

Development of a Primary Care Physician Intervention in the Management of Overweight and  
Obesity in Children and Adolescent: A Pound of Cure

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## **Introduction**

Childhood obesity is a complex multifactorial public health problem that not only has behavioral and genetic contributions, but also social and environmental ones. As a result, obesity is our greatest challenge as a pediatric health care community, one that requires urgent attention by all physicians. Despite this urgency, many physicians have failed to engage the patients and parents in their practice around the topic of obesity. Many physicians consider it futile, too time consuming, and poorly reimbursed; others simply feel unprepared to counsel effectively.<sup>1-3</sup> Yet in early childhood, when obesity takes root, physicians have unparalleled access and influence to reshape the family's collective habits to prevent or reverse overweight. The national guidelines encourage physicians to provide preventative counseling, weight and laboratory screening, and intervention for excess weight. Targeting children within the first decade of life, provides an opportunity to intervene in obesity before unhealthy diet and activity habits, and attitudes are fully fixed. Unfortunately, many challenges exist, preventing primary care physicians from addressing the problem of childhood obesity.

## **The Critical First Decade of Life**

The prevalence of childhood overweight and obesity has steadily increased over the past thirty years.<sup>4</sup> Since 1963 we have experienced an abrupt rise of overweight among all U.S. youth; one third of American youth are overweight (above the 85<sup>th</sup> percentile for body mass index, BMI) and 18% are obese (above the 95<sup>th</sup> percentile BMI). Examined by age group, the prevalence of obesity was 12.4%, 17.0%, and 17.6% for children aged 2 to 5, 6 to 11, and 12 to 19 years of age, respectively.<sup>5,6</sup> This illustrates how extensive the epidemic has become and how early in life it takes hold. Furthermore, when looking at the same group of individuals, the

prevalence of extreme obesity, defined as a BMI  $\geq$  97th percentile, was 8.5%, 11.4%, and 12.6% for children ages 2 to 5, 6 to 11, and 12 to 19 years of age, respectively.

Of particular importance are the children under the age of 11 as they experienced an increased prevalence of obesity of 3% in a four-year period.<sup>5,6</sup> Children who are overweight in preschool have a 5-fold greater risk of being overweight at the age of 12. Moreover, a preschool child has an 8% chance of becoming an obese adult, whereas a child who is overweight or obese in middle school has an 80% of being obese when 25 years old.<sup>7</sup> With these statistics in mind, many suggest approaching childhood overweight while the child's lifestyle behaviors are still malleable and under parental control.<sup>8-11</sup>

Well-child visits offer the best public health opportunity to instill proper nutrition and physical activity habits in very young children and to monitor their progress. For children from birth to 5 years old, primary care physicians have 12 scheduled visits to provide advice for families. However, as children age, well-child visits become less frequent, making earlier visits crucial to shape behavior, especially for children at risk for excess weight.

Management of overweight and obesity can only begin when the child is identified as overweight. The process begins with finding a BMI percentile at or above the 85<sup>th</sup> percentile, yet only 12.5% and 13.3% of pediatricians and PNP's, respectively use BMI percentile to assess excess weight, while the majority use their physician impression.<sup>12</sup> Once the child is identified as overweight or obese, that diagnosis should be documented and acted upon. Yet, only 5% and 28% of overweight and obese children, respectively, had this diagnosis charted in their medical record.<sup>13</sup> Unfortunately, pediatrician recognition of childhood overweight increases as the severity of a child's overweight and obesity status increases, missing many opportunities to identify children entering the overweight category.<sup>14</sup>

Following the trajectory of a child's rising BMI percentile can aid in physician recognition of overweight and obesity even at an earlier age, which is ideal for a proactive approach to the prevention of overweight and obesity. Physicians can influence the parents' urgency regarding the child's weight status using the objective BMI status, especially when steadily rising. In a study by Barlow et al, pediatricians reported that they discussed the child's weight status in 96.2% of office visits in which identification of overweight or obesity occurred.<sup>14</sup> However, a recent sample of parents revealed that only 22% with an obese child and 14% with an overweight child recalled the physician mentioning the child's abnormal weight gain or the state of obesity.<sup>15</sup> Ideally, making the child's BMI percentile a brief discussion during every well-child visit will heighten the family's sense of concern as the child increasingly acquires excess weight. At the same time, the BMI percentile can be useful to repeatedly open a dialogue about ways to establish healthful eating habits, providing direction to curtail rapid weight gain.

