are opportunities for interactive activities designed to enhance understanding within each module, and a short electronic message that includes facts or tips about the

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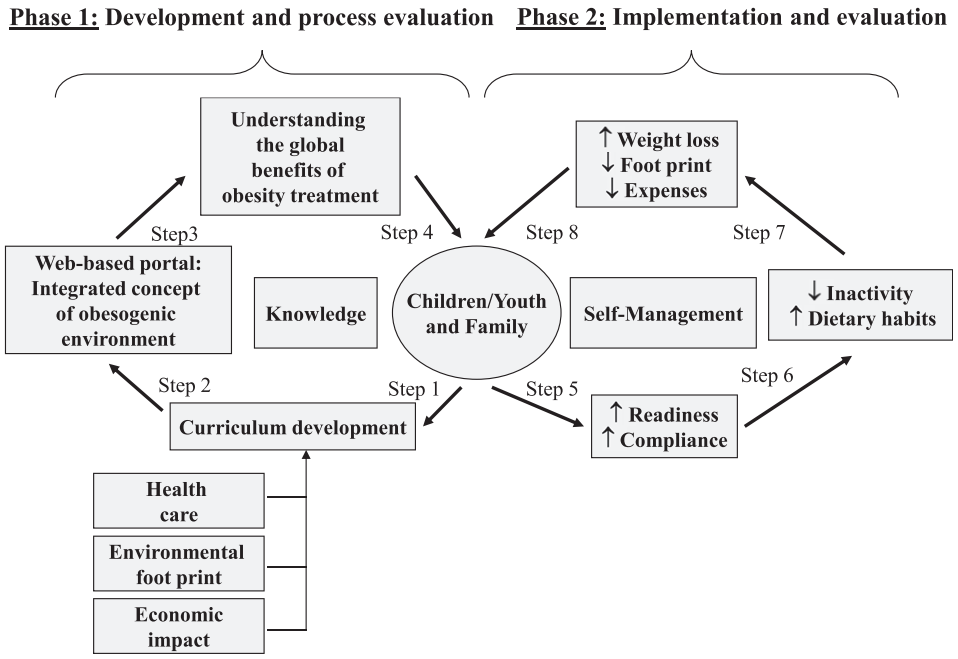

Figure 1. Schematic description of Phase 1 (development and process evaluation) and Phase 2 (implementation and outcome evaluation) of the LiGHT program.

section is sent to the participants on a daily basis for a 4-week period.

The 11 topics of the curriculum were chosen on the basis of their relevance to obesity treatment in children and adolescents, and were derived from literature review and expert opinion (TW and JPC). The environmental and financial aspects within each topic were researched by experts in environmental health (Dr. Michael Brauer, University of British Columbia [UBC]), economics (Dr. Craig Mitton, UBC) and physical activity (DW). The draft curriculum was reviewed by a curriculum development expert who formatted the material to ensure that it was engaging and understandable for children and youth (written at a grade 5 level), and an editor with a background in Early Childhood Education (ECE) and English as a Second Language (ESL) instruction. Multisectoral partners included the Childhood Obesity Foundation (www.childhoodobesityfoundation.ca), S.U.C.C.E.S.S. (social service agency providing settlement services for new immigrants, English as a second language training, employment counselling, affordable housing assistance, community development, etc.) (www.successbc.ca) and the YMCA (www.vanymca.org). A web development firm incorporated it into an online program.

