A Primary Care Intervention for Management of Childhood Obesity

Dissertation

Presented in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Graduate School of The Ohio State University

By

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Abstract

Introduction: To support weight control and acquisition of healthy behavior in the families with overweight children, the essential first step is to create and sustain behavior change among the primary care providers (PCP) who are doing the counseling toward a standard of care. Despite regular access to families with young children, PCPs lack a comprehensive model for approaching office visits on pediatric excess weight. In 2007, an Expert Committee comprised of 15 national organizations established guidelines for a standard of care for managing pediatric excess weight centered on the PCP. Reluctance of PCPs to assume responsibility for weight management has been the result of numerous professional, practice, and patient related barriers. We hypothesized that improved PCP self-efficacy to counsel, documentation within the medical record around weight management, and knowledge of counseling recommendations, would improve the clinical effectiveness of PCPs and establish a standard of care around obesity management.

Methods: We developed "A Pound of Cure" (POC), a series of modularized office visits for use by PCPs, founded on the 2007 Expert Committee Recommendations. This program was piloted and efficacy established at an urban clinic with a diverse, low-income population by clinicians experienced in the tertiary care of obese children. The POC intervention tools provided PCPs with a counseling model, office systems, and educational tools to direct behavior modification in families with overweight children. Using a novel approach to behavior change first piloted in business, we adapted quality improvement methodology to host a 6-month Learning Collaborative comprised of Ohio PCPs. Here, we introduced the
POC intervention tools and evaluated effectiveness of POC in modifying PCP behavior. The quality improvement methods focused on integration of the POC model and ECRs incrementally into the primary care practices. Physician outcomes were monitored through monthly chart reviews and surveys regarding their knowledge of the ECRs and sense of self-efficacy to counsel the overweight patient. Practice narratives, site visits, and closing interviews highlighted practice specific implementation of POC. Secondarily, patient outcomes were monitored through patient registries.

Results: "A Pound of Cure" physicians achieved a standard of care around obesity management. The Learning Collaborative fostered flexible, practice specific adaptations of the POC model, supported by changes in office systems to support weight management counseling. Provider self-efficacy increased by 10.85 points (p=0.000) during the collaborative while knowledge remained constant. Monthly chart reviews reflected improved PCP documentation around all weight management counseling encounter measures; 100% documentation was achieved for all measures except for documentation of laboratory assessment. Patient and family engagement remained a constant obstacle to counseling. Still, those children who persisted and whose care was captured in the patient registry experienced a modest decrease in BMI percentile, 0.313% (p=0.067).

Conclusion: In summary, the POC Learning Collaborative was a novel mechanism to incrementally improve PCP self-efficacy and documentation around weight management visits and created a supportive primary care environment. By offering serial POC Learning Collaboratives, Ohio PCPs will establish a standard of care on pediatric weight management within the practice setting, the optimal site for early identification and intervention in childhood obesity.
Dedication

To Andy, I am extremely blessed to call you my best friend, husband, and father of our child. You have taught me many things: patience, not to worry, and most importantly, to eat my veggies. I love you so much and look forward to what the next chapter of our lives has in store for us.

To Luka, I did not know that I could love someone as much as I love you until they placed you in my arms. Thank you for being such a great boy and letting me write my dissertation. I know you are still too young, but always follow your passion and do what you love. Mommy loves you so much!

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iv
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# Table of Contents

Abstract ................................................................................................................................. ii
Dedication ............................................................................................................................... iv
Acknowledgements ............................................................................................................... vi
Vita ........................................................................................................................................ viii
Table of Contents ................................................................................................................ xi
List of Tables ........................................................................................................................ xiii
List of Figures ....................................................................................................................... xiv

Chapter One: Introduction .................................................................................................... 1

Chapter Two: Literature Review ......................................................................................... 14  
  Treatment Paradigm ........................................................................................................... 14
  Incorporating Behavior Change Theory into Clinical Practice ................................... 26
  Quality Improvement as the Framework for Behavior Change .................................... 47

Chapter Three: Program Development Phase – Development of and Pilot Study on “A Pound of Cure,” a Weight Management Curriculum .................................................................................. 55  
  Introduction ....................................................................................................................... 55
  Methods ............................................................................................................................. 58
  Results ................................................................................................................................. 61
  Discussion .......................................................................................................................... 71
  Limitations ......................................................................................................................... 74
  Conclusions ....................................................................................................................... 74

Chapter Four: “A Pound of Cure” Pilot – Secondary Patient Outcomes ...................... 76  
  Introduction ....................................................................................................................... 76
  Methods ............................................................................................................................. 79
  Results ................................................................................................................................. 81
  Discussion .......................................................................................................................... 87
  Limitations ......................................................................................................................... 92
  Conclusions ....................................................................................................................... 92

Chapter Five: Expansion of “A Pound of Cure” Primary Care Model .................. 94

Chapter Six: “A Pound of Cure” Pilot Learning Collaborative – Evaluation of Program Effectiveness ............................................................................................................................ 100  
  Introduction ....................................................................................................................... 100
  Methods ............................................................................................................................. 101
  Analyses ............................................................................................................................. 116

Chapter Seven: “A Pound of Cure” Pilot Learning Collaborative – Provider, Practice, & Aggregate Results .................................................................................................................... 117
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider Recruitment</td>
<td>117</td>
</tr>
<tr>
<td>Provider Outcomes</td>
<td>118</td>
</tr>
<tr>
<td>Practice Level Outcomes</td>
<td>121</td>
</tr>
<tr>
<td>Learning Collaborative Outcomes</td>
<td>131</td>
</tr>
<tr>
<td>Closing Dialogues – Lessons learned for moving forward</td>
<td>138</td>
</tr>
<tr>
<td>Conclusions – Utility of the Learning Collaborative Model</td>
<td>148</td>
</tr>
<tr>
<td>Limitations</td>
<td>153</td>
</tr>
<tr>
<td>Chapter Eight: Concluding Discussions</td>
<td>154</td>
</tr>
<tr>
<td>References</td>
<td>169</td>
</tr>
<tr>
<td>Appendix A: “A Pound of Cure” Learning Collaborative Key Driver Diagram</td>
<td>178</td>
</tr>
<tr>
<td>Appendix B: Chronic Care Model for Childhood Obesity</td>
<td>179</td>
</tr>
<tr>
<td>Appendix C: Initial Visit History Collection Forms</td>
<td>180</td>
</tr>
<tr>
<td>Appendix D: “Keeping it Balanced” Handout</td>
<td>182</td>
</tr>
<tr>
<td>Appendix E: “A Pound of Cure” Progress Notes</td>
<td>183</td>
</tr>
<tr>
<td>Appendix F: Behavioral Index</td>
<td>187</td>
</tr>
<tr>
<td>Appendix G: “A Pound of Cure” Primary Care Provider Surveys</td>
<td>192</td>
</tr>
<tr>
<td>Appendix H: “A Pound of Cure” Chart Review Materials</td>
<td>197</td>
</tr>
<tr>
<td>Appendix I: Office Systems Inventory</td>
<td>209</td>
</tr>
<tr>
<td>Appendix J: Monthly Practice Narrative Questions</td>
<td>212</td>
</tr>
<tr>
<td>Appendix K: Family Feedback Form</td>
<td>215</td>
</tr>
<tr>
<td>Appendix L: Closing Interview Questions</td>
<td>217</td>
</tr>
<tr>
<td>Appendix M: Follow-up visit Run Charts</td>
<td>218</td>
</tr>
</tbody>
</table>
List of Tables

Table 3.1 - Anthropometric documentation at POC follow-up visits (development phase) .. 69
Table 3.2 – POC office visit components (development phase).................................................. 70
Table 4.1 – “A Pound of Cure” pilot population follow-up visit characteristics ....................... 82
Table 4.2 – “A Pound of Cure” pilot patient demographics....................................................... 83
Table 4.3 - Medical risks for patients attending “A Pound of Cure” pilot office visits.............. 83
Table 4.4 - Obesogenic behaviors of patients attending “A Pound of Cure” pilot office visits... 84
Table 4.5 - Weight-related outcomes of patients attending POC pilot office visits. ............... 85
Table 4.6 - Regression Model for Follow-up Visit Attendance at POC pilot office visits. ......... 87
Table 6.1 - Chart review measures for POC initial and follow-up visits................................. 107
Table 7.1 - "A Pound of Cure" Learning Collaborative Provider & Practice Demographics –
Effectiveness Phase ............................................................................................................. 118
Table 7.2 - Results of provider self-efficacy survey ................................................................. 119
Table 7.3 - Results of provider ECR knowledge questionnaire .............................................. 121
Table 7.4 - Results of Office Systems Inventory by Key Driver ............................................. 122
Table 7.5 - Changes in individual office systems during the effectiveness phase. ................. 123
Table 7.6 - PDSA cycles conducted by practice teams during the effectiveness phase.......... 129
Table 7.7 - Documentation percentages for initial & follow-up office visit chart reviews
during the POC Effectiveness Phase .................................................................................... 131
Table 7.8 - Demographics of POC learning collaborative patients – effectiveness phase. .... 137
Table 7.9 - POC learning collaborative patient weight-related outcomes............................ 138
Table 7.10 - POC learning collaborative follow-up visit characteristics ............................... 138
List of Figures

Figure 1.1 - Tiered approach to obesity prevention and management as suggested by the Expert Committee.................................................................................................................. 11
Figure 2.1 - Assessment of the child’s obesity risk ................................................................................................................................. 21
Figure 2.2 - Prevention & treatment strategies based on the child’s identified health risk... 25
Figure 2.3 - Model for Improvement (Associates in Process Improvements) ......................... 49
Figure 2.4 - Institute for Healthcare Improvement’s Breakthrough Series Learning Collaborative Model........................................................................................................ 54
Figure 3.1- Social Ecological Model for Behavior Change................................................................. 56
Figure 3.2 - Methods utilized during the development and piloting of "A Pound of Cure".... 60
Figure 3.3 - Clockwise are versions of "Proper Portions." a) Initial draft of POC materials in Microsoft Word; b) Draft of POC materials in Microsoft Publisher (format with nutrition facts label); c) Final draft of POC handout used in learning collaborative..... 68
Figure 5.1 - Institute for Healthcare Improvement’s Learning Collaborative Model Adapted for the "A Pound of Cure" Learning Collaborative................................................................. 95
Figure 7.1 - Run chart on weight status measures for POC initial visits during the effectiveness phase........................................................................................................... 133
Figure 7.2 - Run chart on blood pressure measures for POC initial visits during the effectiveness phase........................................................................................................... 134
Figure 7.3 - Run chart on medical risk assessment measures for POC initial visits during the effectiveness phase........................................................................................................... 134
Figure 7.4 - Run chart on history collection measures for POC initial visits during the effectiveness phase........................................................................................................... 135
Figure 7.5 - Run chart on counseling measures for POC initial visits during the effectiveness phase........................................................................................................... 135
Figure A.1 - "A Pound of Cure" Pilot Learning Collaborative Key Driver Diagram. ................178
Figure B.1 - Chronic Care Model for Childhood Obesity (Jacobson et al.)............................ 179
Figure C.1 - Initial Visit history collection form (side one)............................................................ 180
Figure C.2 - Initial Visit history collection form (side two)........................................................... 181
Figure D.3 - "Keeping it Balanced" Handout ................................................................................ 182
Figure E.1 - Initial Visit Progress Note (Paper Version) ............................................................. 183
Figure E.2 - Follow up Visit Progress Note (Paper Version) ....................................................... 184
Figure E.3 - Screenshot of electronic medical record progress note (continued on next page)................................................................................................................................. 185
Figure E.4 - Screenshot of electronic medical record progress note.................................... 186
Figure H.1 - Image of POC initial visit chart review tool............................................................. 197
Figure H.2 - Image of POC initial visit summary sheet (side one).............................................. 198
Figure H.3 - Image of POC initial visit summary sheet (side two).............................................. 199
Figure H.4 - Image of POC follow-up visit chart review tool................................................... 207
Figure H.5 - Image of POC follow-up visit summary sheet...................................................... 208
Figure M.1 - Run chart on weight status measures for follow-up visits.................................. 218
Figure M.2 - Run chart on blood pressure and comorbid measures for follow-up visits.... 219
Figure M.3 - Run chart on counseling measures for follow-up visits.................................... 219
Chapter One: Introduction

