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iAmHealthy: Rationale, design and application of a family-based mHealth pediatric obesity intervention for rural children

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Abstract

Children in rural areas are disproportionately affected by pediatric obesity. Poor access to healthcare providers, lack of nutrition education, lower socioeconomic status, and fewer

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opportunities to be physically active are all unique barriers that contribute to this growing health concern. There are very few pediatric obesity interventions that have been developed that target this unique population. iAmHealthy is a family-based behavioral, nutrition and physical activity intervention developed with input from rural children and families that capitalizes on the innovative use of mobile health applications (mHealth). iAmHealthy is a 25-contact hour multicomponent intervention delivered over an 8-month period targeting 2nd-4th grade school children and their families. This paper describes the rationale, design, participant/school enrollment, and planned implementation of a randomized controlled trial of the iAmHealthy intervention in comparison to a monthly newsletter delivered through rural elementary schools. Child Body Mass Index z-score (BMIz) is the primary outcome, along with child 24-hour dietary recall, and child accelerometer-determined physical activity and sedentary behavior as secondary outcomes. The study will include 18 schools (with 8 children each) resulting in a final planned sample size of 144 children. This project also has a strong focus on dissemination and implementation science, and thus includes many measures related to the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance). Data collection is completed at baseline, end of intervention (8 months), and follow-up (20 months). This study is the first randomized controlled trial to deliver a rurally tailored, empirically supported, family-based behavioral intervention for pediatric obesity solely over mHealth.

Keywords

Pediatric obesity; rural; school; mHealth

1. Introduction:

Pediatric obesity remains a critical public health concern in the United States. Data from the National Health and Nutrition Examination Survey (NHANES) from 2009 to 2010 indicate that 16.9% of US children and adolescents are classified as obese [body mass index (BMI) > 95th percentile] and 31.8% of youth are either overweight or obese (BMI ≥ 85th percentile).¹ Childhood obesity continues to be associated with significant short-term health consequences and severe long-term risk for obesity and health problems.^{1,2}

Children in rural areas are disproportionately affected by pediatric obesity.² They experience a higher prevalence of overweight and obesity than their urban counterparts (50% higher odds of being obese for rural over urban children³). Our research (Figure 1)⁴ concurs that there is a higher prevalence of pediatric obesity in rural areas of Kansas than in urban areas of the state. Rural children are also exposed to unique barriers such as lack of nutrition education, poor access to healthcare providers, lower socioeconomic status, and fewer opportunities for physical activity.² Currently, there are few treatments available to meet the needs of these individuals. Prior research⁴ indicates that there are differences in the health behaviors of rural and urban children, with rural children more likely to eat junk food and urban children more likely to skip breakfast, for example. Rural children also engage in lower levels of moderate to vigorous physical activity (MVPA) and rural children engage in higher rates of sedentary activity than their urban counterparts. It is likely that these behavioral differences are due, at least in part, to their rural status.

Research consistently demonstrates that family-based behavioral treatments are highly effective and scalable treatments for pediatric obesity.^{3,5} Two defining features of such interventions are the involvement of parents in treatment and the use of behavioral and cognitive-behavioral techniques such as goal setting, self-monitoring, and stimulus control. Group treatment is very practical, allowing for a single healthcare provider to treat 8–10 families in a single one-hour session. Recent research indicates that including individual coaching sessions with families to help them overcome family-level factors can improve group treatment success.^{3,6} A recent review by the United States Preventive Services Task Force (USPSTF) indicates that treatments with at least 25 contact hours are more likely to be effective than shorter interventions.

The purpose of this paper is to describe the design of a Phase III randomized controlled trial to assess the effectiveness of a group and individual family-based intervention delivered over interactive televideo to treat pediatric obesity among rural children (iAmHealthy) compared to a newsletter control group (control). Specifically, we hypothesize that the iAmHealthy intervention will result in significantly decreased child BMIz and parent BMI compared to the control intervention. We also hypothesize that the iAmHealthy intervention will result in significantly better food choices than the control intervention, as indicated by servings of sugar-sweetened beverages, “red foods,” and fruits and vegetables. Finally, we hypothesize that the iAmHealthy intervention will result in significantly greater time spent in MVPA than the control intervention.

2. Study Design

2.1 Objective

Our primary aim was to assess the effectiveness of iAmHealthy, a home-based pediatric obesity treatment program tailored for rural families, compared to similar content delivered via newsletter.