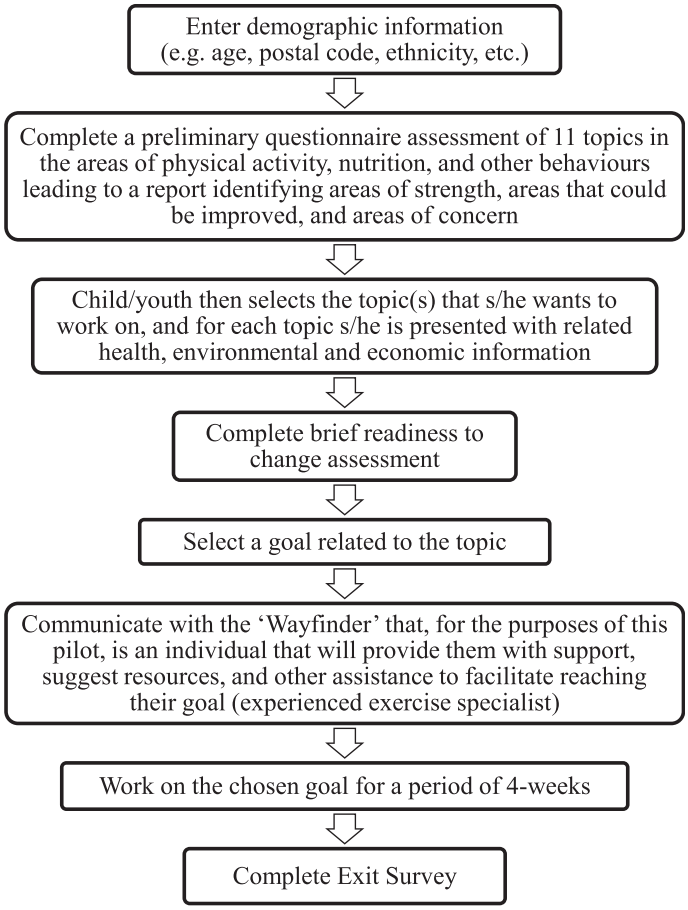

Figure 2. Pilot LiGHT program flow.

The program was designed such that parents and children log in separately and to ensure that the child's information remains private. Parents simultaneously complete a parent version of the LiGHT program and are encouraged to talk to their child about their goals and how they can offer support. Although the parent and child paths are distinct from each other, each family is linked by a common selected "family name," which permitted the LiGHT team to identify who were members of each family.

To better describe how the health, environment and economic information is provided, a complete version of one of the modules ("Getting to school") is available (see Supplementary Material). The web-based design can be accessed online (15).

Participants

Qualitative data collection to inform program development was obtained during 2 occasions (groups 1 and 2), before conducting a 4-week pilot involving quantitative data collection and written qualitative assessments (group 3).

Group 1

While program planning was still underway, we sought early input from a convenience sample of three overweight or obese children age 10–17 years, each accompanied by a parent. Children

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and their families that expressed an interest in participating were invited to attend a one-to-one interview with a member of the research team (ACC) at BC Children's Hospital in July and August 2011. Parking expenses were reimbursed.

Group 2

Once the draft LiGHT program had been developed, we sought 10 families who would participate in a 2-hour qualitative assessment of the LiGHT program using computers located at BC Children's Hospital in February 2012. We recruited participants from both the Greater Vancouver area (largely urban and suburban areas) and Revelstoke (a rural area in BC) through posters placed in BC Children's Hospital and community centers, and notices in community newspapers. Ten families agreed to participate; 1 family discontinued participation (reason was not given), and 1 additional family that did not own a vehicle participated using their home computer. Each family unit had to consist of a child aged 10–17 and at least 1 parent/guardian. Participating child–parent units were provided $50 and parking and mileage were reimbursed.

Group 3

Using similar recruitment strategies as were used for group 2, we recruited 20 families to pilot test the LiGHT program over a 4-week period in February-March 2012. Nine families that had participated in group 2 also chose to participate in group 3, along with 11 new families. Twenty children began the 4-week pilot program on their home computer, and 17 completed it. Families that completed the 4-week pilot, encompassing a time commitment of approximately 1–3 hours/day, most days of the week, were compensated $100/week.

Data collection and evaluation

This mixed methods process evaluation involved qualitative and quantitative data collection in 3 phases: interviews (group 1), focus group (group 2) and pilot (group 3).

Group 1

The following topics were explored during a semi-structured one-to-one interview: 1) how children like to learn; 2) what they like to learn about; 3) websites they have seen that interested them, what they liked about these sites, and what encouraged them to stay on one page longer than another; and 4) what they would recommend to improve the success of the LiGHT program. Interviews were tape-recorded and analyzed, and then feedback was immediately provided to the program development team to inform the ongoing development of the LiGHT program.

Group 2

During a 2-hour focus group, participants were logged into the LiGHT program and asked to review sections of the program and offer feedback. Open-ended questions were used to prompt discussion in the following areas: user-friendliness of the program in general and data entry process in particular; language level; perceived facilitators and barriers to lifestyle changes; general impressions of the program; and thoughts about what should be modified for the future. Responses were tape-recorded and transcribed verbatim by a research assistant. This information was analyzed and used to make further revisions to the program before the pilot. Tips for achieving success in the program along with program support for families were developed following this focus group.

Group 3

During the pilot, pre- and postintervention multiple-choice surveys assessing participants' knowledge in health, environment, and financial domains, as well as readiness to change, were conducted. The impact of the LiGHT program was also reviewed in an exit survey that consisted of open-ended questions relating to program evaluation, feedback, commitment to the program, and barriers to success. Both the transcript and written documentation from the pilot were analyzed by 2 research assistants.