The Critical First Decade of Life

The prevalence of childhood overweight and obesity steadily increased over a period of approximately thirty years.\(^1\) Data collected by the National Health and Examination Survey (NHANES) between the years of 1963 and 2006 revealed an abrupt rise of overweight in all U.S. youth. The most recent NHANES data demonstrated that the prevalence of obesity between 1999-2000 and 2009-2010 continued to rise in boys, while no trend appeared in girls. However, nearly one third (31.8%) of American youth (ages 2 to 19 years old) are overweight (above the 85th percentile for body mass index, BMI) and of those, 16.9% are obese (above the 95th percentile BMI).\(^2\) While the prevalence of overweight did not increase, national prevalence of obesity and extreme obesity has increased, particularly in adolescents, mainly boys and minorities.\(^3, 4\) In 2010, 12.3% percent of children were extremely obese (above the 97\(^{th}\) percentile BMI), and severe obesity (a BMI that exceeds the 99\(^{th}\) percentile) persisted in nearly 4\% of children and adolescents, a prevalence that has tripled during a 25-year period (1979 to 2004).\(^2, 5\)

Examined by age group, the NHANES data presented striking numbers during the most recent survey in 2010. The prevalence of obesity was 12.1\%, 18.0\%, and 18.4\% for children aged 2 to 5, 6 to 11, and 12 to 19 years of age, respectively. 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 was 9.7\%, 13.0\%, and 13.0\% for children ages 2 to 5, 6 to 11, and 12 to 19 years of age, respectively.\(^2\)
Of particular importance are the children between the ages of 2 to 5 and 6 to 11.\textsuperscript{5} In the short two-year time span between NHANES 2007 and NHANES 2009, the prevalence of obesity in preschool aged children increased by 2\% while it remained constant in school-aged children.\textsuperscript{2} Children who are overweight in preschool have a five-fold greater risk of being overweight at the age of 12. Risk accelerates quickly with age: 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\% chance of being obese when 25 years old.\textsuperscript{6} As more studies have come to light, it has become clear that obesity takes hold even earlier in life than previously thought; one practice evaluated weight-for-length data found a staggering 17\% of infants were obese by 24 months of age, a number much higher than the 10.1\% of overweight infants found in NHANES 2003-2004.\textsuperscript{7,8} Additionally, longitudinal data examining NHANES birth cohorts demonstrated that individuals reach a high prevalence of obesity at younger ages.\textsuperscript{9,10} Furthermore, studies of this nature demonstrated how obesity persists into adulthood and the small likelihood of an obese child becoming a non-obese adult.\textsuperscript{11,12} With these statistics in mind, many suggest approaching childhood overweight while the child’s lifestyle behaviors are still malleable and under parental control, to prevent weight-related co-morbidities and the accumulation of excess weight early in life.\textsuperscript{9,13-16}

Minority children are at higher risk for overweight and obesity.\textsuperscript{1,2,5,17-19} In the 2010 NHANES data, non-Hispanic black and Mexican-American children were more likely to be obese, a trend that was more striking in girls than boys.\textsuperscript{1,2,17,19} Additionally, non-Hispanic Black children experienced rapid adiposity rebound, a potential predictor of later obesity, earlier than their Mexican-American and White peers.\textsuperscript{20} Early identification and acculturated counseling should be tailored to meet the needs of minority children, given their increased risk for excess weight.
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 providers (PCPs) have 12 scheduled visits to provide advice for families. The timing of office visits provides physicians with frequent opportunities to counsel children during formative years, which occur during crucial growth periods. Adiposity rebound, a developmental period at which the child’s BMI is lowest and when body fat tends to begin accumulating, occurs when children are approximately 3 to 7 years old; girls and minorities tend to experience an earlier period of adiposity rebound. Similarly, the child’s weight trajectory should be monitored over the course of well-child visits, particularly those rapidly crossing BMI percentiles or when excess weight persists. 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.

**Beginning the conversation about excess weight**

For physicians to shape a child’s and/or a family’s diet and activity behaviors, they must first recognize and identify the child as overweight or obese. Yet, despite well-established BMI screening recommendations, few physicians have routinely followed the guidelines. In one study, only 12.5% and 13.3% of pediatricians and pediatric nurse practitioners, respectively, use BMI percentiles (BMI%) to assess excess weight, while the majority use their clinical impression. Following the trajectory of a child’s rising BMI percentile can aid in clinician recognition of overweight and obesity at an earlier age, which is ideal for a proactive approach to the prevention of overweight and obesity. Providers can influence parental urgency regarding the child’s weight status using the objective BMI status, especially when BMI is 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. 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. A study done several years later by Perrin, et al., elucidated similar results; only 22.4% of parents of overweight children recalled their health care provider mentioning their child’s overweight status. Furthermore, Perrin’s study highlighted that parent recall was more common in minorities, those publicly insured, older children, and children with more severe obesity. Ideally, making the child’s BMI percentile a brief discussion during every well-child visit will heighten the family’s awareness and sense of urgency 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.

**Why it is Important to Discuss Excess Weight**

Providers are responsible for addressing a child’s excess weight despite poor parental recognition or initial lack of concern. A family’s readiness to change health-related behaviors can only begin once the parents recognize that their child is carrying excess weight. Yet, depending on age and degree of obesity, only 10.5% to 79% of parents accurately perceive their child’s weight status. Importantly, parental recognition of a child carrying moderate excess weight is poor; only a third of parents of obese children recognize that their child is overweight, and they only begin to recognize excess weight towards the latter part of the child’s first decade of life. The provider’s first obligation is to recognize the problem and raise parental awareness about their child’s overweight or obese status as a means to help move families towards managing their child’s excess weight.
Should a clinician fail to address a child’s elevated weight status, a caregiver is eight times more likely to misclassify their child’s weight status. This may be a challenging task for PCPs since 71% of parents of overweight children, and 28% to 55% of parents of obese children perceived their child’s weight as “about right,” and 72% of parents of obese children perceived their child as only somewhat overweight. Parental misperception and concern of their child’s weight status may be influenced by the age and gender of the child, what friends and family consider a “healthy weight,” and living in an area with a high prevalence of obesity. Parents tend to underestimate their child’s weight and this may occur more frequently with the shift in weight status norms as overweight status becomes more common. Despite poor recognition of their child’s weight status, parents report obesity as an important problem to be addressed during office visits. Of 30 topics, obesity was ranked sixth most important, a concern that increased in frequency as the child’s age increased. However, parental concern may not always be present. Parents are more likely to report concern about their child’s weight status if their child is female, if they actually perceive their child as carrying excess weight, or if the child has been diagnosed as obese. Once parental concern is present, those parents are more likely to limit screen time, increase physical activity, and modify their child’s diet to incorporate healthier foods. Only when parents recognize excess weight as a problem and express concern can the PCP begin to assist families in addressing their child’s excess weight.

**Provider Perceptions of Childhood Overweight**

Given the task at hand, it is important to understand providers’ perceptions, attitudes, and beliefs about childhood overweight and obesity and their treatment. Designing programs that overcome negative perceptions held by providers will advance treatment of childhood overweight. However, there are several challenges to address.
Many of the challenges in managing weight in adults or children rest with the attitudes held by the health care provider. A survey by Ferrante et al. revealed that 51% of physicians felt that treatment of obesity is not effective, 66% felt frustrated when dealing with obesity and weight loss, and 34% were pessimistic about patients being successful in their own weight loss attempts. Franc et al. found similar results in his survey of pediatricians; 51.3% felt that even with proper guidance formerly obese children would return to their prior weights and 43.2% believed that management of childhood obesity usually results in failure. Older pediatricians were more likely to report that weight management in children leads to failure than their younger counterparts. Additionally, providers may feel that their patients will not adhere to the counseling recommendations. For instance, only 24% of Australian general practitioners felt confident that parents would adhere to lifestyle changes, once initiated. Not surprisingly, only 57% of those same practitioners felt that counseling for obesity was a rewarding experience. Health care providers’ perceptions and attitudes can be shaped by many components of the excess weight counseling process.

One primary reason clinicians may deem treating childhood obesity as futile is the lack of an effective treatment or medication. The classic medical model of physician-patient interaction depends on a clear treatment paradigm: identify symptoms, diagnose, and prescribe a didactic, broad, non-specific directive as a treatment plan. Physicians were asked to rate the efficacy for diet and physical activity recommendations, on a 5-point Likert scale (1= not at all effective and 5=extremely effective), in treating childhood obesity. Physicians rated physical activity recommendations as being more effective than dietary recommendations, although by a narrow margin (2.9/5 for physical activity and 2.7/5 for dietary), and neither as highly effective. However, physicians who were more experienced and knowledgeable of the existing recommendations expressed fewer negative attitudes.
Overweight and obesity requires that physicians move to a more patient-centered, interactive, negotiated course of treatment in order to progress through the steps involved in controlling the behaviors controlling weight, and consequently, health risk. The directive posture of simply prescribing diet and activity recommendations and providing an informational handout will not be a successful model for treatment of childhood overweight. The 21st century clinician must learn to incrementally guide families through a series of self-selected diet and activity behaviors and effectively use educational materials to counsel the families with overweight children through the behavior modification process. This rather new skill leaves many clinicians feeling inadequately trained.

As a result of feeling helpless in the management of childhood obesity, general practitioners interviewed by Walker et al. felt that their only role was to raise parental awareness of the child’s weight status and to manage medical conditions associated with excess weight. The practitioners viewed families and other health care providers to be responsible for the management of excess weight. Whatever the health care provider’s role, many do not feel comfortable initiating discussions on obesity and moving families through incremental behavioral change. Focus groups held by Turner et al. demonstrated conflicting feelings on whether the primary care setting was appropriate for the management of childhood obesity. The community based nature, established rapport of practitioners and families, and continuity of care were cited as reasons to provide obesity management within primary care. Those opposed cited many barriers, including time, lack of expertise, lack of effective treatment, and the social / cultural nature of obesity that make it difficult to manage within the fast-paced primary care setting.