2.2 Participant recruitment, enrollment, and retention

Participants include children in 2nd through 4th grades attending rural elementary schools in a single Midwestern state. To begin, a flyer was sent to all rural elementary schools in the state of Kansas, and schools were recruited and enrolled (see 2.2.1 Schools). After schools completed all required procedures, participant recruitment ensued (see 2.2.2 Participants). All methods were approved by the Human Subjects Committee at the University of Kansas Medical Center (KUMC). Prior to participation, parents provide full written consent, and children provide full written assent.

2.2.1. Schools—Schools were contacted via a flyer sent to all 550 rural elementary schools in the state. For the purposes of this study, and to be consistent with our previous work, rural is defined using the US Census Bureau Criteria as city and/or county population < 20,000.^{7,8} Interested schools contacted the study team via a toll-free number and identified a single onsite school representative. Onsite school representatives were key to the dissemination of this work to local elementary schools. These individuals may be school nurses, physical education teachers, principals, school counselors or any other teaching staff

from the local elementary school. These staff undergo training on research ethics, study measurement procedures and administrative issues. The onsite school representative was paid for their services to the study outside of normal school hours/duties.

2.2.2. Participants—Once a school is fully enrolled, the onsite staff and principal sent home letters to parents and families explaining the study, and interested parents are invited to call the researchers via a toll-free number with any questions. Schools recruited 8 target parent/child pairs. Parents then reviewed and signed consent forms and the onsite school representative measured BMI percentile for each child to assure that they qualified for the study. Participants include rural children who were in the 2nd-4th grades, whose BMI percentile is ≥ 85th percentile for age and gender. Both the child and parents must speak English, and the family is available at times the intervention is offered. Exclusion criteria include: children with a known physical limitation or who receives an injury which significantly limits physical mobility, children with a significant known medical issue (i.e. cancer), children and parents with significant developmental delay/cognitive impairment known to the school, and children who have a sibling already enrolled in the program. If a family moves to a non-participating school, they will be withdrawn from the study. Families from the intervention/control study were paid proportionally for completion of measures.

2.3 Randomization

This is a cluster randomized design, with schools randomly assigned to condition (iAmHealthy or control) and the 8 parent/child pairs at each school assigned to the same condition. Recruited schools are stratified by two key variables (school size, percent free/reduced lunch) and assigned to one of the intervention groups by our statistical team, such that all children/families who are consented and enrolled at each elementary school will be assigned as a single group to either iAmHealthy or control (i.e. randomization occurs at the school level, not at the individual level).

2.4 iAmHealthy Intervention Group

The iAmHealthy intervention consists of both group and individual sessions delivered via teleconferencing software over a provided tablet equipped with a wireless connection to the internet. Content includes a dual approach of Cognitive Behavioral Theory (CBT)⁹ and the Child Weight Theory of Davison & Birch (2009), as well as topics identified in our own previous qualitative research with rural parents.¹⁰ The intervention is family-based and focuses on behavioral, nutrition, and physical activity topics (Table 1). The group intervention consists of weekly group sessions for 8 weeks followed by monthly group sessions for 6 months, for a total intervention period of 8 months (to coincide with the length of the typical school year). Intervention groups are delivered to family homes at times that are convenient for participating families (evenings, weekends). If a participating family misses a group session, they receive a makeup session at their convenience. These topics are discussed at the individual level and at the family and school/community level, allowing families to discuss barriers unique to their rural schools and communities. The sessions begin with a review of progress since the last meeting and end with parents and children setting goals. Parents and children work together throughout each session, and both are required to attend for the entire meeting unless otherwise specified in the session manual.

Families also complete 30–45 minute individual health coaching sessions with intervention staff via the tablet every other week. This work will focus on goal setting, problem solving of barriers, reinforcement for tracking, and completion of homework assignments that are part of the manual. For example, after the *Week 3 Stop Light Diet* lesson, families are given the materials to identify the foods in their cabinets and refrigerators as red, yellow or green using stickers. Our team is able to help each family complete this homework activity through interactive tablet technology provided by the study by looking into their cabinets with them and helping to appropriately categorize foods according to their labels. We will provide 11 hours of individual sessions over the 8-month intervention period. Treatment sessions focus on making the groups fun and getting parents and children vocal and involved.