Statistical methods and analysis

Child and parent scores from pre- and postintervention knowledge surveys were evaluated by calculating means and 95% confidence intervals (CI) for health, environment, economy and total scores. Discrete variables are presented as counts and percentages. Analysis of field notes and recordings from the three interviews in group 1 was conducted by a single reviewer, and involved familiarization of the data and general abstraction of themes. The analysis of qualitative data transcripts from the focus group and pilot involved familiarization of the data, followed by coding conducted independently by 2 research assistants. Each reviewer generated a list of themes and subcategories with supporting quotations. The reviewers compared their coding schemes and consensus was reached on any areas of disagreement.

Results

Characteristics of child participants in group 1 (interviews), group 2 (focus group) and group 3 (pilot) are presented in Table 1. Parents were involved in all phases; 3 parents participated in the interview, 8 in the focus group plus an additional parent working with her child to participate from home, and 15 in the pilot program.

Group 1

Themes that arose from the one-on-one interviews are presented in Table 2. These include the importance of electronic follow-up communication, site legitimacy and security, child and youth engagement, the importance of creating a sense of community, goal setting, and the need for culturally relevant and financially feasible nutrition recommendations. This data was subsequently used to inform ongoing development of the LiGHT program.

Group 2

Themes, comments and representative quotations are presented in Table 3. Several program strengths were discussed. Many families expressed appreciation that the research team was attempting to develop a virtual program that families could access from their own home. The program was deemed trustworthy in part because of its affiliations (e.g. physician researchers at BC Children's Hospital, recognized funding source in the Public Health Agency of Canada). It also offered support and guidance that were felt by some to be reasonable and practical.

Participants also identified weaknesses and offered suggestions to guide future program design. The most consistent feedback from

Table 1
Characteristics of child participants

	Interview	Focus group	Pilot program
Sample size (n)	3	8	17
Gender (n [%])			
Male	3 (100)	4 (50)	7 (41)
Female	0 (0)	4 (50)	10 (59)
Mean age (range in years)	13.0 (11–14)	15.5 (10–17)	14.4 (10–17)

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Table 2
Themes from qualitative data derived from Group 1 interviews

Theme	Comments
Follow-up communication	• Electronic communication felt to be an important way to provide encouragement and support as families endeavour to make and sustain lifestyle changes.
Security and legitimacy of the site	• One youth in particular felt that it was very important to him/her that the site be readily identified as secure—specifically, that there should be a "lock" icon that symbolizes a secured site. S/he also felt that the site should clearly post well-respected organizations that the program is affiliated with (e.g. funded by the Public Health Agency of Canada). S/he felt that s/he would be uncomfortable sharing her/his personal information if these provisions were not in place.
Child/youth engagement	Suggestions: • Use contests or challenges, for example, pepper questions throughout the content that children/youth can answer and receive points for. • Use the terminology "Did You Know" to peak interest.
Community	• Important for child/youth to feel that they are part of a community while using the LiGHT program. For example, having a list of the other "family nicknames" that are involved with the program; a discussion board; and the opportunity to have "family contests" and compete against other families.
Goal-setting	• Goals should represent "small steps" rather than highly ambitious ones with low chance of achievement. • Parent expressed that although s/he wants to support her/his child, s/he may not be able to support all goals. With respect to goals that require her/him to transport or supervise the child (particularly with respect to physical activity goals), her/his support of the goal depended on whether this was feasible for their situation. For example, if the child sets a goal to exercise frequently and requires her/him to take the child to programs, s/he may not be able to do this because of work.
Culturally diverse nutrition information	• A family requested that there may be culturally diverse food information on the website (e.g., South East Asian food recipes, discussion of how to include more vegetables in a culturally appropriate way—not all cultures have "salad" as a part of their traditional diet).
Cost-conscience nutrition information	• Request for cost-saving ideas to be included as part of nutrition recommendations.

Table 3
Representative focus group quotations identifying program strengths and weaknesses