Negativity about the treatment of obesity is mirrored in social attitudes towards childhood overweight. While 78.4% and 91.7% of physicians believed that an overweight child and overweight adolescent, respectively, needed treatment, only 13.9% of physicians
felt that childhood or adolescent weight loss was easier than in adults. Yet, when pediatricians surveyed by Franc et al. considered the child’s growth potential, a striking 53% believed that obesity in the child was more amenable to treatment than in the adult. The younger the child, the more confident the physician was that change was feasible. Over half of physicians thought that overweight children were not likely to outgrow their excess weight, but that number grew to over 75% when overweight adolescents were considered. Additional attitudes and beliefs regarding childhood obesity include low perceived efficiency in managing obesity with comorbidities, increased inconvenience of treating an obese child compared to a non-obese child, and lack of professional gratification with treating childhood obesity. Added to this discussion was the relatively newly defined concept of weight bias; that is, one’s tendency to negatively judge or categorize someone based solely on their weight. In health care, a provider’s weight bias can negatively impact the quality of care an overweight child and family receive.

Contrasting the negativity of the past few paragraphs, only a minority of pediatricians believed that an obese child is lazy (5%) or that an obese child lacks will (12%) and the majority believed that obesity is an illness. Common perceptions of the etiology of childhood obesity can be categorized into dietary, physical activity, and familial reasons (genetic, environmental and cultural). Over 75% of physicians perceived poor eating behaviors, easy access to hyper-caloric food, sedentary lifestyle, lack of parental concerns and heredity to be major causes of childhood obesity. Low price of junk food, food advertising pressure, unsafe streets, and lack of family cohesion were also identified as additional causes beyond the immediate control of practitioners.

Primary care providers believe that pediatric overweight warrants intervention. Yet, they are stuck in a traditional medical model where they are ineffective at identifying childhood overweight early, raising parental awareness around excess weight and feel that
existing treatments are inadequate. Providers do not feel comfortable in approaching weight management given its unique counseling and treatment requirements, despite knowledge of the behavioral targets.

**An “Ounce of Prevention” is worth “A Pound of Cure”**

Anticipatory guidance is not new to the field of pediatrics, especially to PCPs. Daily, PCPs counsel families at well-child visits about how to give children a safe and healthy life. The American Academy of Pediatrics “Bright Futures” outlines messages on anticipatory guidance to promote injury prevention, growth and development, healthy relationships, healthy weight, healthy eating and healthy activity habits; messaging that is developmentally appropriate and prepares caregivers for what to expect as their child grows. From infancy to adolescence, PCPs deliver evidenced based information in hopes to prevent illness, injuries, unhealthy weight gain, and acquisition of unhealthy habits and relationships. As patients age, providers spend smaller portions of office visit time discussing anticipatory guidance. During the first year of life, approximately 45% of well-child visit time is spent discussing feeding; yet, time spent on feeding drops to 27% during the second year of life and to 9% over the next two years. Well-child visits in early life provide a significant amount of time to discuss preventative messages centered on healthy diet and activity messages.

“Ounce of Prevention” was developed in 2007 to aid PCP delivery of healthy eating and activity anticipatory guidance at well-child visits. This toolkit includes well-child visit specific parental educational handouts, a BMI wheel, and additional materials to equip providers with the necessary tools to educate parents and prevent childhood obesity through family and child acquisition of healthy nutrition and physical activity behaviors. “Ounce of Prevention” messages are delivered from the newborn well-child visit to the 18-
year-old well-child visit. The evidence-based diet and activity behaviors that have been shown to be effective in preventing obesity are the same that are identified as being effective in treating it. In other words, a limited number of high-risk behaviors are at the center of the obesity problem for children. However, when preventative steps fail, PCPs require a model to approach incremental behavioral counseling with overweight children and their families.

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 Expert Committee Recommendations (ECRs) to provide a guide for PCPs regarding 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 Expert Committee suggests a tiered approach to obesity prevention and management (Figure 1.1). As in “Ounce of Prevention,” PCPs can deliver these messages as anticipatory guidance for preventative purposes to all children, regardless of weight status, termed Stage 1. These messages can also be used as part of the intervention strategy (Stage 2) when the child has been identified with a rising BMI or a BMI over the 85th percentile. Should the child’s weight status worsen or initial management steps prove inadequate, the Expert Committee suggests the child and family undergo more intense counseling. Stages 3 and 4 of the treatment algorithm include the use of a multidisciplinary team approach to obesity management and referral to tertiary care for possible surgical options, respectively. However, targeting children with these messages while they are younger and while parents are more influential may prove to be beneficial for obesity prevention and for the early stages of excess weight management.
Obesity Management in Daily Practice

Our overall aim was to test the effectiveness “A Pound of Cure, POC” in modifying primary care providers’ behaviors around obesity management using a guided quality improvement process for establishing a pediatric weight management curriculum and process in their primary care practice. The decision to utilize a quality improvement process rather than the traditional controlled trial was a conscious one. Implementation of obesity management into daily primary care practice is a monumental task; many barriers, behavioral and environmental, exist. Foremost among them is the need for PCPs to incorporate a entirely new treatment approach that involves incremental, long-term behavioral counseling rather than adherence to the traditional medical model of diagnose and treat. While the literature has identified commonly cited barriers for the provider population, additional, unforeseen, practice-specific barriers always arise as providers implement obesity management into their daily practice. Such barriers may
hinder even the most motivated provider from implementing a well-designed, controlled trial into their daily routine. Therefore, in the dichotomous realm of the controlled trial, there exists a high likelihood of study failure in which the test intervention fails to achieve its aims. In a controlled trial, each failure requires analysis of why the intervention package failed, time spent redesigning the package for another round of full-scale evaluation, additional funding, and another study. Fortunately, an alternative model was available in which rapidly executed small studies are used to support sequential, incremental practice change, which in turn systematically reduces the obstacles commonly associated with large-scale institution and behavioral change. The Institute for Healthcare Improvement's (IHI) Breakthrough Series Learning (BTS) Collaborative Model – adapted from established techniques in the corporate world – has successfully brought together healthcare providers and their organizations in multi-disciplinary teams to improve care around a specified health condition.

For obesity, the challenge was to construct a foundation of knowledge, clinical practice steps, counseling skills, and simple, step-wise goals feasible within a primary care practice framework. Using the IHI’s BTS Collaborative model, our research team could approach the complex task of establishing a standard of care around obesity management in real time, with real providers and real patients in a real primary care setting – this model allowed us to identify, address, and remove unforeseen barriers, provide personnel and systems-level support, and monitor incremental progress as weight management curriculum was established in primary care. Additionally, improvements in the standard of care around obesity management were rapid and testing around multiple factors that required modification was feasible within the context of this model. This model follows the second stage of the treatment pyramid, as suggested by the Expert Committee, to provide structured, individualized weight management. To accomplish this, the study planned to
train the providers in counseling, provide tips and tools to aid them, and use regular feedback of data on their compliance with national guidelines, as a means to steadily improve the quality of PCP practice around obesity.

**Primary aim:** To significantly improve the clinical effectiveness of providers relative to their pre-collaborative control period. Quality improvement techniques will be utilized with regular feedback of data to the PCPs to shape each cycle of practice improvement. Our key driver diagram (Appendix A) highlights aspects of our collaborative that will be put into place to drive the hypothesized changes.

We tested the following hypotheses that following the collaborative, providers will show a significant improvement in:

**H1:** their self-efficacy for counseling childhood obesity in their practice.

**H2:** knowledge of childhood obesity and its treatment, particularly, the national Expert Committee guidelines and responsibilities of the primary care provider in the treatment algorithm, as compared to their pre-intervention knowledge.

**H3:** obesity-related documentation in the patient medical records.
Chapter Two: Literature Review

• The Gold Standard: A National Treatment Paradigm
• Incorporating Behavior Change Theory into Clinical Practice
• Environmental, Practice and Patient-Family Barriers
• A Definition of Success
• Review of Three National Obesity Management Programs
• Quality Improvement is a Framework for Behavior Change

Treatment Paradigm

The dramatic rise and high prevalence of childhood obesity has called the healthcare sector to action. If this epidemic continues unabated, we could expect to see a 3.7% increase in obesity prevalence each decade, particularly among non-Hispanic black 12-19 year olds and non-Hispanic white 2-5 year olds, especially if dietary and physical activity behaviors of children remained unchanged.48 To prevent this from occurring, Healthy People 2020 lists several goals around nutrition, physical activity, and weight status, but of interest to this discussion are the goals for primary care providers:

• Increase the proportion of primary care physicians who regularly measure body mass index (BMI) for age and sex in their child and adolescent patients
• Increase the proportion of physician visits made by all child or adult patients that include counseling about nutrition or diet.49

The Institute of Medicine and the Dietary Guidelines for Americans 2010 defined gaps in healthcare and in dietary behaviors of Americans, respectively. Together these documents have identified young children as a prime target population to counsel and prevent establishment of obesogenic behaviors. Staggering rates of overweight and obesity,
numerous federal, state, and local policies, and evidence-based recommendations for prevention, treatment and management strategies all point to an urgent need for a concerted effort to end this public health crisis. However, before we can expect children and their families to gain control over their weight and lifestyle habits, primary care providers (PCPs) need to move toward an interactive standard of care around obesity management. Providers should transition from a didactic, directive-counseling model to a counseling model that encourages patients to be intrinsically motivated to incrementally change self-selected behaviors.

**Expert Committee Recommendations**

As referenced previously, 15 collaborating organizations formed the Expert Committee on Prevention, Identification, and Treatment of Obesity. This group published their Recommendations (ECRs), providing health care providers with an obesity treatment algorithm, from primary care prevention to tertiary care surgical options. Briefly, the nine evidenced-based recommendations 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 (or less) per day
- Participating in at least 60 minutes of physical activity
These messages may be delivered as anticipatory guidance for preventative purposes or used as part of the intervention strategy when a child is rapidly crossing BMI percentiles, or has a BMI over the 85th percentile. Since 2007, the Dietary Guidelines for Americans Advisory Committee again reviewed the literature and came to a consensus on very similar behavioral recommendations, including a new section on balancing calories to manage weight. In addition to and expanding on the ECRS, the Dietary Guidelines recommend the following:

- Consume nutrient dense foods and beverages
  - Reduce sodium to less than 2,300 mg or 1,500 mg
  - Consume less than 10% of calories from saturated fatty acids
  - Consume less than 300 mg per day of dietary cholesterol
  - Consume less than 300 mg per day of dietary cholesterol
  - Consume less than 10% of calories from saturated fatty acids
  - Limit consumption of refined grains
  - Increase fruit and vegetable intake (eating a variety of dark-green, red, and orange vegetables, beans, and peas)
  - Consume at least half of all grains as whole grains
  - Increase intake of fat-free or low-fat milk and milk products
  - Choose a variety of protein foods including seafood, lean meat, poultry, eggs, beans, and peas, soy products, and unsalted nuts and seeds
  - Increase the amount and variety of seafood
  - Use oils to replace solid fats
  - Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D

Targeting children with these messages while they are younger and while parents are more influential may prove to be beneficial for improving diet quality and daily physical activity as a path toward obesity prevention or control of excess weight. The Dietary Guidelines for Americans and the ECRs equip health care providers not only with high-quality and well-balanced dietary and physical activity messages, but also with a treatment
strategy as they approach obesity management within their practice. Acquisition of these behaviors determines success or failure of treatment, not just in terms of weight loss or maintenance but also in mitigating the health risk of the child, improving their overall health, irrespective of body shape.