2.4.1. Interventionists and Fidelity—Interventionists for the group sessions are Ph.D. psychologists with experience in health behavior change intervention, and they are assisted by dietitians who also serve as interventionists for the individual health coaching sessions. Interventionists follow the iAmHealthy treatment manual for the group sessions and received training with the PI prior to the start of their intervention groups. Treatment fidelity is measured for 20% of sessions by comparing a digital video recording of the sessions to a checklist of 8–10 topics from the treatment manual. Both the group leader and an independent coder have demonstrated inter-rater reliability during a training period code for fidelity.

2.4.2. Technology—The technology selected for the iAmHealthy intervention is similar to videoconferencing technology our team has used in our previous mHealth intervention studies. Families receive iPad tablets (16 GB with Wi-Fi and 4G; Apple, Inc.) with data regardless of owning computers or iPads/tablets. This ensures uniformity of experience across users. These tablets were chosen to allow multipoint connections in order to display multiple sites simultaneously. The tablets utilize an institutionally vetted videoconferencing solution (Zoom Video Communications Inc, Overland Park, Kansas) that has been highly successful with previous home-based videoconferencing intervention with families. The consumer friendly, HIPAA-compliant approach allows the families to securely connect to the pediatric obesity team and other families in the convenience of their homes. This cloud-based platform allows the user to connect to other videoconferencing systems as well as the secure videoconference bridge already established at KUMC for multi-point conferences.

Uniform data plans were purchased for participants with tablets to ensure consistent connectivity; this choice was made due to variable connectivity across rural sites. In addition to a tablet use agreement completed by the families, the tablets come with tracking features that will be used in order to diminish the risk of theft. At the end of the study, subjects are required to return the iPads to researchers through the onsite school representatives.

2.5 Active Attention Control Group

Although literature suggests that there are some advantages to using no-treatment controls in randomized designs of obesity interventions,¹¹ for the current study we elected to use an active intervention – an education only control. This increases the methodological rigor of the examination of the iAmHealthy intervention while also allowing for all children to

receive some form of intervention, which increases palatability of the project for schools. As has been done in previous studies by pediatric obesity treatment experts,^{12–14} a newsletter control group is used, in which families receive a monthly newsletter with “parenting tips, sample praise statements, and child-appropriate activities and recipes”.¹⁵ The content is similar to that delivered in the iAmHealthy groups. Previous research suggests that newsletter/mail interventions are well received by participants¹⁶ and are frequently included in federally funded health intervention studies.

2.6 Primary Outcome Measures

Unless noted otherwise, all measures are collected at baseline, post-treatment (8 months) and follow-up (20 months).

2.6.1 Child Body Mass Index z score (BMIZ) and Parent Body Mass Index (BMI)—Although there has been debate about the best measure of childhood adiposity, research has indicated BMIZ may be superior to other measures.¹¹ To calculate child BMIZ (as well as parent BMI), we use standard formulas/equations. Height and weight are assessed by fully trained onsite school representatives on standardized, calibrated equipment provided by the study. Staff are trained in standard research anthropometric measurement protocol, including calibration techniques. Standing height is assessed in triplicate via a SECA stadiometer, Model 213 (SECA, Hamburg, Germany). Weight is measured in triplicate on a portable SECA digital scale (SECA, Hamburg, Germany) after the participant has been asked to void. Model 813 is accurate within 0.2 lbs. over range of 1–440 lbs. Parents and children are measured with light clothing and no shoes.

2.7 Secondary Outcome Measures

Unless noted otherwise, all measures are collected at baseline, post-treatment (8 months) and follow-up (20 months).

2.7.1 Dietary changes—Dietary changes are measured via the 24-hour food recall (24hr FR). The 24hr FR is a standardized five-pass method, developed by the US Department of Agriculture for use in national dietary surveillance. Although there are weaknesses to every method of dietary assessment, this approach was selected as it is widely used in large trials, which serve as models for the current project,^{1,17,18,19} and data suggest it is the most valid and reliable method of dietary assessment for children.²⁰ We collect two weekdays and one weekend day at each assessment point, as is recommended. The data are collected using highly standardized probes by trained research staff. Regarding school lunches eaten away from home, per typical procedures, parents review the school lunch menu with their child at the end of each day, having the child report to the best of their ability what they consumed. Recalls are analyzed with the Nutritional Data System for Research (version 2015; University of Minnesota, Minneapolis, MN). Although a plethora of information is available from this analysis, the current study specifically focuses on servings of sugar-sweetened beverages per day, number of “red” food items per day (foods with 7 grams of fat and/or 12 grams of sugar), and number of servings of fruits and vegetables per day, as calculated by the computer software.