### **Expert Committee Recommendations**

In 2007, The American Academy of Pediatrics and 14 other collaborating organizations formed the Expert Committee on Prevention, Identification, and Treatment of Obesity. This group published their Recommendations (ECRs) to provide a guide for physicians about the specific steps that should be undertaken to help families facilitate their child to avoid or manage overweight. The published guidelines covered how to screen for, assess, and manage excess weight in general pediatric practice. The recommendations were rooted in scientific research, compiled to achieve optimal effectiveness in clinical practice. The nine ECRs include:

- Encouraging exclusive breast feeding during the first 6 months of life
- Having breakfast daily

- Encouraging family meals
- Limiting fast food consumption
- Increasing fruits and vegetables
- Limiting sugar-sweetened beverages
- Eating age-appropriate portion sizes
- Limiting screen time to 2 hours per day
- Participating in at least 60 minutes of physical activity

These messages can be delivered as anticipatory guidance for preventative purposes while children are younger or can be used as part of the intervention strategy when the child has been identified with a rising BMI or a BMI over the 85<sup>th</sup> percentile. Targeting children with these messages while they are younger and while parents are more influential may prove to be beneficial for obesity prevention or for excess weight management.

The Expert Committee provided physicians with an algorithm for addressing overweight and obesity in children and adolescents, beginning with identification of a BMI percentile that indicates whether the child is normal weight (or underweight) versus overweight or obese.<sup>16</sup> The Center for Disease Control and Prevention and the World Health Organization have provided growth charts and other resources that can be used in practice to identify a child's weight status based on the child's age and gender.<sup>17</sup>

Once the physician confirms that the child is either rapidly cutting across BMI percentile ranks or is already overweight or obese, the focus shifts to an assessment of the degree of health risk. This is accomplished by conducting a thorough collection of the child's family history centered on obesity and cardiovascular diseases, a targeted review of systems and physical exam focused on obesity-related disorders, and ordering appropriate screening blood tests. The

identification of a child at risk mandates screening labs, according to the Expert Committee guidelines. Depending on the age of the child and the extent of overweight, the labs will include some or all of the following: a lipid panel to identify high triglycerides, LDL or VLDL cholesterol, or a low HDL cholesterol; a fasting glucose for glucose intolerance or early type 2 diabetes; ALT and AST for evidence of non-alcoholic fatty liver disease (NAFLD). However, less than 58% of pediatricians adhere to these recommendations.<sup>12</sup>

Finally, the physician should conclude the history collection with an assessment of behavioral risks that affect energy balance, such as the child's and the family's sedentary time and physical activity behaviors, meal and snacking habits, and daily schedule, including sleep time. In this aspect of the history, the physician is seeking to identify modifiable behavioral risks that contribute to the child's energy imbalance. Behavioral risks fall into two categories: traditional and non-traditional risk factors. Traditional risks are those dietary behaviors and physical activity-related behaviors that can be obvious contributors to the child's weight gain. Non-traditional risk factors include factors that compromise the child's daily life, including their daycare situation, sleep and wake times, and meals eaten as a family. The compilation of risks will identify for the physician which of the nine evidence-based ECRs should be addressed first when counseling the patient and the family on how to manage excess weight.

### **Barriers to Successful Management of Childhood Overweight**

Despite the Expert Committee Recommendations, physicians fail to adequately address excess weight management as evidenced by physicians' insufficiencies in most steps of the treatment plan. Physicians report that treating obesity within the primary care setting appears overwhelming, even though 78.1% and 89.1% of pediatricians thought that childhood overweight and adolescent overweight, respectively, warranted intervention.<sup>1</sup> However, lack of

patient motivation, lack of parent involvement, lack of support services, lack of physician time, lack of reimbursement for non-MD staff, lack of on-site dietitian, lack of patient education materials and lack of treatment skills have been cited as barriers to treatment of overweight children and adolescents.<sup>1,2</sup> Physicians also expressed that caregiver's fail to perceive weight as a problem and that treatment of childhood obesity may be more complex than treatment plans for adult obesity since it includes modifying the entire family's behaviors.<sup>3</sup>