Themes	Quotations
Strengths	
Program	• It's a program made by doctors for kids so I'd trust it. • I like having someone to talk to…sometimes when you go online to find something you can't find it. • What I like about it is that it's not saying "don't do this," "do this." It's saying "these are some things that are simple to do" like "hey you're drinking six pops a week!" and to me this is for anybody—adult or child.
Weaknesses	
Privacy and confidentiality	I would suggest that you comment on the paper somewhere that this will be confidential so as the child opens up and answers some of these personal questions. You want to know right away that it's confidential…Also point out to the child that the information is confidential and it will only be shared with the right resources. With [my daughter], she didn't want me to know about her weight. I don't think she would want to do [the program] together. So it looks like there is valuable information but will it get to kids that are "closet emotional" overweight people?
Sensitivity	Develop some empathy…what would attract them to [the site]? A desire to change and to learn. In society today you are pushed to do this and that. The site should make students feel that it is on their side. [The] first question on the knowledge test was "are sugary drinks a problem regarding weight?" and it just landed on me as kind of an insult—is the whole questionnaire going to be about this? The site is designed to help people live with healthy choices, but I'm wondering that if a child or parent enters, that it should be discussed that it may not be about eating and exercise? I found it offensive that already it's going this direction because for [my son] it's not about this issue. You can have health complications, or disease.
BMI discussion	Almost not giving you their BMI right away, let them go through it, the child might feel hopeless. Give the BMI as an afterthought because the child doesn't care about that. And when you get at [BMI] right away it's in your face, you're not getting compassion. If you come at it later, it's more reasonable. The child will be more willing to disclose things. You should be able to put in BMI without logging in so it's an option on the side. You can disclose information without anyone knowing about it.
Age-appropriate	All those words that you're using – I don't think kids can answer that on their own so they end up asking [their] parent. So the parent would end up answering that [using] their own opinions as opposed to the child's. So if they put that in more of a child's language that might be helpful. I was wondering if we can do an age 10–14 wording and then a 15–18 wording cause that's quite a range.
Target audience	[This] is the wording you need: Simple, clear, more relevant. "Can you make a healthy breakfast for less than 3 dollars?" I don't think people my age will really care about that…so I think some questions have to be more relevant to my age group. Cost doesn't matter to kids; we don't care how much our parents spend on food. Parents should have that [information]—it should be the parents' responsibility. Kids don't want this.
Appeal	There's a lot of text and I don't want to read this. I think for me I would love to see that but for my child, he or she is going to be bored…maybe put up pictures, or have something move or shift over to tell us how much we need. Even me, I'm like 17 but I like interactive stuff. There's a lot of text and I don't want to read this. I want something fun to do. It might even help if it was a video of not adults but kids talking to kids cause then we're almost the same age so I don't mind listening to that…cause we've been through the same thing. It really needs more visuals. You're only engaging the readers and not the visual learners.
Psychology	It would be helpful if there was a module on thinking independently? Like you don't have to be just like your peers—same screen time, eat same stuff, it's OK to be your own person especially because your body is different. I think that there should be a self-control, psychology area… just recently we saw from the news that pop/sugar—it may be a craving. Some people try to get better but can't because that substance makes us want more. That's why I also want to ask about how you will emphasize on the psychology?
Justification	It just says "if you eat breakfast you'll do better in school." I think [the website] should say how and why cause I wouldn't really know. I'd be asking why and how to do this and that. In the pre-check survey, I think you need to tell us why we're doing it or else we are gonna be like "why are you asking me this?"

BMI, body mass index.

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Table 4
Child and parent knowledge scores pre- and postpilot evaluation of LiGHT

Topics	Child		Parent	
	Pre-LiGHT	Post-LiGHT	Pre-LiGHT	Post-LiGHT
Health (/17)	15.1 (14.5–15.8)	16.1 (15.4–16.7)	15.9 (15.0–16.7)	16.7 (16.0–17.3)
Environmental (/6)	4.3 (3.9–4.8)	4.00 (3.6–4.4)	4.9 (4.3–5.4)	4.2 (3.5–4.9)
Economy (/7)	5.9 (5.1–6.6)	6.5 (5.9–7.1)	6.4 (6.0–6.8)	6.8 (6.6–7.0)

Mean, 95% confidence interval.

both parents and children is that the online program needs to have a reduced amount of text and greater visual appeal and interaction.

These comments informed key changes that were made to the program before the pilot study, including the addition of an introductory paragraph clearly outlining the purpose and approach of the program, explaining that we understand the multitude of factors that can influence body weight, and discussing that the program was not intending to judge children but to help them live the healthiest lifestyle they can. Minor changes were made to the visuals of the program.

Group 3

Pre- and postpilot evaluation data for the children/youth and their parents are presented in Table 4. The pre-intervention average scores were close to the maximum in all areas, with minor difference between the pre- and postintervention evaluations.

Participants' readiness to change was also assessed before and after the pilot program (Table 5). The majority of parents and children indicated that they were really ready to change at program outset, and there was a further non-significant increase in readiness to change on program completion.