Physicians begin treatment by evaluating the child’s health risk. 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 (BMI 85th to 94th percentile) or obese (BMI greater than the 95th percentile). The Center for Disease Control and Prevention has 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. These charts serve as the first step in assessing a child’s health risk, a risk that intensifies as a child’s BMI status increases.

*Implications of the Shift in Growth Charts*

In 2006, the American Academy of Pediatrics (AAP), the Center for Disease Control and Prevention (CDC), and the National Institutes of Health (NIH), convened to discuss the use of 2006 World Health Organization (WHO) growth charts compared with the 2000 CDC growth charts. It is important to note that there are differences in the population of children studied and the methods used to create the CDC and WHO growths charts and therefore, each growth chart describes growth differently.

*Center for Disease Control and Prevention Growth Charts*

The CDC growth charts depict how certain groups of children grew in a specific place and time and should be used as a growth reference. Data for the CDC growth charts
for children less than 24 months old was obtained from national vital statistics (for birth
weights) and from Missouri and Wisconsin vital statistics (for birth lengths), the Pediatric
Nutrition Surveillance Systems, and NHANES I, II, and III data. Data were collectively used to
create growth curves for children 2-23 months old. All three of the NHANES were used to
generate growth curves for children older than 24 months. At least 50% of the infants
included in the CDC charts were breastfed and 33% were breastfed until 3 months of age.
Additionally, the CDC charts included children with overweight measurements as part of its
cross-sectional population.

The World Health Organization Growth Charts

The WHO charts, on the other hand, illustrate how healthy, economically stable
children thrived under the most favorable conditions and therefore represent a growth
standard. The children included in the WHO growth charts were exclusively breastfed
during the first four months of life and continued breastfeeding until at least 12 months of
age. Additional selection criteria included a high socioeconomic status, low altitude at birth,
and inclusion of at least 20% of mothers that would follow international feeding
recommendations. Weight and length were measured weekly during the first two months of
life, monthly until 12 months of age, and then bimonthly until the child was 24 months of
age. For children 24-59 months of age, population demographics were similar. However, for
children 24-59 months old, the WHO growth charts did not incorporate children whose
weight was three standard deviations above the mean weight; therefore, the effect of
overweight children is not incorporated in the curves, even though these children were a
part of the study population.
Using Growth Charts in Clinical Practice

Currently, it is recommended that the WHO growth charts be used for all children less than 24 months old. Children in the WHO study sample had their weight-for-length monitored regularly, and were breastfed for at least 12 months, predominantly for the first 4 months of life, meeting the US Dietary Reference Intakes and the AAP’s endorsement on breastfeeding. If the WHO growth charts are utilized, physicians should use the 2nd and 98th percentiles to identify any poor health conditions. It should be noted, however, that use of the WHO curves means that in early life many more American children will be considered overweight. For children 24 months and older, meeting participants recommended to continue using the 2000 CDC BMI percentile growth charts. The CDC charts not only allow physicians to monitor fluctuations in growth for children 2-19 years old, but they also incorporate overweight children in the study population. Physicians using the CDC charts were recommended to continue to use the 5th and 95th percentiles as indicators of unhealthy conditions. As a child ages, physicians tend to transition from weight-for-length measurements (toddler supine) to measuring the child’s height (child standing). The timing of this transition from one measurement method to the other usually occurs around 2 years of age. Mistakenly using the inappropriate growth chart may result in a higher prevalence of obesity. For children two to five years old, overweight and obesity prevalence was higher when assessed using WHO versus CDC growth charts; this discrepancy is even larger and detected at younger ages when WHO charts instead of CDC charts are used to determine prevalence of overweight in children younger than 2. A similar discrepancy was seen when International Obesity Task Force age and gender specific BMI cutoffs were used instead of CDC cutoffs. While use of the WHO growth charts was not recommended for children over the age of two, it may serve to open dialogue with families at higher risk for obesity and associated comorbidities, promoting earlier identification and behavioral
modification. Nevertheless, it is important to remember that BMI is a screening tool, not a diagnosis in and of itself. Accordingly, it is crucial that an abnormal BMI is followed by an examination of the patient to corroborate the results and determine whether the child is at risk. This allows the clinician to assess the child’s medical and behavioral risk, assess the family’s concern over the child’s weight status, and gauge the degree of motivation to change diet and physical activity-related behaviors.

Despite having growth standards and references at their fingertips, many providers fail to routinely use weight-for-length and BMI percentile to identify a child developing excess weight. Sesselberg, et al. surveyed family physicians and found that only 45% stated that they computed BMI percentile at most or every well-child visit and even fewer plotted BMI (31%).55 A study surveyed Australian general practitioners and pediatricians found similar results; only 67.4% of providers always or regularly plotted height and weight on a percentile growth curve.56 Physicians with access to electronic medical record (EMR) systems have substantially higher rates (85%) of assessing BMI for children greater than two years old. However, nationally only one-third of practices utilized an EMR.57

Once the child is identified as overweight or obese, the diagnosis should be confirmed, documented, and acted upon. Despite the national statistics on obesity, only 5% and 28% of overweight and obese children, respectively, had a diagnosis charted in their medical record.58 Unfortunately, pediatrician visual recognition of childhood overweight only increases as the severity of a child’s obesity increases, missing many opportunities to identify children approaching or just entering the overweight category. A study cohort of pediatricians only correctly identified 27% of overweight children compared to correctly identifying 86% of obese children.23

A child’s BMI is just the first step of the weight management process, identifying the point at which the physician should begin the treatment algorithm. Once identified as
carrying excess weight, the child’s obesity related behavioral risks should be catalogued by the physician, a step that is comprised of medical and behavioral risk assessment, evaluated using a concise, yet thorough history collection, including a family medical history (Figure 2.1).

**Figure 2.1 - Assessment of the child's obesity risk.**

*History Collection around Medical Risk*

Once the clinician 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. There are several steps to accomplish this:
1) A family health history – centered on obesity, cardiovascular disease
(hypertension, dyslipidemia, medications or surgeries, heart attacks or strokes,
early death) and diabetes.

2) A targeted review of systems – centered on obesity-related disorders, such as
sleep apnea, asthma, polycystic ovary syndrome and psychological problems

3) A targeted physical exam – centered on the physical findings of obesity-related
disorders, such as acanthosis nigricans to indicate insulin resistance, hypertension,
enlarged liver, hirsutism

4) Screening blood tests

**Nutritional and Physical Activity-Related Behaviors – Behavioral Risk**

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 clinician is seeking to identify modifiable
behavioral risks that contribute to the child’s energy imbalance. Behavioral risk factors
should be documented within the medical record to serve as a baseline for the family as
they participate in the counseling process. Yet, only 50% of providers’ charts contain
documentation of the collection of a nutrition history.\(^{59}\) The step is not complicated. One
study showed that after a brief two-hour training session with dissemination of weight
management tools, documentation of nutrition history collection increased by 30%.\(^{59}\)

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
clinician which of the nine evidence-based ECRs should be addressed first when counseling
the patient and the family on how to manage excess weight.

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). Yet, in 2002, chart evaluations in pediatric practices showed that appropriate
orders for a lipid panel, fasting glucose, ALT and AST were found in only 57.8%, 29.0%, and
10.8% of cases, respectively. In a more recent study in 2012, Illinois pediatricians
reported that they always or usually obtain a fasting lipid profile, a fasting glucose (children
≥ 10 yrs.), and an ALT/AST 73%, 71%, and 33% of the time, respectively, for children ≥ 95th
BMI percentile. For overweight children with risk factors, percentages were slightly lower:
65%, 61%, and 21% of pediatricians always or usually obtain a fasting lipid profile, a fasting
glucose (children ≥ 10 yrs.), and an ALT/AST, respectively. Finally, only 28% of
pediatricians always or usually ordered a fasting lipid profile for overweight children
without risk factors. In the 2002 study, only 25% of pediatricians collected a complete
family history. However, the remaining pediatricians did assess some part of the child’s
family history to evaluate the child’s obesity-related health risk; 85% asked about
overweight family members, 90% assessed the child’s family history for cardiovascular
disease and hypertension, and 64% asked about diabetes mellitus and dyslipidemia.22
Understanding the child’s medical risk assists in focusing counseling on mediating risk
through acquisition of the ECRs and DGAs, rather than on the child’s weight and appearance.

*Intervention for Treatment*

Only after laying a foundation for intervention is the physician ready to manage the child’s excess weight. Based on the child’s age and BMI percentile, the physician will advance through the stages of treatment accordingly. The most powerful intervention to ensure weight management is prevention. Regardless of whether the aim is prevention or early intervention for rising weight, the physician’s target is problematic behaviors. Initial strategies might include praise for beneficial behaviors, concern about negative behaviors, and family centered counseling to move the diet and activity pattern into better alignment with guidelines. However, as the child’s degree of excess weight increases, so should the firmness of the providers counseling tactics (Figure 2.2). Within the primary care setting, physicians may continue to provide counseling around the ECRs while they begin to encourage follow-up visits in a structured sequential manner (moving from Stage 1 to 2). However, should excess weight gain continue, more intense counseling and therapy may be appropriate (Stages 3 and 4).
Figure 2.2 - Prevention & treatment strategies based on the child's identified health risk.
Incorporating Behavior Change Theory into Clinical Practice

A family's readiness to change their child's dietary and physical activity behaviors is an important determinant of successful weight management. To a great extent, the clinician must shape the family perception and thus, urgency. In one study evaluating parental concerns about various health risks, parental attitude about excess weight (78%) was similar to that of their child experiencing multiple sunburns (76%) and slightly higher than parental concern about children watching too much television (67%). Degree of parental concern may relate to parents' perceptions of the health risks associated with excess weight. For instance, 67%, 74%, and 76% of parents believed that overweight children are more likely than children who are of a healthy weight to become overweight adults, have problems in social relationships, and develop diabetes, respectively. Furthermore, a family history positive for cardiovascular disease in association with having an overweight child increased parental perception of the likelihood of their child developing diabetes. There are additional situations that may influence parental perception of obesity-related health risk and the role of the clinician is to examine each individual parent's perception of risk and ultimately the parent's readiness to change their child's behaviors.