To overcome the cited barriers, pediatricians expressed interest in learning behavioral management strategies, tips for resolving family conflicts, and guidance in parenting techniques. They would prefer to learn this information and acquire additional skill sets by referencing professional guidelines and taking CME courses.<sup>3</sup> Of all practice barriers cited by physicians, 96% of physicians expressed a need for better counseling tools to facilitate behavior changes within their patients.<sup>2</sup>

### **Define Success**

First, define "success"; that is, set reasonable goals for counseling. The primary objective of counseling should be to improve daily habits. Markers of success would include improved dietary choices, increased daily activity and therefore, a reduction in sedentary time. In addition, structured daily schedule, improved family commitment and confidence, as well as creation of a network of support surrounding the patient, are all fundamental foundations for weight management. Weight is not the sole, or even the most important, early measure of success.<sup>18-20</sup> Involvement of the family is crucial since parents, especially mothers, are the most powerful agents of child for a young child.<sup>8-11</sup>

## **Overcome Barriers**

Of importance is the family's confidence to influence their child's diet and activity patterns. Parents of children 2-11 years old had higher self-efficacy to manage their child's lifestyle behaviors than did parents of children older than 12 years.<sup>21</sup> Furthermore, parents of obese children had lower levels of self efficacy to modify their child's eating and activity behaviors.<sup>22</sup> Thus, physicians should view the management of the child's weight as a stepwise, incremental process, enacted through a series of office visits.<sup>18</sup> The intervention is individualized, designed in conjunction with the family, and initiated at the initial screening office visit.<sup>23,24</sup>

The physician will guide behavioral modification of traditional and non-traditional risk factors by encouraging families to set goals, to self-monitor daily progress towards goal achievement, and to equip the families with the knowledge and skill to accomplish the defined goal.<sup>18,19</sup> Golan & Weizman describe how physicians should work to increase parental nutrition knowledge and health skills, to encourage parents to reframe their relationship with their child, how to exercise parental leadership and general skills, and to promote problem solving. Physicians encouraged families to structure daily activity, practice regular meal, snack activity, and screen time, and to create an environment that reduces cues for overeating.<sup>23</sup>

Brief negotiation approach, a modified version of motivational interviewing, can be used within the time constraints of the typical primary care office visit. The brief negotiation approach takes between 5 and 15 minutes; it allows the physician and family to decide how to approach the weight management process, picking goals to work on between now and the subsequent office visit. This approach can be used at future office visits to discuss the progress

the family has made, the family's self-efficacy to continue behavioral modifications and future goals and directions.<sup>25</sup>

Routine counseling often is late and non-specific. In a self-reported survey on office visits with preschool aged children, only 50% of pediatricians made recommendations for weight control, compared with school-aged children where 82% of pediatricians made such recommendations.<sup>26</sup> Pediatricians suggested dietary changes such as “changes in eating patterns” and “limiting specific foods”, and physical activity changes such as “increase in free play” and “decrease in sedentary behaviors”. Pediatrician adherence to the ECRs was approximately 40% for dietary behaviors and 80% for physical activity related behaviors.<sup>26</sup> Physicians spent longer times counseling on diet and physical activity when the child was recognized as overweight or obese, although the time devoted to such counseling was only two or more minutes in length.<sup>14</sup> Contrary to intuition, when the targets are specific and counseling clear, the number of office visits required are few and the amount of physician-facilitated counseling time limited. The key is to focus on the behaviors cited by the Expert Committee and offer tips, handouts, encouragement and parenting advice to help achieve those goals.<sup>27</sup>

Better counseling tools may increase physician self-efficacy and therefore making one more confident in their counseling abilities, ultimately improving excess weight management. Another tool to bolster confidence and to improve self-efficacy may include obesity counseling training sessions, which could include information on the topics of detecting unhealthy weight trajectories, how to communicate sensitive weight issues to parents, how to provide evidenced based messages on diet and physical activity, and how to follow up on counseling messages.<sup>28</sup> Perrin et al. conducted an intervention with the training session described. She provided physicians with ways to initiate discussions on weight management, the “Promoting Healthy

Weight” counseling tools, BMI color-coded charts, and tools to assess parental readiness to change. Physicians who participated in this intervention experienced an increase in self-efficacy in their ability to interpret BMI, identify risky eating and physical activity behaviors, and their ability to counsel on risky eating and physical activity behaviors.<sup>28</sup> Physicians also found that it was easier to counsel on healthy eating, physical activity and healthy weight and that they had increased their frequency of discussions on dietary habits and physical activity.