Finally, participants completed written program evaluations on completion. A number of program strengths were identified (Table 6). Participants felt that the online nature of the program made it accessible, appealing to its target audience, and convenient and easy to use. One participant stated that "online access provides a convenient way for teenagers (even some parents) to use the program," whereas another participant "always had it accessible on my phone if need be." Others appreciated the integration of health, finance and the environment in a weight management intervention; for example a parent stated "once we change one kind of not so good habit, other areas will have benefit…less screen time leads to more physical activity and get healthier, use less electricity and save money and good for the global environment." The program was considered effective for increasing motivation in children/youth and many liked working with the Way-finder who "replied to e-mails and questions promptly and always with a great, positive attitude. [She] gave the program a personal touch and was always very helpful."

Participants felt that goal-setting was manageable and the time commitment realistic: "In total I would say that I spent about 4–5 hours per week on the program, although it never felt like work, more like quality time…even on the track in the pouring rain!" Several parents commented on how the program provided opportunities to communicate with their child, as 1 parent states, "I liked being able to talk to [my child] about weight issues without her feeling like I was forcing it on her, as the program promoted a lot of things that I had tried to do in the past, but was unsuccessful with. It really opened our lines of communication without my daughter thinking that I was being accusatory."

Table 5
Child and parent readiness to change pre- and postpilot evaluation of LiGHT

Readiness	Child n (%)		Parent n (%)	
	Pre-LiGHT	Post-LiGHT	Pre-LiGHT	Post-LiGHT
I'm really ready	13 (76.5)	15 (88.2)	11 (73.3)	13 (86.7)
I might be ready	4 (23.5)	2 (11.8)	4 (26.7)	2 (13.3)
I don't know	0 (0)	0 (0)	0 (0)	0 (0)

Challenges are highlighted in Table 7, and suggestions for improvement in Table 8. Program visual appeal was continually addressed. Regarding program duration, the majority of participants felt that the program was too short, with one parent stating that s/he wished it were longer "to keep my son interested in his health." Others felt that the information presented was too simple for older children, suggesting that perhaps 2 streams (for younger and older children) would be appropriate.

There was the suggestion of the importance of building a sense of community, an important consideration for a virtual program where there is no face-to-face interaction. For example, a parent suggested having an "open forum for parents only…communicating with other parents in the same position enables us to get different ideas for meals, for exercise and for life skills such as communication. I think the kids would benefit from a forum too, however, it would have to be monitored." As well, the importance of translating the program into other languages was suggested, which is planned for the future.

Finally, participants discussed barriers that they encountered to making the lifestyle changes necessary for obesity management (Table 9). Key issues included a lack of time, motivation and money, as well as safety concerns. Geographical factors were frequently cited barriers to lifestyle change. This variable affected 1) accessibility to healthy food options, primarily due to increased cost of healthy food in remote areas; 2) proximity to health facilities; and 3) climate, which made outdoor activities less viable options for exercise. Working healthy habits into an already busy and inflexible schedule was another important barrier for multiple families. The cost of healthy living was mentioned as a barrier several times. Finally, lack of motivation, current habits, and psychological factors were described as hindering families in adapting healthier lifestyles.

Discussion

We describe the development of LiGHT, a novel pediatric weight management program that combines health promotion, global environment and personal finances, in an online format. The process evaluation of the program provided an assessment of program impact on knowledge and readiness to change, and outlined strengths and areas for improvement as a basis for program modifications.

Evaluation of web-based weight management programs in adults and children suggests that this approach hold promise in terms of its reach, accessibility and outcomes (11,12). Internet access is widespread in Canada. Ninety-three percent of Canadian households with at least one member under the age of 18 have internet access (10). Furthermore, in 2009, 70% of home internet users searched for health information online, an increase from 59% in 2007 (10). In Chinese-American adolescents, a web-based intervention was successful in improving physical activity, diet and anthropometric markers after 8 months, although long-term outcomes remain to be clarified (16). Process evaluation of

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Table 6
Program strengths from pilot evaluation surveys