2.7.2 Physical Activity—For the current trial, physical activity is assessed using the triaxial wGT3X-BT ActiGraph accelerometer (ActiGraph LLC, Pensacola, FL). The ActiGraph is a small, lightweight activity monitor that is worn on an adjustable belt over the non-dominant hip for seven consecutive days. The ActiGraph has been shown to provide valid assessments of physical activity, across a range of intensity levels, for adults and children during both laboratory (treadmill walking/running)^{21,22} and daily living activities.^{23–25} Prior to data collection, participants and parents receive detailed instructions on wearing and caring for the monitor. Accelerometers are initialized to begin data collection at 12:00AM and raw data are sampled at 40 hertz. After the data collection period, participants return the accelerometers via a prepaid envelope and data are downloaded and reintegrated to a 15 second epoch via ActiLife software prior to data processing. Data are screened for non-wear using the Choi algorithm,²¹ and participants with 10 hours per day on 4 of 7 days are retained for analysis. The primary outcome is: average (across valid wear days) time spent per day in MVPA, as well as % time spent in MVPA defined established threshold values (vertical axis data²² and vector magnitude data²³).

2.8 Tertiary Outcome Measures

To assess the iAmHealthy intervention's implementation and dissemination, we included several measures organized according to the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance). See Table 2 for a complete listing of RE-AIM Measures organized according to the framework.

2.8.1 Reach—Reach is calculated as the total number of children who complete enrollment procedures divided by the total number of children who expressed interest in the iAmHealthy intervention. As a second measure of reach, we also conduct interviews with nonparticipants to learn more about their barriers to enrollment.

2.8.2 Efficacy/Effectiveness—In addition to the measures of efficacy/effectiveness outlined previously (dietary changes, physical activity, BMIz/BMI) assessment of psychosocial variables are key. Previous research indicates variables such as quality of life, parent distress, peer victimization, stigma, food insecurity, and depressive symptoms, as well as satisfaction, can impact the program's efficacy. These measures are collected over the iPads through an electronic data capture survey system.

2.8.3 Adoption—In order to measure adoption, we measure the representativeness of the schools that participate, comparing them to all rural elementary schools in our state on key metrics including percent of students who receive free/reduced lunch and ethnic/racial composition of the student body.

2.8.4 Implementation—As measures of implementation, we include individual level factors (attendance, participation) and setting factors (group process factors, fidelity, cost). Attendance will be calculated for each parent/child pair as the percent of sessions attended divided by the total number of sessions offered. Both intervention and control parents and children were asked about additional health related information they sought to supplement the content of the program, such as health websites, apps, books, programs, etc. For both

groups participation will also include the amount of homework that was completed from the sessions (as a percent) self-reported as part of the Post Questionnaire at the 8-month time point. Group process factors are assessed with the Living in Familial Environments Coding System.^{24,25} Per proper procedures, only initial sessions are coded for the 15 content codes (facilitative, solicitous, self-positive, problem statement, proposed solution, complaint, oppositional, command unaccountable, self-complaint) which fall into 3 categories (positive, negative, neutral). This coding is completed for each parent and child separately and allows for a calculation of child engagement and parent engagement uniquely. This system has been found to produce scores that are reliable and valid²⁶ and has recently been used to measure predictors of attrition from family therapy.²⁵ Cost includes both provider costs as well as client costs. Provider costs include personnel, technology and supplies, and client costs include only time and the travel distance to and from their school for height and weight measurements.

2.8.5 Maintenance—Maintenance will be measured at the school level by structured interviews with key staff focused on indicators of institutionalization of components of the iAmHealthy program at their site.