Additionally, equipping physicians with counseling strategies may better prepare physicians as they begin discussions on weight management. Focus groups with parents of overweight children provided insight for physicians on how they should approach and facilitate discussions on pediatric overweight.<sup>29</sup> Parents felt such discussions should begin with pediatricians classifying the child’s weight status and referring to national standards and discussing the associated health risk of excess weight would help parents understand the issue at hand. Two of the ECR messages, limiting sugar sweetened beverages and screen time to two hours, were considered confusing and barriers to treating excess weight. Sugar sweetened beverages should be clearly defined, especially fruit juices and 100% juice, and recommendations made for serving number and size. Preschool aged children should consume no more than one, 4-6 oz glass of 100% fruit juice and the rule of thumb is that children should consume no more than half of their daily servings of fruit from juice.<sup>30</sup> Another area of concern was screen time, defined as time watching TV, using a computer, playing video games, or playing in a room where children’s programming is on. Parents expressed difficulty in limiting screen time during inclement or colder weather or limiting screen time when they felt it was educational. Although challenging, pediatricians can recommend more interactive family time

instead of screen time, moving during commercials, scheduling screen time and structured and unstructured playtime using an activity calendar.<sup>31, 32</sup>

### **Frameworks for Management of Childhood Obesity**

To improve obesity management, physicians need to know the Expert Committee Recommendations, to feel barriers to treatment are minimal, to have high self-efficacy to participate in behaviors required by the excess weight management process, and to have access to counseling processes and resources. Treatment of excess weight in children requires a comprehensive framework to outline an obesity plan that will allow physicians to effectively tackle childhood obesity. However, a simple mnemonic device can help start the process. The 5-2-1-Almost None (5-2-1-0) recommendations have been championed within the American Academy of Pediatrics. The 5-2-1-0 behaviors include: eating **5** or more servings of fruits and vegetables each day, limiting screen time to less than **2** hours per day, being physically active for at least **1** hour each day, and consuming little or **0** sugar sweetened beverages, except for flavored milk. However, the Expert Committee drafted **9** recommendations, not **4**, therefore we modeled our educational materials on the ECRs. We have developed the Pound of Cure (POC) training package; the package incorporates all nine ECRs plus non-traditional risk factors into the Expert Committee's algorithm. This package will provide physicians with a comprehensive approach to excess weight management.

### **Development of A *Pound of Cure* Primary Care Counseling Model**

Within the primary care setting, we have established streamlined office visit modules founded on the ECRs. Beginning the summer of 2009, we piloted this comprehensive set of modules, entitled "A Pound of Cure" (POC), within the Hilltop region of Columbus, Ohio.

These office visit modules allow efficient collection of information, effective counseling, and distribution of materials for child and family to reinforce messages.

### **Development of Educational Materials**

We developed a unique set of educational handouts for use at the Hilltop clinic. Using handouts previously made by the Center for Healthy Weight and Nutrition (CHWN) at Nationwide Children's Hospital, the ECRs, and additional research in the literature, we drafted the counseling handouts. Particular attention was given to the language of the documents ensuring that materials were written at the fifth grade reading level while maintaining the integrity of each ECR message.

Originally, eight, half-sheet handouts were developed in Microsoft Word to address:

- the importance of breakfast every day
- eating age-appropriate portions
- limiting sugary beverages
- increasing family meals
- limiting eating out
- increasing fruits and vegetables
- increasing physical activity
- limiting screen time

Accompanying each handout is a self-monitoring or tracking sheet to increase patient awareness of each behavior. Patient satisfaction guided development of counseling materials on each ECR. Patients were interviewed after their first visit and on several follow up visits; interviews indicated that the earlier materials were visually unappealing, lacking color and adequate pictures. We revised handouts using Microsoft Publisher. Current materials occupy a full page of paper, utilizing vivid color, graphics, and include new sections. Handouts contain facts on each ECR, a parent tip area, a goal section mirroring the respective tracking sheet, and in some, an activity for the children. Additionally, we updated the tracking sheets, mirroring the goals on the ECR handout. Patient satisfaction with new materials substantially improved;

families stated that the materials had the appropriate number of pictures, text, color, and information. In August 2010, to meet the needs of the population we serve, our handouts were translated into Spanish; this allowed us to enroll Spanish-speaking participants into our pilot program, since approximately a third of the Hilltop population is Latino and their primary spoken language is Spanish.