Website
• Online access provides a convenient way for teenagers (even some parents) to use the program.
• I especially like that teenagers have their privacy in this program while parents can have a rough idea for what they are doing.
• I liked how it was an easy program to use. Everything went smoothly.
• I liked that the kids have to use a computer to do the program. I know that seems obvious, but the fact that our computer addicted generation has to use a computer to learn more about their health makes me hope that it will be used.
• I always had it accessible on my phone if need be.
Environment and surroundings
• That it made myself as well as my family more aware of small things that can change not only our health but the environment.
• That this program took into account (with some amazing facts) environmental issues and our beloved planet earth was very special.
• It got my son thinking about what he was eating and drinking and how it affects him and the environment.
Program
• The LiGHT program was really good. I think it's a great program to get children started and to give them the motivation to be healthy.
• I like the inter-related components of "LiGHT." Once we change one kind of not so good habit, other areas will have benefit. For example, less screen time leads to more physical activity and get healthier, use less electricity and save money and good for the global environment.
• Goal setting is done in a way that is manageable and to me makes it seem possible to make changes and see progress.
• In total I would say that I spent about 4–5 hr per week on the program, although it never felt like work, more like quality time…even on the track in the pouring rain!
• But it is a great start and I hope a new beginning to a healthier lifestyle and approach to the way we see our lives and our environment around us.
• I think it was great to be able to talk to the Way-finder through the program and think it is good to have someone for people to be able to communicate with.
• Our Way-finder was by far a wonderful person to have in the program. She replied to e-mails and questions promptly and always with a great, positive attitude. [She] gave the program a personal touch and was always very helpful.
Finance
• [My son] cares deeply about his planet and was able to feel great about himself helping the environment AND our family budget! I am so thankful that my family realizes the financial end of it!
• Finances are a huge problem, so I did find suggestions in the forums from other parents that helped a great deal.
Mentality
• Having the right attitude and sense of commitment and recognition of the importance of a healthy lifestyle can help surmount any of the barriers. Seeing change and feeling better could help overcome barriers, i.e. success leads to more success.
• He needed to make good choices and you gave him those options. We would spend time each day talking about good and bad choices and hope we could make them a daily habit.
• I found that the program enabled me to show my daughter that others are like her too, and that there is such a thing as too skinny as well as too big.
Health
• Every change in the meals went smoothly and could fit right in.
Relationships
• I liked that I could participate in activities with my daughter. I liked being able to talk to her about weight issues without her feeling like I was forcing it on her, as the program promoted a lot of things that I had tried to do in the past, but was unsuccessful with. It really opened our lines of communication without my daughter thinking that I was being accusatory.
Education
• I loved how this program had all the information needed for achieving a healthy lifestyle, along with a nice web page.
• [My son] was able to "help himself" to knowledge online, especially enjoyed was the links to sites where he could learn further about physical activity or nutrition, and abundance of information.
• I liked that I was able to learn information about things I didn't know before and that I could pay attention to things I never knew were important before. For example learning to actually pay attention to commercials on television was good.

a web-based weight prevention and weight management study has been reported, but no outcome data are presently available.

Although increased calorie intake and decreased physical activity are clearly associated with the marked increase in the prevalence of obesity (17), they also have implications for the global environment and the family's personal finances. The relationship between how obesity in youth affects family finances has received little attention in the literature. In contrast, there is increasing

Table 7
Program challenges from pilot evaluation surveys

Website design
• At the beginning we were to use our last name to post on the dashboard and didn't want to as our name is distinctive and wanted to keep our privacy. After we sent that info in, we did get new names/passwords which was good but I never got back to posting.
• I felt there was a lack of direction and clear instruction for kids and parents on how to carry out the module assignments. I sensed the confusion from other families as well based on what I read in the forums.
• The new, very in touch generation will think this program is a bit too "lame." Not enough interaction, too many words. A child will not come home to work on a computer to do "homework" type assignments. I know at the phase one study we were told there are not many funds to really develop the site, but without the development there will be few users. Kids need graphics, interactions and challenges to keep them engaged. They are a very sophisticated, computer-savvy generation.
• I think some of the wording may have not been very sensitive, as was discussed at the [focus] group, such as using the words "childhood obesity," having kids deal with BMI and the costs of eating.
Program
• I just wished it were longer to keep my son interested in his health.
• It was a short time frame. It seemed more like a sampling than a complete program/change because it went by so fast. We would like to do all the modules because they are all issues/challenges.
Education
• Narrow focus on foods and activities, when obesity can be caused by so many other factors that need to be addressed in a holistic fashion.
• I think the changes are realistic, but some are very obvious. I know that one of my daughters felt that she had learned "this stuff" in school and through us. She felt there was really nothing very new that she learned. Putting it into practice is a different story.
• My daughter thought that there was too much information to grasp from the modules. I don't think kids want to spend a lot of time sorting through information in order to understand what is expected of them.
• Too simplistic—the assumptions about nutrition knowledge for example—we and most/all of our friends are WAY beyond some/most of the info that is in here (e.g. try to walk more rather than driving, use whole grains, soft drinks add calories, etc.). Does anybody really not know these things already? Isn't it more about not having the motivation to change?