2.9 Analysis

2.9.1 Power Analysis—Power analyses for treatment condition differences were conducted using the Optimal Design software for cluster-randomized trials with person-level outcomes and treatment at level-2. Because each cluster has different community characteristics that might affect treatment efficacy, we anticipate that the intra-class correlation coefficient may be as large as .25. Thus, values of .2 and .3 were considered in the power analysis to be conservative in estimation. Cluster sizes of 6 and 8 are included in the power analysis to allow for attrition. Assuming an ICC of .20, we will have .80 power to detect effect sizes of $d = 0.82$ and 0.77 with cluster sizes of 6 and 8 respectively, using a critical p -value of .05. If the ICC is .30, we will be able to detect effects of $d = 0.91$ and 0.88 with the same cluster sizes of 6 and 8 respectively. These detectable effect sizes are consistent with the magnitude of expected effects found for children in the literature. For example, in previous work,³ effect sizes for changes in BMIz were $d = 1.20$ and 1.02 for interventions using family-based behavioral groups. Thus, the 18 clusters with 8 participants per cluster allowing for attrition will be adequate to address the primary aims of this study. Even when we adjust the critical p -value to account for the two comparisons related to unhealthy diet outcomes, with the minimum expected sample size, we will have power to detect effects of $d = 0.87$ or higher, which is smaller than we anticipate for the dietary change outcomes. For outcomes with a baseline covariate, we will be able to detect even smaller effects. For the between group differences in proportion of students in each treatment condition reporting stigmatization, power analyses were conducted using G*Power. Given our anticipated proportion of stigmatization in the newsletter group of approximately .05, we will have .80 power to detect a significant difference between groups (using a critical p -value of .05) if at least 20% of the treated group reports stigmatization.

2.9.2 Quantitative Analysis Plan—In order to address our aims, both Intent-to-Treat (ITT) analyses and analyses of completers are planned. The ITT analysis is necessary as we

predict that at least some participants will withdraw prior to the completion. Any participant who consents to participate, completes all baseline measures, and has at least one measurement after baseline will be included in the ITT analyses. Since monthly assessments are done on weight and height for intervention purposes, we will have parent and child outcome data available for use in the ITT analysis for the secondary hypothesis variable of BMIz and several of the other variables to address questions of intervention effectiveness through the 8-month intervention period. The second planned analysis is for those who are identified as completers of the intervention. A completer will be defined as a participant who receives at least 80% of their assigned intervention. For those in the comparison group, the criteria will be 80% of their data collection time points. The analysis approach will be the same for both efficacy and ITT analyses; only the participants and scores included will vary. For primary outcomes, two analyses will be conducted; one examining outcomes at 8-months controlling for baseline and one examining outcomes at 20-months controlling for baseline. To accommodate the cluster randomized design where schools are randomized to conditions (and all participants at that school randomized to the same condition), multilevel modeling (MLM) analyses will be conducted using SAS PROC MIXED. In this design, children (Level-1 units) will be nested within-treatment clusters (Level-2 units). Each school will have exactly one treatment cluster. Unconditional models will be examined with each dependent variable to determine the amount of between and within cluster variances. Preliminary data indicate that an ICC of .25 is likely, while it is expected that there will be considerable variability within the groups of children in both baseline and 8-month scores. Analyses will be conducted on each outcome separately in order to gain a better understanding of which variables are most sensitive to the intervention, as is common in obesity studies with children. For the primary hypothesis and secondary hypothesis, there are multiple outcome variables, and each of those variables will be analyzed separately. For the hypothesis in which we have two indicators of poor diet (number of sugar sweetened beverages, and number of servings of red foods), we will use the Bonferroni adjustment to control for familywise error rate. It is possible that since some of the diet variables are counts of number of servings, their distributions will not be appropriate for use in the traditional multilevel models, and appropriate transformations or link functions will need to be applied in the analyses.

A fixed effect indicating treatment group will be estimated in the model for each separate dependent variable as a level-two predictor to determine if there are significant differences between participants based on condition. Gender and baseline values of the outcome variable will be included as covariates at level-1 to control for differences in these characteristics. The hypotheses are directional and anticipate that children in the iAmHealthy condition will have a better response to intervention than children in the control condition.

While attrition and incomplete data may be unavoidable, the deleterious effects missing data may have on our results can be mitigated through a combination of careful data collection and thoughtful analysis. Full information maximum likelihood estimation, which uses all available data to build a multidimensional likelihood function for each highest-level unit (schools), will be used for the multilevel models. For variables brought into the likelihood function, any missing cases are assumed missing at random, which means random only after conditioning on model predictors and the observed outcomes. Reasons for student departure

(e.g., dropout versus changing schools) can be tracked and included as model predictors to help reduce the bias that might otherwise be created.

2.9.3 Qualitative Analyses—Research indicates qualitative methods can be highly effective in studying interventions in health behavior change.²⁷ Families who participate in the qualitative portions of the current study will be verbally consented over the phone, and will be asked a series of structured questions regarding why they elected not to enroll (or in the case of the maintenance interviews with school staff, questions related to those issues). Questions will focus on hypothesized barriers as well as hypothesized solutions, all using open-ended probes. These interviews will be transcribed and analyzed using the accepted qualitative analysis techniques of Morgan and Krueger.²⁸ Any discrepancies on themes will be resolved prior to dissemination.