Thus far, we have created educational materials shaped to meet the needs of our patient population. We then worked to develop a progress note in the electronic medical record (EMR) to guide the physician through each module. The progress note allows for a thorough but concise history collection, one that complements history collected in the forms completed by the patients. During the initial visit, families complete two history collection forms on the child's eating and physical activity habits and their family history. The EMR note also incorporates patient handouts and the goals and topics discussed during each office visit. **Figure 1** is a screenshot of the Hilltop progress note in Epic, the EMR used by Nationwide Children's Hospital and depicts similar problematic eating and activity behaviors addressed on the history collection forms developed. Physicians can use the printed history forms on these behaviors or view the progress note in Epic to guide discussions.

Physicians are then prompted to provide and discuss handouts based on the problematic eating and physical activity behaviors identified. The handout section provides a list of all possible handouts, allowing physicians to multi-select the handouts discussed; physicians can adhere to the *POC* office visit outlined on "Keeping it Balanced" or order the office visits, and consequently the handouts, based on the needs of the patient. After the physician selects the handout he gave the family, a drop down menu appears, from which he can choose the goal(s) that were set for that handout's ECR. The order of the goals within the progress note is the same

as that listed on each handout. Finally, the physician writes what will occur at subsequent office visits. The physician will copy the care plan into the patient’s homegoing note to review with the family. We have built the Epic progress note to guide physicians through the office visit modules by facilitating and easing:

- Collection of family, diet and physical activity risk factors
- Documentation of:
  - Handouts distributed and
  - Goals set for each office visit.
  - The child’s care plan.

**School attendance:** {HWN SCHOOL ATTENDANCE:50288818}  
**Meals eaten in a typical day:** { :10022}  
**Problem eating areas:** {HWN PROBLEM EATING AREAS:50288827}

**Eating & Activity Behaviors:**  
**Water:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Vegetables:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Fruits:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Fried Foods:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Regular Soda:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Diet Soda:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Milk:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Fast Food:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**Eating Out:** {HWN FOOD CATEGORY FREQUENCY:50288828}  
**High Calorie Beverages:** {HWN HIGH CALORIE BEVERAGES:50288828}

Every day
Several times a week
Once a week
Once a month
Less than once a month
Never
***

**Physical Exam:**  
**Vital Signs:** There were no vitals filed for this visit. No weight on file.  
 , No height on file.

**BMI:** There is no height or weight on file to calculate BMI. Normalized BMI data available only for age 2 to 20 years.  
**Measurements:** Neck: | cm    Waist: | cm  
 {HWN PE:50281502}

|

**Impression:**  
 No diagnosis found.

**Figure 1.** Screenshot of EPIC, the electronic medical record, progress note for initial assessment of obesity related health risk. This section of the note emphasizes dietary risk.

We only developed two progress notes for *POC*, one for the initial visit and the second for all subsequent return visits. The Epic progress notes for office visits 2-5 contain all the information found in the initial visit's progress note with the exception of the history collection. As stated before, the counseling package can adhere to the office visit order described in the "Keeping it Balanced" handout or the physician can modify the order of office visits. For the latter reason, as we developed the progress note for visits 2-5, we allowed for variability in the handouts and topics discussed. The progress note permits physicians to select any possible handout, goal, etc, again based on the needs of the child. The structure of the Epic progress notes is complete and we are currently waiting for the modules to be integrated into the live environment. Epic modules will be tested and modified over the next couple of months.

The office visit modules, patient educational materials, and the Epic progress note were all subject to multiple modifications. We did not conduct the pilot study as a traditional research study, where all materials were in their final drafts and implemented as a final package, instead we conducted multiple, mini studies on the materials, modifying as needed. In essence, we conducted a series of plan-do-study-act (pdsa) cycles. As discussed above, child and parental feedback were responsible for final drafts of the patient educational materials. Our physicians also provided input on the handouts that eased the counseling process from their perspective. The patient interviews, questionnaires and chart review provided valuable feedback for continuation of our primary care model. Throughout the enrollment process we have surveyed families pre- and post- initial visit and upon completion of visits, to gather themes on expectations, perceptions, attitudes, and satisfaction with materials and physician counseling. When asked about the office visit modules 98% of families felt that they spent an appropriate amount of time with the doctor, 94% of families felt that they had good discussions with the

doctor and 96% of families felt that they obtained information that was specific to their child. On new information discussed during the office visits 75% of parents felt their received the right amount of new information, 15% thought there was too little new information presented and 10% thought too much new information was presented. From these interviews, we have modified office visit modules as needed, discussing the feedback with our physicians.