Trans theoretical Model and Stages of Change

Most clinicians are fully aware that the starting point for healthy behaviors varies between patients; yet, when given a simple tool to quickly assess family readiness to make diet or physical activity changes, only 38% found it very helpful. Familiarity with the Trans theoretical model may assist clinicians as they gauge a family's readiness to make changes in health behaviors. However, much of the family's ability to change behaviors is
predicated on the physician moving toward a patient-centered counseling model to facilitate incremental behavior change. Physician knowledge of behavior change theories will assist physicians as they broach families with stage of change-appropriate counseling strategies. The Trans theoretical model is comprised of five stages of change, 10 processes of change, decisional balance (the pros and cons of changing) and self-efficacy (confidence and temptation); all 19 constructs emphasize different aspects of the behavioral change process. The five stages of change that are indicative of the parent or patient’s readiness to make health-related changes are:

1. Precontemplation
2. Contemplation
3. Preparation
4. Action and
5. Maintenance.\textsuperscript{63}

In the precontemplation stage, parents have no interest in changing their child's health behaviors. Parents may be thinking about making a change in their child's behaviors but have yet to do so when they are in the contemplation stage of change. In the preparation stage, parents intend to make a change in the near future. Parents are actively helping their child make changes in their health behavior when they are in the action stage. When the family has maintained a change in the child's health behavior for six or more months, they are in the maintenance stage of change.\textsuperscript{64} The process of change builds upon the previous step and relapses commonly occur as the individual progresses through each stage. Individuals can make both forward and backward progress as they work towards maintenance of their targeted behavior.
Clinicians should first identify the parent and child’s stage of change, tailoring the intervention to meet the needs of both parent and child. The role of the clinician is to guide parents and their children along the continuum of change, towards the desired nutritional or activity-related behavior; clinicians can utilize the processes of change during this time. The clinician may use any combination of the following processes to move the family towards adopting the desired behavioral change, although certain processes are more valid at particular stages than others:

1. Consciousness raising
2. Dramatic relief
3. Self-reevaluation
4. Environmental reevaluation
5. Self-liberation
6. Helping relationships
7. Counterconditioning
8. Reinforcement management
9. Stimulus control
10. Social liberation

As the intervention progresses and the clinician utilizes the above processes, it becomes important to reevaluate the parent and child’s stage of change. As the family moves along the continuum, the clinician should continue to tailor his intervention to address their needs. Clinicians should keep in mind that the child’s degree of overweight and parental overweight status are associated with parent’s stage of change, as well. It is more likely for parents who are aware of their child’s overweight status, parents of obese children, and parents who are overweight themselves, to be in the preparation or action stage than the precontemplation. Evaluating the parents’ readiness to change the child’s
nutrition and physical activity-related behaviors allows the clinician to augment the way he approaches discussions on modifying these health related behaviors.

Motivational interviewing techniques can be used to elicit patient and family concerns about potential behavioral change targets and counseling strategies, based on the family’s stage of change. This technique uses a patient-centered approach, where the physician guides a patient along the behavioral change continuum; physicians seek to understand patient motivation, listen to reasons for why change has not yet occurred, and to empower patients to change.\(^6^5\) Physicians should establish a rapport with their patients, set an agenda for office visit discussions, use open-ended questions and reflective listening to understand patient perspectives and confidence in behavior change, and finally, summarize and close the discussion. Motivational interviewing is an essential skill for guiding families attending weight management visits to build intrinsic motivation and approach behavior change – but PCPs are neither confident in nor comfortable with their motivational interviewing skills.\(^6^6\)

**Social Cognitive Theory**

In nearly all behavior change models, self-efficacy is a central concept. In terms of obesity, a strong sense of self-efficacy is needed by both the clinician and the family to treat excess weight. According to Bandura's Social Cognitive Theory (SCT), *self-efficacy* is a person's belief in one's own ability to manipulate his environment and behaviors.\(^6^3\) Self-efficacy is situation-specific and an increase in self-efficacy has been associated with changes in desired behaviors. Not only is it an indication of one's sense of control over a specified action, but also it reflects the control of one's thoughts, emotional and physiological states, and intrinsic motivation.\(^6^7\) Self-efficacy is only one of the eight constructs of the SCT, of which *reciprocal determinism*, the interplay of the environment,
personal factors and behavior, is the centerpiece. This, obviously, is highly relevant to the complexities of obesity. Self-efficacy can be viewed as the foundation for much of behavior change, of which the level, strength, and generality of one’s efficacy beliefs determine the types of challenges one is ready to undertake.

For treatment of pediatric obesity, an area relatively new to pediatric medicine, not only do clinicians require knowledge of the ECRs, they also require self-efficacy to effectively deliver the ECRs and to guide families participating in the weight management process. However, many clinicians are not very confident in their ability to counsel on excess weight, let alone excess weight in children. Perrin et al. surveyed Fellows of the American Academy of Pediatrics, who provide pediatric care and were members of the North Carolina Pediatric Society, on their self-efficacy to manage childhood obesity, barriers to obesity management, and potential resources for obesity management. Only 12% of respondents felt highly self-efficacious to manage childhood obesity, even though 39% of those surveyed believed that physicians in general could effectively treat and manage this rising epidemic. In a similar study by McFarlane et al, Australian physicians felt mildly confident in their ability to counsel on nutrition and physical activity, but were highly confident in their ability to make referrals to a dietitian.

Since self-efficacy is situation specific, environmental and practice-based barriers can negatively influence one’s self-efficacy. Perrin cited the presence of specific practice barriers - lack of non-physician reimbursement, lack of on-site dietitian and lack of directed patient education materials - as being associated with clinicians’ feelings of low self-efficacy. Those surveyed felt their ability to treat asthma, ADHD, and prevent STDs was better than their ability to manage or treat obesity. Not surprisingly, physicians younger than 48 years of age had higher self-efficacy than their older counterparts. Pediatricians whose practice utilized an electronic medical record (EMR) or had existing weight management resources
(on-site dietitian and standardized weight management protocols) perceived their skills to provide lifestyle counseling and their capacity to screen for comorbidities as high, compared to those without EMR or weight management resources.\textsuperscript{57} Furthermore, those who felt professionally prepared and trained to manage childhood overweight and obesity were 3.31 times more likely to do so.\textsuperscript{70} A historical analogy to obesity intervention is that of interventions for asthmatic adolescents who smoked, in which the clinician's self-efficacy greatly improved with specific training in counseling, approaches to inquiring about smoking status or counseling on smoking cessation as well as with greater number of personal encounters with pediatric asthmatic patients.\textsuperscript{71}

Modeled after a survey of physicians treating adult obesity, Jelalian et al., mailed surveys to physicians practicing in Southern New England to evaluate weight management barriers, treatment methods, and attitudes towards childhood obesity. While self-efficacy was not directly measured, perceived competence and comfort level in treating childhood obesity were reported. Surprisingly, over 75% of physicians considered themselves competent to treat overweight in children; of these, 47.9%, 22.7% and 2.8% felt moderately competent, quite competent, and extremely competent, respectively, in treating childhood overweight.\textsuperscript{72} Physicians expressed degrees of comfort in treating overweight that were strongly correlated with their sense of perceived competence ($r=0.60$). Previous successes in treating childhood overweight, a sense of effectiveness, and training in obesity treatment methods were associated with increased competence and comfort in treating excess weight in children.\textsuperscript{72, 73}

The Social Cognitive Theory suggests several additional mechanisms for increasing self-efficacy, such as mastery experience, vicarious experiences, verbal persuasions, and improved physical and emotional states, similar to the strategies suggested in the studies by Jelalian et al. and Thompson et al.\textsuperscript{68, 72} Behavior is comprised of a person's current
perspective of his environment, his mental and physical capabilities, and what has been learned from prior experience. Therefore attempts at behavioral change should seek to encompass as many SCT mechanisms as possible for increasing self-efficacy. Behavior will remodel as the individual, in this case the primary care provider, attempts incrementally more challenging tasks on the continuum toward the desired behavioral outcome. Ultimately, the PCP will master performance of the behavior, which has the strongest influence on one’s self-efficacy for that particular behavior. Social modeling, or watching another individual successfully complete the behavior, is an additional construct that can reinforce the steps required to master the new behavior. Further, strong, positive encouragement can facilitate taking the initial steps toward behavior change, which can reduce stress and support commitment.

As mentioned, along with the fundamental focus on self-efficacy, there are seven auxiliary constructs in the SCT, the interplay of which influences self-efficacy. To the extent possible, each should be marshaled to enhance the commitment to change. The seven are:

- Reciprocal determinism
- Outcome expectations
- Collective Efficacy
- Observational Learning
- Incentive Motivation
- Facilitation
- Self-regulation
- Moral Disengagement

**Reciprocal determinism** describes the interaction of people with their environment. As an individual begins changing his behavior, it is important that his environment supports rather than resists this behavioral change. One method in which the
environment can support one’s changing behavior is incentive motivation, using rewards and disincentives to encourage desired or discourage undesired behaviors. However, the latter may have unintended effects on producing the desired behaviors. Outcome expectations are subjective and depend on the person’s belief and value of the potential outcomes resulting from the targeted behavior. Collective efficacy, beliefs about a group’s ability to perform combined actions to produce the desired outcome, outcome expectations and self-efficacy influence the performance of a behavior. Observational learning is an important construct, especially when in the form of social, peer, or coping models, to influence behavior; the more relatable the model, whether the same age or facing the same challenges as the observer, the more likely the observer will imitate the model. Facilitation is the provision of essential tools and resources to change the environment to favor the desired behavior. Environmental barriers will be identified and removed, empowering the individual to change. Self-regulation, or acquisition of management skills, entertains the concept of delayed gratification as one works toward achieving a long-term goal despite encountering short-term negative outcomes. Self-regulation can be achieved through self-monitoring (or self-tracking), setting goals, receiving feedback on performance and ways to improve, rewarding oneself, self-instruction during a behavior, and surrounding oneself with a strong social network. The final construct, moral disengagement, considers how people violate moral standards. This concept includes euphemistic labeling (use of less offensive words to describe violent acts), dehumanization and blaming of victims, diffusion and displacement of responsibility, and perceived moral justifications. Moral disengagement is more applicable to describe situations like war, but one can see its application in the context of cultural bias against the obese population. Empathizing with the child and family – essentially, humanizing them, rather than blaming them -- is a crucial precursor to counseling effectively.
All of these constructs surrounding the concept of self-efficacy are relevant to the health care professional in clinical practice. Any successful program aimed at altering their approach toward obese children and families will need to deploy a wide array of different constructs to accommodate the diverse styles, personalities, and skills of those practitioners enrolled in the process.

*Environmental, Practice Based, and Patient and Family Barriers*

Despite the Expert Committee Recommendations, physicians fail to adequately address management of excess weight, as evidenced by physicians’ insufficiencies in most steps of the recommended treatment plan. Clinicians 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 such intervention. In one study sample, pediatricians list perceived lack of patient motivation (85.7%), lack of parent involvement (81.2%), lack of support services (60.0%), lack of clinician time (58.0%), and lack of treatment skills (45.0%) as barriers to treatment of overweight children and adolescents. In another study sample, physicians cited environmental, practice-based, and individual patient and family factors as barriers to effective treatment. Fast food and soft drink availability were noted by 97% and 95% of physicians, respectively, as ubiquitous environmental barriers, while the most common practice based barriers were: lack of reimbursement for non-MD staff (51%), lack of on-site dietitian (51%), and lack of patient education materials (44%). Sixty-five percent of physicians felt that the caregiver’s failure to perceive weight as a problem was the single most common individual and family barrier to treatment. Additionally, clinicians thought that treatment of childhood obesity might be more complex than treatment plans for adult obesity since it includes modifying the entire family’s behaviors. As one primary care
clinician stated, "At the end of the day, parents have to be the ones to do it", i.e. solve the problem of their child’s obesity.41

**Steps for Overcoming Barriers**

Patient, family, practice-based, and environmental barriers pose challenges to the primary care provider approaching pediatric weight management. Primary care providers must first eliminate these barriers, modify their behaviors, and adhere to a standard of care before they can expect patients and families to do the same. 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.41 Of all practice barriers cited by physicians, 96% of physicians expressed a need for better counseling tools to facilitate behavior changes within their patients.69 Fostering physician self-efficacy, reshaping provider perceptions, equipping clinicians with a counseling strategy and materials, and building a primary care environment with support systems and process are key components for a pediatric weight management counseling package.