2.10. Questionnaires

A demographic questionnaire will ask about age, race, ethnicity, income, free/reduced lunch status, and parental education. We will also assess for the availability of home computers, high-speed internet access, tablets, smartphones, or other technology already present in the home that could be utilized for secure videoconference connections in future studies.

Food insecurity will be measured using the 5-question survey from the Centers for Disease Control and Prevention instrument to measure food insecurity,²⁹ including whether they had enough money to buy meals, had balanced meals, skipped meals due to money, ate less than they felt they should, or went hungry because they could not afford more food. Questions are asked of adult participants (as is typical). Previous research has indicated this measure is reliable and valid for US populations.²⁹

In order to assess for possible contamination effects, participants will complete a short post-intervention questionnaire asking about any contact they had with their primary care physician during the intervention period, as well as other weight loss efforts or health behavior change efforts in which they engaged.

Technology problem logs will be kept by group leaders to record difficulties they have 1) connecting to the participant homes or 2) with technology interruptions during sessions. Our previous research indicates these problems are rare, but the degree of these types of problems when delivering groups to the home is unknown.

3. Conclusions:

This study is one of the first randomized controlled trials targeting the treatment of pediatric obesity using an intervention with over 25 contact hours delivered remotely via technology. Pediatric obesity rates are unacceptably high, and children from rural areas are disproportionately affected. While prevention efforts are key, experts agree that empirically supported treatments are also needed. Few interventions have been designed to treat pediatric obesity among rural children, and those that have been developed are not currently available in rural areas. Previous research indicates that mHealth is feasible and acceptable for the delivery of pediatric obesity interventions to rural children, lowering child BMIz, and

helping children and families to significantly change their health behaviors. The current trial extends this work in a new and innovative direction by moving the mHealth intervention into rural family homes, increasing convenience and dose simultaneously. The results of the iAmHealthy trial may significantly impact the way we treat obesity among rural children and families by providing a scalable, minimally burdensome option for rural families who have limited access to weight management services.

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Figure 1. Prevalence of obesity in Kansas children by location.

Percentage of participants in each BMI category not statistically significant (χ^2 (2, N = 135) = .949, $p = .622$).

Table 1.**iAmHealthy Intervention Topics**

iAmHealthy Standard Intervention Topics		Rurally Tailored Topics
Goal Setting & Sticker Charts	Reading Food Labels	Decreased focus on fast food
Stop Light Diet	Energy Balance	Increased focus on eating at social gatherings
Parent Healthy Behavior Changes	Use of Privileges	
Decreasing Sedentary/Increasing Physical Activity for Parents and Children	Family Exercise Ideas and Cooking with a Limited Budget	Increased information on exercise activities for children that can be done alone (due to poor proximity to neighbors, etc.)
Praising & Ignoring/Making Healthy Choices	Parties, Barb-B-Qs, and Eating Out	
Monitoring Screen Time	Nutrient Density	Increased attention to self-esteem
Portion Sizes/Healthy Foods in the Home	Self-Esteem	Tips for dressing appropriately for larger body types

Table 2.

RE-AIM measures used in the iAmHealthy Intervention.

RE-AIM Measures Timeline				
Primary Outcome Measures		Baseline	8 Months	20 Months
	24-hour food recall (child)	X	X	X
	Physical Activity Monitors (child)	X	X	X
	Child BMIz/Parent BMI *	X	X	X
Reach				
	Participation	X	X	
	Structured Interview with Non-participants		X	
Efficacy				
	HRQOL (parent, child)	X	X	X
	Parent Distress (parent)	X	X	X
	Peer Victimization (child)	X	X	X
	Child Depression (child)	X	X	X
	Satisfaction (parent, child)		X	
	Stigma (parent, child)		X	
Adoption				
	Assess Representativeness of Participating Schools	X		
Implementation				
	Attendance/Participation		X	
	Cost		X	
	Group Process		X	
Maintenance				
	Structured Interviews with Participating Schools		X	
Other Measures				
	Demographics (parent)	X		
	Food Insecurity	X		
	Post Questionnaire (parent)		X	
	Technology Feasibility (parent)	X	X	

* Child BMIz/Parent BMI will be taken monthly throughout the 8-month intervention period.