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Table 8
Suggestions for program development from pilot evaluation surveys

Website design
• Any plans to appeal to different aspects of our multicultural communities (e.g. Indo-Canadians)?
• It would be better if you could add more languages for easier understanding of the information.
• I wish there had have been a "parents only" forum. I really wanted to know how other parents were talking to their kids and what they were doing without having the children able to see all of the communication.
• Include educational games to make this program more interesting for the younger kids to follow along.
• I don't think kids want to spend a lot of time sorting through information in order to understand what is expected of them. They want you to get to the point!
• For some of the questions, I was forced to select "yes" or "no" when I simply do not know the answer so I prefer if I can choose "I do not know."
• I'm not sure about the coloring of red. Usually, children think of red as failure. It would be like a failed test with no re-doing whereas in the adult site you can actually go green, yellow and red cause we are used to driving so we understand what this means.
Environment and surroundings
• Perhaps extend to a whole family rather than just a parent/child. Our whole family was involved and made some changes but that didn't seem to be part of the program. I think it's harder to make changes in isolation and easier if there is a team approach. That's our healthy living plan from here on.
• The costs and environmental aspects seemed more of an afterthought which may be okay—we saw it as a kind of bonus rather than our focus. Perhaps if it is to be a focus, it could be integrated a bit more?
Program
• I believe that the program should be extended; my family and I thought that 4 weeks was too short.
• It would have been good to have a calendar with the starting date, module goals, survey dates, etc. to refer to. I did print out an overview with dates on it (What's Next?) and it seems good but maybe something bigger, clearer, more detailed.
Mentality
• [My son] became aware of emotional eating during the program. He now becomes involved in other activities to calm down or decrease boredom. Perhaps a module that discusses alternatives to snacking when bored, sad, angry, etc.
• The only other thing I wanted to suggest was to include something in the program regarding self-confidence and body image. It was difficult for [my son] to first decide to do this program because he feels "different" from other kids. The program increased [his] confidence and he is proud of himself!
Health
• I think having a menu plan/shopping guide as suggested in discussion would be a great help. Recipes and things to beat boredom in our diets would help as well.
• Would have been fun to have a recipe page, for healthy easy kid friendly recipes.
Relationships
• Bullying will always be a problem, but with some encouragement the kids can be peers to each other. Speaking of bullying, a discussion on that would be helpful; sadly overweight kids are so often the target. Online support, phone support, etc. would be great.
• My only suggestion would be to keep an open forum for parents only. I think that by communicating with other parents in the same position enables us to get different ideas for meals, for exercise and for life skills such as communication. I think the kids would benefit from a forum too, however, it would have to be monitored, or more of an open forum.
• Maybe have a chat page for the kids. They enjoy knowing that they are not alone in there struggles. Maybe even have a chat section for parents, as social networking is a big part of this new age. Parents need support as well.
Education
• Just about the language for children's sites again—I was wondering if we can do an age 10–14 wording and then a 15–18 wording because that's quite a range.

interest in the dual effect of the obesogenic environment on health and global environment (18,19). Each of the 11 modules that we have developed emphasizes these 3 aspects: health, global environment and personal finances. For instance, the "Getting to school" module: 1) illustrates how walking, biking or even bussing to school can be an important part of an active lifestyle; 2) emphasizes how being driven to school by car contributes to air emissions which have implications for global warming; and

Table 9
Barriers to program assessed through pilot surveys

Environment and surroundings
• Truth is [my son] completed school at 17 and 4 months and drives 30 km round trip to work—walking isn't viable for everyone, and biking would be unsafe as he starts work before 7 a.m.
• Money and where we live [are barriers]. We are in a small community and we only have two grocery stores so buying healthy is not always cheap here. Also we have a lot of snow and my son has to take the bus to and from school during the winter months. So riding a bike is not always an option so we have to find other ways to get exercise.
• Inertia! We can list many barriers: lack of time, unexpected events, lack of planning, and bad habits.
• The barriers that prevent us from adopting these changes successfully are: 1) the lack of time in our day, and 2) the distance from our home to where the activities usually take place. Because my husband and I work full time and don't get home until 5:30 p.m., it is sometimes difficult to prepare a good home cooked meal thus having to resort to take-outs. The day and time for after school activities is a conflict for us because of our work schedules. For example, I want to put my daughter in a swim club but these activities usually takes place at 4:30 p.m. on weekdays and both parents are still at work and can't make it home on time. Although the distance between the swimming pool and our house is only 10 km, we still have to fight through rush hour traffic to get to and from our house.
Program
• Having the motivation to actually do the modules, as well as doing the actual changes that you're not comfortable with.
• Nowadays, we know what is good for us but we need motivation to have the change. That is "priority."
• I probably should have spent more time, but working full time, kids' activities, etc. limits the time I spend on the computer, period. You should see my inbox!
Finance
• Also getting swimming and gym passes not cheap as we are a single parent family.
Psychology/mentality
• One of the things I learned through the program was that it's bad to watch television while eating because you blindly eat more than you plan to, but when I eat family dinners every night, we usually watch television at the same time.
• Changing the lifestyle is really difficult. For my daughter, it is really hard to find activities that engage her because she gets easily frustrated when she is not doing as well as other kids. This makes her more shy and less willing to practice sports. It is difficult to ask her to do sports in front of the TV by herself because that is not interesting for her age.
• Psychological factors are the biggest barrier to adopt these changes.
Health
• Within our family the only barriers that we would have would be food allergies and physical injuries. So we just had to watch which foods we were having and the best types of exercise for the injuries as to not cause more damage.