**A Definition of 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.\textsuperscript{75-77} Involvement of the family is crucial since parents, especially mothers, are the most powerful agents of change for a young child.\textsuperscript{13-16} Redefining success and shifting provider focus is the critical first step towards overcoming the numerous, commonly cited barriers. Physician adherence to a behavioral change counseling model that guides families to improve diet quality and commit to regular activity patterns will lessen the child’s health risk, improve treatment outcomes, and reduce provider focus on weight change as the sole outcome.

\textit{Overcome Barriers}

1) \textit{Gather baseline information}. When addressing barriers to obesity management, it’s crucial to start at the beginning of the office visit encounter and build the foundation. Health care providers should begin the encounter by measuring and documenting the child’s height and weight, using this information to calculate BMI. This simple, yet vital, task may not occur if there is no visible place within the medical record for this documentation. The Kaiser Permanente Southern California (KPSC) initiative overcame this barrier as they implemented an electronic medical record system (EMR) and these vital signs were used to automatically calculate BMI.\textsuperscript{78} The EMR alerted physicians when the child’s BMI was above the 85\textsuperscript{th} percentile, reminding physicians to counsel the families and screen for comorbid conditions. By the end of the KPSC initiative, documentation of height and weight increased by 28\% to a total of 94\% of charts. Continuing with the KPSC model, documentation of weight diagnosis increased by nearly 50\%. With only $\frac{1}{3}$ of practices nationally having access to an EMR, manual methods for charts must be incorporated into routine practice, necessitating alternate tools.

2) \textit{Seek early intervention}. 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.\textsuperscript{61} Furthermore, parents of obese children had lower levels of self efficacy to modify their child’s eating and activity behaviors than those of overweight children.\textsuperscript{79} Thus, clinicians should view management of the child’s weight as a stepwise, incremental process, enacted through a series of office visits, capturing children while they are younger and just approaching overweight.\textsuperscript{75} The intervention is individualized, designed in conjunction with the family, and initiated at the initial screening office visit.\textsuperscript{80, 81}

3) \textit{Focus on the parent role.} 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 families with the knowledge and skill to accomplish the defined goal.\textsuperscript{75, 76} Golan & Weizman described 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 to promote problem solving. Physicians encouraged families to structure daily activity (regular meal, snack activity, and screen time) and to create an environment that reduces cues for overeating.\textsuperscript{80}

4) \textit{A shared approach, not a dictated solution.} Brief but repeated use of the 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 five and 15 minutes; it allows the physician and family to decide how to approach the weight management process, picking goals to work on between the current office visit 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.\textsuperscript{82}
5) **Specific, clear diet and activity targets.** Routine counseling is often 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. In terms of counseling, 47% of adolescent girls and 44% of adolescent boys received nutrition counseling, while only 36% of boys and girls received counseling on physical activity. However, as severity of excess weight increased, adolescents were more likely to receive both diet and activity counseling, particularly if they were black or Hispanic. Pediatricians often suggested vague dietary measures, such as “change eating patterns” and “limit specific foods,” and physical activity changes such as “increase free play” and “decrease sedentary behaviors.” Pediatrician adherence to the ECRs was approximately 40% for dietary behaviors and 80% for physical activity related behaviors. 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. Contrary to intuition, when the targets are specific and counseling clear, the number of office visits required to effect change is fewer and the amount of clinician-facilitated counseling time is 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.

6) **Use effective communication tools.** Better counseling tools may increase physician self-confidence 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. 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 subsequently, their ability to counsel on risky eating and physical activity behaviors. 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.

7) Employ family-centered counseling strategies. Additionally, equipping clinicians with counseling strategies may better prepare clinicians as they begin discussions on weight management. Focus groups with parents of overweight children provided insight for clinicians on how they should approach and facilitate discussions on pediatric overweight. Parents felt such discussions should begin with pediatricians classifying the child’s weight status and referring to national standards. Physicians should then discuss the associated health risk of excess weight to help parents understand the issue at hand. Two of the ECR messages, limiting sugar sweetened beverages and limiting screen time to two hours, were considered confusing 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. 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 either a TV or computer. 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.\textsuperscript{89, 90} As
clinicians counsel children, they should consider their structure and approach to
counseling; clinicians should schedule and conduct follow-up appointments and make
counseling a family experience. However, one study points out that while 77% of the
doctors surveyed organized follow-up appointments, only 16% stated that they involved
the whole family when treating childhood obesity.\textsuperscript{56}

\textbf{Review of 3 National Programs for the Management of Childhood Obesity}

\textit{Chronic Care Model for Childhood Obesity}

The Chronic Care Model for Childhood Obesity is depicted in Appendix B and
illustrates the dynamic nature of treatment and management of childhood overweight and
obesity in the primary care clinic.\textsuperscript{91} This model is a more in-depth version of the NICHQ's
Child Care Model and emphasizes process and outcome measures for the patient and
provider that will lead to changes in provider behaviors and documentation, and ultimately
improved patient outcomes.\textsuperscript{92} This model suggests that by improving patient and family
self-management support, the delivery system design, decision support, and clinical
information systems, that changes in the patient and providers’ behaviors should occur.
Several organizations have incorporated aspects of the Chronic Care Model for Childhood
Obesity and the Expert Committee’s algorithm for identification, assessment and prevention
of childhood and adolescent obesity into training sessions for physicians, screening tools,
and patient materials. The two primary care interventions, the Delaware Initiative and the
Keep Me Healthy – The Maine Youth Overweight Collaborative, designed their collaborative
using a framework similar to this model.
The 5-2-1-0 Tool

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. A simple pneumonic 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 and Dietary Guidelines for Americans 2010 propose a more comprehensive set of behaviors to adapt to improve diet quality and activity. The 5-2-1-0 model is rooted in the old medical model of prescribing behaviors as opposed to a shared behavior change model, proposed by the Expert Committee and that used for our counseling model, “A Pound of Cure”.

The Delaware Initiative

The Delaware Initiative focused on practice integration of a parent survey, the 5-2-1-0 assessment tool.93 Health care professionals attended a daylong learning session where they learned how to incorporate Stages 1 and 2 of the Expert Committee Recommendations into well-child visits and the 5-2-1-0 messaging into the primary care setting, although Stages 3 and 4 of the ECR treatment algorithm were also taught. Motivational interviewing techniques were emphasized to promote patient-centered counseling. Learning sessions were available three times a year and conference calls occurred on a monthly basis. Office-
wide participation was suggested, as involvement of various personnel would reduce the burden of this new assessment and make success likely. This initiative worked to improve the office environment by distributing the workload and made sure that families received consistent messages from their primary physician, the nurse, and other clinicians while improving clinicians' confidence in treating and managing childhood overweight.

The focus of the initiative was to open dialogue with families when their behaviors do not meet 5-2-1-0 criteria. The strength of the initiative was their use of patient-centered counseling to assist families attending well-child visits in making specific, diet and activity behavioral changes that was delivered during multiple learning session formats. However, the initiative failed to employ several of the steps outlined above, most importantly, a mechanism to monitor improvement, emphasize parental roles in modifying child behavior, and a comprehensive set of educational materials to assist families modifying behavior that focuses on all ECRs.

Utah Pediatric Partnership to Improve Healthcare Quality – Learning Collaborative

In Utah, primary care providers participated in two, one-day workshops and a series of monthly phone calls throughout the course of a nine-month learning collaborative, similar to the Institute for Healthcare Improvement's (IHI) learning collaborative model. Workshops consisted of lectures on the ECRs, 5-2-1-0 messages, and motivational interviewing, a discussion on ways to increase physical activity and a discussion led by a dietitian on additional dietary recommendations. A quality improvement specialist described the theoretical framework of the learning collaborative, in which he discussed the Model for Improvement and Plan Do Study Act (PDSA) cycles. Primary care provider teams developed their own aims for the learning collaborative, tests of change for PDSA cycles, and ways to measure the tests of change. Teams were responsible for collecting their own
data, which consisted of monthly chart reviews of their proposed measures. All teams stated that they would measure BMI at all well-child visits. Additional chart review measures included providing 5-2-1-0 messages and assessing screen time.

As a result of participating in the Utah learning collaborative, there were several practice-based changes within the offices of PCPs. There was a significant increase in documentation of BMI percentile, 55% to 97%, of all well child office visit encounters. Additionally, practices began to routinely provide anticipatory guidance to parents regardless of the child’s weight status. Both of which are good steps in preventing obesity but do not assist in managing pediatric overweight, particularly given the emphasis of the learning sessions. There were also several practice-level system changes around preventative messaging, diagnosis of overweight or obesity within the medical record, and a referral system for obese children.

The Utah learning collaborative was of a higher caliber than the Delaware learning sessions. Utah provided a more thorough approach to obesity management and better preventative strategies at well-child visits although their emphasis was still only on the 5-2-1-0 messages and not all the suggested ECRs. Providers collected baseline data, however, changes were difficult to determine given that individual practices developed unique aims and PDSAs – so that changes were not shared by the whole collaborative. There was not much discussion around parents as agents of change and their role in behavior modification through a shared counseling approach nor were tools beyond the 5-2-1-0-assessment tool provided to clinicians and families.

*Keep ME Healthy – The Maine Youth Overweight Collaborative*

The final primary care intervention, Keep ME Healthy - The Maine Youth Overweight Collaborative, also utilized the 5-2-1-0 materials within a more structured IHI
learning collaborative model. Physician-based teams were provided with clinical decision support comprised of guidelines for prevention and management of overweight, reference lab values, tips for communicating with parents of children 5 to 18 years of age, and counseling strategies based on the 5-2-1-0 behaviors. They also received counseling and self-management support for families and patients, which consisted of the patient screening tools, 5-2-1-0 goal setting worksheets, and self-monitoring sheets.95

The teams participated in this collaborative for 18 months, which included three learning sessions, bimonthly phone calls, site visits, and a toolkit. Each team served as its own control; chart reviews were conducted before and after the intervention. Teams collected baseline data from 70 well-child visit charts. Charts were reviewed for documentation of height, weight, BMI, BMI percentile, diagnosis of overweight or obesity, and blood pressure.

Baseline family data was collected and included information on parents’ recall of hearing 5-2-1-0 messages from the child’s provider or nurse. A total of 50 pre-intervention surveys were collected by each practice. Surveys were also distributed during the collaborative, to ask similar questions and to rate the counseling they received. Providers were surveyed before and during the collaborative to obtain their knowledge, self-efficacy, and practices around the 5-2-1-0 messages.

Upon conclusion of the learning collaborative, there was a 64% increase in obtaining BMI percentile for age and gender, a 56% increase in weight classification, and an 82% increase in the use of the 5-2-1-0 behavioral screening tool. Parents also indicated that physicians began to discuss the 5-2-1-0 messages and provided increased nutrition, physical activity, screen time, and sweetened beverage counseling. Providers experienced an increase in their self-efficacy to counsel patients on the 5-2-1-0 behaviors and an
increase in knowledge of the American Academy of Pediatrics recommendations on BMI and weight classification.