In a similar fashion, we structured and ordered the office visit modules. A chart review, uncovered a theme in the problematic behaviors commonly discussed during the first visit, inappropriate portion sizes, overconsumption of sugar-sweetened beverages and consumption of high fat dairy products. Initially these topics were introduced during all first visits and discussed detail at the second visit. However the scope of the initial visit shifted to assessment and identification of the child’s obesity health risk by collecting the child’s history, structuring the office visit modules for the time-limited primary care environment. With a complete history, physicians introduced the topic of Energy Balance and outlined topics for future visits. Therefore, “Energy Balance” became the first office visit. The second visit’s theme became “Excess Calories”. We then decided how to order the remaining ECR topics based on themes. The third visit discusses how to keep the child active and was aptly named “Keeping Active”. We discuss “The Importance of Routine” during the fourth visit and conclude the series of office visits with “Nutrient Rich Foods”. The handouts and topics discussed during each office visits is explored in greater depth below.

### **Outline of *Pound of Cure* Office Visit Modules**

The *POC* counseling package provides educational materials and resources that guide the physician through a simplified weight management process for children between the ages of 2 and 11, with a BMI percentile greater than or equal to the 85<sup>th</sup> for age and sex. When the

physician encounters a child with an elevated BMI, he can approach excess weight discussions with the patient and family using POC materials. **Table 1** outlines all 5 office visits and the materials included in each office visit. By the beginning of the pilot study it was evident that our physicians needed to individualize the office visit modules to meet the needs of the child's identified obesity related health risks. The order of office visits we listed below, simply provides a guide for physicians with less experience, as they begin counseling on excess weight. Again, the modules can be individualized based on the health risks identified during the child's history collection.

During the initial modularized encounter, the physician will collect a detailed history on the child's diet, physical activity, and family history, using the provided history collection forms, and the physician can obtain a clear picture of the child's obesity related health risk. We developed forms to collect diet, physical activity, and family history to evaluate the child's total health risk based on those behaviors and family history characteristics considered risk factors by the Expert Committee. All history collection forms were incorporated into electronic medical record, EMR, to streamline history collection within the Ambulatory network at Nationwide Children's.

At this point excess weight related discussions could begin by discussing the concept of energy balance. The "Keeping it Balanced" handout depicts a balance and discusses the importance of balancing what one eats, termed "energy in" with one's physical activity, defined as "energy out", providing a list of the Expert Committee Recommendations (ECRs) that will equip families with the knowledge to maintain that delicate balance. Based on the child's history, the physician will identify which of the ECRs the family should pay attention to, checking the box next to each "energy in" and "energy out" topic that pertains to the child. The

## Pound of Cure Office Visit Modules

Office Visit	Office Visit Topic	Handouts	Topics Discussed
1st Visit	Energy Balance	Keeping It Balanced Diet, Activity & Family History 3 Day Food Diary Go, Slow, Woah! Foods Guide to Good Eating	This first visit discusses the importance of balancing what one eats with the activity one does. We gather an intense history identify the child's obesity-related risk factors. We briefly discuss age-appropriate servings and how to move the family from eating nutrient poor foods to nutrient rich foods.
2nd Visit	Excess Calories	Proper Portions Snack It Up Sugary Beverages Juice The Milk Group	There are many areas that provide excess calories. We discuss how to measure age-appropriate portions, snacking, limiting sugar-sweetened beverages, differences between juices, and how to meet one's daily requirements of calcium.
3rd Visit	Keeping Active	Physical Activity Screen Time No Screens in the Bedroom Tracking Sheets	A majority of children watch over 2 hours of TV a day. During this visit, we provide suggestions for decreasing screen time to less than 2 hours a day while talking about the importance of physical activity.
4th Visit	Routine is Important	Breakfast Family Meals Eating Away From Home Sleep	Providing children with a structured day that includes breakfast, regularly occurring family meals, limited eating out, and a consistent sleep schedule instills better eating and activity habits.
5th Visit	Nutrient Rich Foods	Fruits & Veggies Know the Facts Shopping Guide Eating on a Budget	The final visit applies the topics discussed during previous visits to the Nutrition Facts Label. We walk families through the Nutrition Facts and provide them with a Shopping Guide and how to eat on a budget. We also talk about incorporating additional fruits and vegetables in the child's diet.