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3) outlines the cost of operating a car (e.g. gas, insurance, maintenance). Whether a weight management program based on the above paradigms will be more effective at promoting a healthy lifestyle in youth and their families compared to conventional approaches remains to be demonstrated, and will be the focus of Phase 2 of this project.

Our evaluation reveals that an online weight management program is viewed by a sample of children and their families as an accessible, convenient and acceptable way to promote lifestyle changes. The integration of health, environment and economy was viewed favourably by many participants, although there were some suggestions that children were less interested in financial information compared to their parents.

Yet the online format creates unique requirements. First, the need for a visually appealing and interactive program to hold the attention of children and engage visual learners. LiGHT interactivity is being further developed before larger scale implementation of the program in 2014. Second, the need to build a sense of community. The absence of face-to-face interaction heightens the importance of participants feeling connected to others through discussion boards, forums and family contests. Although we included some preliminary strategies, further development of this area is important. Specifically, text messages with practical tips will be sent daily for the duration of each of the 11 modules in Phase 2. Finally, the presence of a phone-based professional (the Way-finder) who children can talk to and discuss their goals and potential factors affecting goal attainment, was well-received and may provide a much-needed personal connection. Other programs, such as the "Quit Now" smoking cessation program in BC, offers the opportunity to speak to a "Care Coach" for quitting advice and support (20). The opportunity to speak to an actual person may be an important element of a virtual program.

The importance of involving the family in child health/weight management is well supported (21,22). There was generally positive feedback about family participation in the LiGHT program and appreciation that the program provided a stimulus for communication. Parents are aware of what areas their child has chosen to work on, involved when there is connection with the Way-finder, and encouraged to discuss the goals their child has set and to explore ways they can offer support. The involvement of family will remain an integral part of the LiGHT program. In fact, if wider family involvement is desired there is the potential for expanded participation through the online format. However, youth in particular emphasized that it is important for them to feel that their personal information remains confidential and is not seen by their parents (e.g. their weight).

The results seen with the knowledge scores (slight improvements in health and economy total scores, but a lower increase than we expected, and a decline in environmental scores) may be due to a ceiling effect. Both parents and children started with very high baseline scores, possibly reflecting the ease of the questions, making it hard to show even greater improvement. One parent stated, "One of my daughters felt that she had learned 'this stuff' in school and through us. She felt there was really nothing very new that she learned." Therefore, more challenging questions may be added to decrease baseline scores and prevent a ceiling effect. A larger sample size should also be used.

It has been shown that child/youth readiness to change is a key factor in predicting the success of a weight management program (23). Although there was a small increase in readiness to change post-LiGHT, there was a large number of participants who selected that they were "really ready" to change pre-intervention. This may be due to a selection bias. Participants were volunteers and may have been highly motivated at the outset. However, the small increase may suggest that the program did help to maintain, and increase, readiness to change in participants. Consequently, a larger sample should be used to further assess the impact of the LiGHT program on readiness to change.

In summary, Phase 1 of the LiGHT project has led to a completed first version of the program and highlighted the points that require improvements. Preliminary evaluation indicates favourable responses to the health-environment-economy approach, and appreciation of the convenience of an online method of delivery. Outcome evaluation of the program is the next step of this project and will test the hypothesis that LiGHT, a comprehensive, web-based, interactive, self-management program that focuses on obesity treatment while decreasing the environmental footprint and uncovering economic benefits for Canadian families struggling with obesity, helps families make sustained, positive lifestyle changes and is an effective alternative to existing pediatric weight management interventions. We see the LiGHT program as an integral part of a comprehensive Provincial structure that will provide all levels of care for the treatment of weight excess and its complications in youth in British Columbia.

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Author Contributions

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