The Maine Collaborative was an extension of the previous two programs for preventing excess weight in children. Similarly, Maine also emphasized preventative counseling during annual well-child visits. Learning sessions emphasized patient-centered approaches to counseling and goal setting, 5-2-1-0 behavioral counseling recommendations, and quality improvement methodology. Additional information was provided on group visits and shared medical appointments. This collaborative focused on a broad age range and not necessarily early intervention. Similar to Delaware and Utah, it too did not discuss all ECRs. Baseline data was collected and compared to post collaborative chart reviews to note improvements, however, measures only encompassed identification and diagnosis of excess weight and blood pressure. Collaborative chart review failed to include measures on weight-related comorbidities, laboratory evaluations, history collection, and behavioral counseling - the crux of obesity management office visits. Furthermore, it appeared data was collected from well-child visits alone – the collaborative makes no mention of data collected during follow-up visit counseling encounters.

The three obesity prevention programs described above provided foundational steps to building a learning collaborative around this topic. Yet, they fail to adequately address several components of the Expert Committee treatment algorithm and therefore, neglected to utilize many of the components available to overcome barriers in weight management. Two of the programs, Maine and Delaware, used the IHI learning collaborative model to structure their interventions, just as we did for POC. This methodology, described in the section below, facilitates incremental changes in process of weight management at the level of the individual and the system. The learning collaborative seeks to change provider behaviors while reshaping the support systems within the primary care
environment. We developed “A Pound of Cure” (described in Chapter Three) to: 1.) include all nine of the ECR diet and activity specific behaviors; 2.) help children 2 to 11 years of age and their parents to set goals and monitor progress using a patient-centered shared decision approach; and 3.) use a comprehensive set of communication tools to assist physicians as they approach discussions on excess weight.
Quality Improvement as the Framework for Behavior Change

An Introduction to Quality Improvement

Quality improvement (QI), also known as Statistical Process Control, had its origins in the early 1900's with Bell System Statistical Techniques. William Shewhart of the plan-do-check-act and the War Production Board introduced the methods during World War II. However, QI methods may be most famous for their use in the automotive industry, more specifically by Toyota. Toyota’s success drew international attention and many companies desired to learn how they became so efficient. Akio Toyoda, the CEO of Toyota, founded his company on four principles: philosophy, process, people (and partners), and problem solving. Philosophy is the foundation of the company and the remaining three Ps, through which Toyota strives to add value for their customers, society, the community, and associates. With philosophy as the foundation, the right processes can be implemented, including those that reduce waste and create flow. He felt that input from those affected is to be used to build the system. The people and partners of the process should be challenged, forcing them to be creative and grow through problem solving, the last P. Toyota’s four Ps are incorporated into Lean Systems; a process that focuses on delivering high quality, value-added products or services to a customer at a low cost. Toyota was extremely attentive to all processes employed by their company. Workers and managers were highly experienced, with many years on the job. Until recently, the company focused on their goals and philosophy guided their processes. When a problem arose, the company quickly began problem solving, fixing the problem, and anticipating what may occur next. Essentially, Toyota was conducting many cycles of rapid improvement, continually striving to improve their processes, and through them, their outcomes.
Now what does all this have to do with healthcare? The same principles used by Toyota can be applied to healthcare. In healthcare, this is formally known as the Model for Improvement (Figure 2.3), which was developed by Associates in Process Improvements. This model provides a framework for planning, analyzing, and implementing changes through many cycles. Three questions drive change for improvement:

• What are we trying to accomplish?

• How will we know that a change is an improvement?

• What changes can we make that will result in improvement?

The first question assists one to identify the aims of the project: what are the outcomes expected by project completion? The aim provides a focused rationale and vision for what the team hopes to accomplish. Aim statements are developed to drive teams and should be SMART. SMART aims are specific, measurable, action-oriented, relevant/rerealistic, and timely. All these components should be included in the aim statement so that it is clear to team members what the goal is, how it will be measured, what steps will be taken, by when, and its relevance to the organization. The aim statement is usually included in a team or collaborative’s key driver diagram, a document that outlines the path by which the aim will be achieved; potential interventions and suggestions for changes that impact the main outcomes tied to the aim, are typically depicted in a key driver diagram.
The second question, how will we know that a change is an improvement?, identifies the measures to be collected. The measures help the team learn and are not used to judge or compare teams to one another, although some teams find motivation seeing how they perform compared to the peers. In terms of provider self-efficacy, feedback on measure performance can lead to observational learning from peers. Such collective learning as a key feature of a collaborative and provides a built-in incentive for continued improvement.
Measures help one recognize areas for improvement, clearly demonstrating the gap between where the system currently is, to where it needs to be. They provide feedback as a means to evaluate whether the changes being made are having the desired impact. Additionally, measures help to characterize the robustness of the change; how the system responds to the changes made, issues of sustainability, additional supports that may need to be put in place, and the impact various environments and time, are all factors to consider when characterizing robustness. There are several types of measures to determine whether a change is an improvement. Process measures represent the working of the system and typically reflect whether components of the systems are performing as planned. For example, the proportion of children with a BMI above the 95th percentile that receive a diagnosis of obesity is a simple process measure. Outcome measures reflect the voice of the customer or patient. Examples may range from patient satisfaction with wait times to population reduction in BMI percentile. Balance measures help to identify whether the changes being made are impacting the system in other ways; for instance, by incorporating a new weight management office visit into the patient schedule, do patients have to wait longer to schedule a well child visit?

The final question - What change can we make that will result in improvement? - seeks to use expert knowledge of the system and theories to identify what changes can be made. Change concepts are common approaches or areas by which improvements can be made to the system. Some examples of change concepts include eliminating waste, improving work flow, and changing the environment. These concepts combined with expert knowledge will generate ideas that can be tested in change cycles.

The change cycles are composed of four steps: plan, do, study, and act (PDSA). Normally, research and experimental designs are planned in precise detail before implementation. Conversely, in QI, a process, theory, or evidence may already be in place,
but error, waste, or lack of implementation occur, indicating the need for improvement. Countermeasures (changes) or proposed solutions should be put into practice as soon as possible. Conducting a PDSA cycle will lead to countermeasure development. Essentially, a PDSA cycle is a mini-experiment. The planning phase includes the who, what, when, where, and how to fix the error or waste within the process, framing the countermeasure in a way that can be incrementally implemented through multiple PDSA cycles. The power of the PDSA cycle is its scale, especially when an investigator or team’s belief in the countermeasure is low. PDSA cycles can and should be implemented on a small scale, starting with one person, over one day, working with one patient, or one piece of equipment, etc. When planning, the investigator makes theory-based predictions about the outcomes. Based on resulting data, investigators will compare the predictions made to actual outcomes. The planning phase also consists of making a data collection plan. Implementation of the countermeasure occurs in the “Do” step; it’s important for investigators to document all observations during the implementation phase to help interpret whether the change was an improvement. The information collected during the “do” phase will assist in evaluating whether the implemented change was instituted correctly, and determine if the outcomes observed were appropriate. In the “Study” step, one will compare the predictions made with the outcomes. At this point participants will begin to learn more about the process and determine whether they believe in the effectiveness of the changes made. The final step, “Act”, determines what future steps the team will take as they continue to improve the targeted process toward the ultimate aims. If the outcomes achieved during the current cycle were not optimal, then the team can conduct another PDSA cycle. The team may chose to modify the test of change, adapting it to better improve the system, or they may abandon the test of change, seeking an alternative to that particular test. If, however, the outcomes achieved were desirable, the team can scale
up the change. At this point they may try it with more people, over a longer period of time, and in different environments. More importantly, QI methodology supports making small incremental changes, ones that gradually build belief in the change process and the power of the individual to affect it. Also, by performing small changes, there is little risk involved, should the change implemented be incorrect or maladaptive. However, as risk is minimized and degree of belief increased, scaling up the change will eventually lead to full-scale implementation and widespread change.

The Model for Improvement is embedded within the Institute for Healthcare Improvement’s Breakthrough Series Learning Collaborative Model (Figure 2.4). All learning collaboratives begin with selection of a topic and an expert who helps to develop the parameters and framework for the participants. When the expert team has defined the collaborative aim, measures, and compiled topic materials, they can begin participant recruitment. Participants usually form teams that are comprised of people with different backgrounds and expertise within their organization. As participating teams are recruited, they will complete pre-work in advance of the group meeting, which is essentially baseline data collection. Pre-work may also be comprised of storyboards, team specific aims and measures, and other collaborative specific work. Teams and the experts will attend a learning session, which is usually an in person gathering of participants. Depending on the length of the learning collaborative, there may only be one learning session or there can be several over the course of the project. The IHI recommends a learning collaborative be long enough in length to host four learning sessions, with action periods testing changes, between each learning session. At the learning sessions, improvement methodology and topic materials are presented. Teams typically have time to work together to redefine their team-specific aim and measures and to work on their PDSA cycles. Between learning sessions (or until the end of the collaborative) teams will serially conduct PDSA cycles to
learn about unique adaption of the topic to their specific organization. Additionally, team members have several supports in place to assist in their individual and the entire collaborative’s learning process. These may be in the form of monthly phone calls, emails to the listserv, monthly team reports (practice narratives), or site visits. By the end of the collaborative, the group hopes not only to achieve the collaborative aim, but also to develop best practices around the selected topic. Lessons learned can be built upon within future collaboratives or disseminated to larger institutes for additional levels of learning.

It is important to monitor the effects of changes made. Typically, learning collaboratives establish a baseline, as pre-work measures are collected. This assists in interpreting the impact of the step-wise improvement efforts. Time series run charts display the measures of interest as they appeared before and after implementation, and as change cycles (PDSAs) occur. These measures seek to validate the global and specific aims. Additional components of QI include accepting consistent bias, as the system will always contain this, and therefore it will be captured pre- and post-collaborative. Quality improvement relies on small samples to get just enough data to learn from and to plan the next set of small sequential changes. It favors flexible hypotheses, which may change as we learn new information. But most importantly, that all this occurs while continuing to provide high quality care to patients.97

Finally, teamwork is crucial, not only between those involved in the PDSA cycle themselves, but to those who are performing the changes. People and Partners, one of the 4Ps of Toyota, creates an environment where people feel comfortable with being challenged during the change process and have come to rely on each other to make the change happen. As mentioned above, teams are typically formed during the learning collaborative and are instrumental to the learning process; each person has a role in making change a sustainable improvement.
The learning collaborative model provides framework to support the unique counseling paradigm essential for primary care providers approaching excess weight management. Rapid improvement cycles allow for incremental learning around and sequential integration of weight management systems to support changes in provider behavior as they adapt a novel, patient-centered behavior change model.