**Table 1.** Pound of Cure office visit modules. Outline of topics discussed and handouts distributed at each of the five office visits.

physician can individualize the child's care plan by checking with topics will be discussed during subsequent office visits or he can follow the office visit order listed at the bottom portion of the "Keeping it Balanced" handout. Then the physician will discuss 3 handouts with the family "Go Slow Woah! Foods", the "Guide to Good Eating", and a 3 day food diary. The first two handouts provide families with an overview age appropriate servings for each food group and a chart with examples of nutrient poor and nutrient rich foods. With the National Dairy Council's permission, we have modified their Guide to Good Eating handout. We removed the serving number suggestion from the handout and replaced it with a black space that allows physicians to fill in age-specific serving numbers. Physicians can reference the EMR for the suggested age-specific number of servings for that child. Finally, the physician will ask the family to complete a 3-day food diary to capture any problematic eating behaviors not identified during the initial history collection. Families should complete the diary for 2 weekdays and 1 weekend day. At the conclusion of the first office visit the physician should have:

- Conducted a thorough history collection to identify the child's obesity related health risk
- Discussed energy balance, highlighting topics for subsequent office visits
- Briefly discuss age appropriate servings, filling in the recommended serving #
- Raise awareness about differences in foods' nutritional content
- Provide families with a 3-day food diary.

During the second office visit the physician will begin by reviewing the completed 3 day food diary and identify any problematic eating areas that were omitted during the initial history collection. The physician will target food behaviors that lead to consumption of excess calories, affecting the child's "energy in". Depending on the child's identified risks, the physician may discuss one or all of the topics included in this office module. Topics include age appropriate portion sizes, reducing sugar-sweetened beverages, providing healthy snacks, and consuming

adequate servings from the dairy group. The physician may provide the family with up to 5 handouts during this visit, which may include:

- Proper Portions
- Snack it Up
- Sugary Beverages
- Juice
- The Milk Group

The third office visit covers topics related to “energy out” and how families can manage their child’s physical activity levels. Here, the physician will discuss the importance of limiting screen time, where a screen is defined as a television, computer, video, video game, cell phone, and sometimes even MP3 players. The physician should also emphasize that all screens should be removed from the child’s bedroom. While offering information on how to reduce screen time and other sedentary behaviors, the physician can offer ideas about increasing the child’s physical activity levels to 60 minutes or more per day, using the Physical Activity handout. At this office visit, physicians should provide families with the following handouts:

- Physical Activity
- Screen Time
- Tracking sheets for activity time and pedometer steps

The importance of routine is discussed during the fourth office visit. Providing the child with a structured day and healthy lifestyle habits has been suggested to help manage excess weight. Starting the day off with breakfast is one piece of advice the physician may provide to the family. The physician may discuss how the family can have regularly scheduled family meals. Additionally, if the family cannot eat at home, the physician can provide tips for eating away from home. Finally, the physician may talk about establishing a consistent sleep routine

for the child each and every night. At the conclusion of this office visit, the physician will have covered the topics listed on these handouts:

- Breakfast
- Family Meals
- Eating Away from Home
- Sleep

The fifth and final visit builds upon previous office visit modules to address additional skills that may be required by parents as they complete the counseling process. The final ECR message, consuming adequate fruits and vegetables, is discussed during this visit. The physician will walk families through the Nutrition Facts Label, referring back to previously discussed topics. The family will receive a shopping guide with examples of foods from each food group to target during the next grocery shopping trip. Finally, the physician may discuss simple tips for eating healthy for those with economic constraints. The final office visits will give families the following handouts:

- Fruits and Veggies
- Know the Facts
- Shopping Guide
- Eating on a Budget.

## **Results of *Pound of Cure* Pilot Study Office Visit Modules**

### **Study Population**

Two physicians from Nationwide Children’s Hospital Center for Healthy Weight and Nutrition helped guide POC educational materials and EMR development. They also served as “primary care physicians”, seeing patients at the Hilltop clinic. The pilot study clinic was approximately four hours long, held one day a week.

The average age of children referred into our program is 8.3 years of age, although we have counseled children ranging from three to 18 years of age. Male and female children were equally represented in the pilot study. Thirty nine percent, 39 %, 18% and 37% of the patients seen at the Hilltop clinic self identified as Caucasian, African American, or Latino, respectively. Only 2.4% of our population was classified as overweight (BMI percentile between 85<sup>th</sup> and 94<sup>th</sup> percentiles) with the remainder of the population obese. Sixty-nine percent of the obese population was at or above the 99<sup>th</sup> percentile for BMI. Weight maintenance was an important objective for many children seen by our physicians.

### **Patient Population Results**

Twenty-seven percent of children that returned to the clinic either maintained or lost weight. Average weight loss was 1.03 kilograms over an average of 78 days. The remaining 73% of children experienced an average weight gain of 1.73 kilograms over an average period of 102 days. While reviewing the data, one should remember that weight loss is not the ultimate goal for this study; as families attend the series of office visit modules we aim for weight maintenance and behavior modification towards those recommended by the Expert Committee. Furthermore, 57% percent of our patients either maintained or experienced a decrease in their BMI, signifying that they were growing into their weight, through weight maintenance and growth in stature; average BMI reduction was 0.18 kg/m<sup>2</sup>. It is important to remember that many of the patients included in these conclusions have completed all office visit modules; these children will continue to acquire knowledge to modify behaviors to manage excess weight.

On average, motivated families that returned to the clinic needed to complete only three to four modules to successfully incorporate the ECRs into the child's daily life. On average three goals were set per office visit. Fifty six percent, 23% and 21% of the goals were set jointly

by the physician and family, made solely by the parents and made solely by the physician, respectively. Ninety five percent of families expressed that they were worried about their child's weight yet only 33% of families returned to the clinic for follow up visits. Of those returning families 38.5%, 47.3%, 8.7%, 5.2%, and 1.7% of families completed two, three, four, five or six office visit modules, respectively.

## **Conclusions**

The discrepancy between parents stating they were worried about the child's weight and the follow up return rate may be associated with the degree parents were worried about their child. Of parents who rated their degree of worry, 30.4% were worried a little bit, 13.1% were pretty worried, 30.4% were worried a lot, and 26.1% were really very worried. Another discrepancy may be that parents are unaware of the health risks associated with excess weight. Fifty-eight percent of families did not believe that their child's current weight may have associated health problems. However, 93% of families thought that their child could develop excess-weight related problems in the future. This warrants further investigation to understand why parents do not take a proactive approach to preventing excess-weight related problems from occurring. Furthermore, many families could not provide examples of health problems associated with excess weight but those who could, listed diabetes, asthma, high cholesterol, high blood pressure, and heart problems as health risks that could develop because of excess weight.

Thus far, our pilot program has:

- Streamlined evaluation of child's obesity-related health risk
- Developed patient resources to guide physician counseling, based on the ECRs

- Structured office visit modules and a directed counseling process for primary care physicians (which could be used by non-physicians, as well, such as nurse practitioners, nurses, dietitians or parent educators)
- incorporated counseling materials and physician prompts into Epic electronic medical record

## **Future Directions**

We learned that to be successful we needed to guide patients incrementally as they adjust their lifestyle. We accomplished this by:

- informing families about what to expect upon referral to an obesity specialist
- evaluating the family's readiness to change diet and physical activity related behaviors
- providing assistance for simple goal setting
- informing families about health risks associated with excess weight
- addressing barriers faced by families as they attempt goals (i.e., economic or time barriers).

As we continue to counsel families on excess weight, we plan to develop additional materials and counseling strategies based on the above guidelines. In the next phase, we plan to take what we have already developed and make it more culturally relevant for the Latino population. Already, we have translated all materials into Spanish. The next step is to ensure that the materials provide culturally appropriate tips addressing diet, food preparation, and barriers faced as families acculturate. We also intend to train additional ambulatory and community physicians to use the materials we created and then survey them on the utility and practicality of their use. We will supply valuable counseling tools for the management of excess weight in primary care practice.

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