Figure 2.4 - Institute for Healthcare Improvement's Breakthrough Series Learning Collaborative Model.
Chapter Three: Program Development Phase – Development of and Pilot Study on “A Pound of Cure,” a Weight Management Curriculum

For the primary care provider to successfully approach weight management, we removed several commonly cited barriers, the first of which was lack of patient education materials. This chapter highlights the development of “A Pound of Cure” curriculum – comprised of:

• History collection forms
• Progress notes
• Patient educational materials

Introduction

Childhood overweight is a complex health problem faced by nearly 30% of American youth. Contributing factors to our children’s obese state are numerous and are influenced by the various levels of the child’s life. Dietary, activity, and sedentary behaviors are shaped by the child’s personal lifestyle, community in which they live, surrounding institutions and organizations, and the culture of their society (Figure 3.1). Multi-level studies are needed to truly influence a child’s health-related behaviors, however, these can be difficult to plan, implement, and sustain, so many studies seek to impact one level that influences the child’s behaviors. Studies targeting a single behavior in isolation have rarely shown efficacy. Our intervention model focused on influencing the multiple socio ecological levels of the primary care doctors, to improve their individual factors, the counseling environment within their practice, and to begin to reshape the culture, norms, and values of primary care so that we may ultimately improve the child and family’s socio ecological model around health.
Figure 3.1 - Social Ecological Model for Behavior Change.

Providers are reluctant to approach counseling on this topic because much of their environment and personal behaviors do not support this behavior – they lack confidence in current treatments. Physicians lack a comprehensive set of educational materials and a sound counseling strategy to guide families through an individualized behavior change progression. The primary care environment imposes several constraints on the PCP – namely lack of time and lack of connection with dietary and activity specialists – which make it difficult for the PCP to systematically approach weight management. Yet, the PCP
has an invaluable connection with the family built on trust that can serve as a strong foundation for counseling.

We set out to develop and pilot a weight management curriculum and counseling approach for use by primary care providers (PCPs) to help instill healthy lifestyle behaviors and promote weight maintenance in the children counseled. We developed a pediatric weight management program for PCPs in response to two issues:

1. To translate the Expert Committee Recommendations for specific behaviors and the treatment algorithm used in a tertiary care and multidisciplinary team weight management center into a primary care model.

2. To respond to requests from PCPs who had received training in *Ounce of Prevention* (primary care curriculum for delivery of nutrition and physical activity anticipatory guidance at well-child visits birth to 18 years of age) who stated that they lacked the next steps of the counseling process: how to manage the overweight child identified during well child visits.

Understanding the need for timely development of a pediatric weight management package, we did not approach development and piloting of the “A Pound of Cure” (POC) package in the context of traditional research, that is, developed completely, then tested. Using the Center for Healthy Weight and Nutrition (CHWN) at Nationwide Children’s Hospital in Columbus, Ohio as a standard for obesity management, we began to build a primary care model for a comprehensive approach to obesity management. CHWN has provided Stage 3 and 4 ECR counseling for several years through use of a multidisciplinary team comprised of physicians, dietitians, psychologists, and recreational therapists.

Similar to the incremental personal behavior change anticipated in the Trans theoretical Model and Social Cognitive Theory, similar sequential changes can be made to
the primary care practice – and to the PCP’s clinical approach – using the processes piloted by the Institute for Healthcare Improvement, a method called the Model for Improvement.\textsuperscript{99} The theory is that setting small, specific aims and defining serial outcome measures to evaluate whether changes are actually improvements, can impact and improve processes and behaviors surrounding weight management. We used this methodology to develop the physician’s counseling strategy, practice tools, and parent educational handouts that comprised “A Pound of Cure”.

For this study, we set out to:

- develop a series of educational handouts for families attending office visits for excess weight, founded on the 2007 Expert Committee Recommendations (ECR).
- obtain parent and child feedback on handouts to guide revision and final drafts of 15 handouts (1 providing an overview of POC, 8 on the ECR, 6 supplemental handouts).
- develop progress notes for initial and follow-up visits, to guide physicians through history collection, identification of areas within diet and physical activity behaviors that require attention, and documentation of counseling provided and goals set.

\textit{Methods}

From the summer of 2009 to February 2012, we developed and piloted \textit{POC} to address the problem of overweight and obesity of youth in the Hilltop region of Columbus, an urban clinic with a diverse, low-income population. Our intent was to create a model of primary care obesity practice, utilize supplementary educational programs to augment it, and establish a referral process between the local school nurses and the Hilltop Clinic.
One hundred families were enrolled from the population of patients that attended the weight management program at the Hilltop Primary Care Clinic. This was a referral population. Primary care providers and school nurses screened for, identified, and referred overweight or obese children to the Hilltop clinic for intervention (Figure 3.2). The Hilltop Clinic was unique in that it did not utilize the team approach developed at the central hospital facility, but rather employed highly experienced physicians in weight management to evaluate and counsel families. This afforded an opportunity to examine the process in a more primary care type practice setting. Families were asked to aid in the development of the POC model by offering feedback on physician counseling and guiding the creation of materials that made the counseling approach understandable, effective, and culturally acceptable. A strategy of repeated interviews with families and children was used to continuously adjust our primary care model for pediatric weight management over the course of 2 years.
Throughout the enrollment process, we surveyed families pre- and post- initial visit and upon completion of final office visit, to gather themes, attitudes, and satisfaction with materials and physician counseling. These interviews directed our revisions of the subject matter, color, pictures, language, and format of parental educational handouts. Child, parent, and physician feedback were sought for the final drafts of the patient educational materials. English and Spanish speaking families were enrolled and offered a $10 gift card for completing initial visit surveys and interview. Periodic chart reviews were conducted to determine patterns and themes in topics most commonly discussed during office visits, as well as the sequence in which the behaviors were approached. These findings assisted in
structuring the individual office visit modules. Additionally, throughout the development phase, we collaborated with a number of physicians with experience in pediatric weight management to help structure and abbreviate the office visits and progress notes, tailoring them to a primary care practice.

The office visit modules, patient educational materials, and the electronic medical record (Epic) progress note were all subject to repeated modifications during the drafting process. A Pound of Cure materials were not cast in their final drafts and implemented as a final package. Instead, we conducted multiple plan-do-study-act (PDSA) cycles to develop the counseling strategy and educational materials concurrently. Therefore, the office visit modules, patient educational materials, and the progress note were all subject to continuous modifications during the two-year drafting process. Through observations, we learned in real-time how to hone our physicians’ tertiary care obesity management skills and educational materials to make them suitable for the primary care setting. Additional input was received from our physicians, who provided input on counseling strategies, barriers, themes for discussions with parents, and the usefulness of handouts during increasingly brief office visits.

Results

Office Visit Modules, History Collection Forms, & Progress Notes

Within the primary care setting, we developed and implemented streamlined office visit modules. The foundation for the office visit modules was the Expert Committee on the Prevention and Treatment of Childhood Obesity, a consensus document from 15 national health care organizations, based on an exhaustive evidence review. The office visit modules were designed to allow efficient collection of information, effective counseling, and
distribution of materials for child and family to reinforce messages. Each module consisted of an office visit centered on 1-2 specific behavioral targets, chosen in collaboration by the child/parent and physician.

**Initial Visit Module**: During the first module, the physician evaluated the child’s total health risk, presented the child and family with an outline of evidence-based targets to control obesity, and then identified those high-risk diet or activity behaviors that were specific to the child. The Center for Healthy Weight and Nutrition utilized several history collection forms that were mailed to patients’ homes upon scheduling an initial weight management visit. However, several barriers prevented families from completing them prior to the initial office visit, such as, the forms were lengthy, time consuming, required a moderate literacy level, and were only available in English. Additionally, many families failed to arrive at the initial office visit with their paperwork and even fewer had completed the forms. To overcome the challenges faced with CHWN’s approach, we developed concise, yet thorough, forms to collect diet, physical activity, and family medical history as a means to evaluate the child’s total health risk, as defined by the risks outlined in the Expert Committee report (Appendix C). Forms were provided to families when they arrived at the Hilltop Clinic. Initial forms were only available in English, but additional funding was secured allowing the forms to be translated into Spanish and acculturated for the Hispanic population. Eventually, the forms were incorporated into the electronic medical record (EMR) to streamline history collection within the Ambulatory Department network at Nationwide Children’s Hospital.

Early in the development phase, the study team conducted periodic chart reviews to assist in modularizing office visit topics for each POC office visit. With the ECR treatment algorithm as a framework, themes for each office visit became apparent. However, the focus of each visit needed to fit within the constraints of the office visit, mainly time. For instance,
during many initial visits, physicians typically discussed approaches for eating age-appropriate portion sizes, how to reduce excess consumption of sugar sweetened beverages, and how to transition to consumption of lower fat dairy products, leading to longer office visit times. It became apparent that these frequently discussed topics normally broached during the initial visit should be slated for discussion at follow-up office visits instead, should the child’s diet and activity behavior assessment warrant such discussions.

The focal point of the initial visit shifted to a thorough assessment of the child’s medical and behavioral risk. This reduced the length of the initial office visit while allowing for collection of the child’s history and laying the foundation for future office visit discussions. Additionally, the concept of energy balance, a topic used to guide future discussions, was discussed during this visit as a means to frame the counseling process. The child’s specific dietary and activity habits were framed within the context of energy balance, so that the targeted behaviors could be approached individually during subsequent office visits. Appendix D is the “Keeping it Balanced” handout that is introduced during the initial visit (Appendix D also provides a list of handouts distributed during each of the office visit modules). This handout is the foundation of the POC counseling model and provides families with a roadmap of the behaviors to be discussed at future visits and of behaviors changed during past visits. The right hand side depicts our counseling framework and topics discussed during each office visit. As the PCP becomes more familiar and comfortable with the counseling process, the framework should be modified to discuss the specific obesogenic behaviors of the child that were identified during the initial visit. In similar fashion, continued chart reviews revealed themes for ensuing office visits.

*Follow Up Visit Modules:* From this we produced a basic framework for a series of weight management office visit modules, ranging from simplest to most complex behaviors to address. For instance, the theme of the first visit was “Energy Balance.” Follow up visits
themes included reduction of “Excess Calories,” promotion of physical activity by “Keeping Active,” “The Importance of Routine (or Structure) in the Day,” and a final visit on “Nutrient Rich Foods.” Upon conclusion of each office visit, families took home a series of handouts and established a goal to work on between office visits.

With the concept of energy balance, the foundation for future counseling sessions, discussed during the initial visit, the physician and family used ensuing office visits to discuss problematic eating and activity habits. The sequence of messages are similar for each child but are tailored based on the needs of the family and child as identified during the initial visit. Typically, returned three-day diet records were reviewed during the second office visit to identify additional problematic areas possibly omitted during initial discussions about the child’s diet. Each module is comprised of several related ECR topics and handouts. With the help of a computer programmer, we adapted counseling materials and physician prompts into the framework of the electronic medical record, Epic, for use by the Ambulatory Department physicians. This required creating electronic versions of the initial assessment and screening, as well as each subsequent office visit, including the history, physical, counseling, goals, and patient centered materials for handouts (Appendix E).

*Family interview Results*: Parents were generally pleased with the structure of the office visits. When asked about the office visit modules, 96.5% of families felt that they spent an appropriate amount of time with the doctor, 97.6% of families felt that they had good discussions with the doctor, and 95.3% of families felt that they obtained information that was specific to their child. On new information discussed during the office visits, 77.6% of parents felt they received the right amount of new information, 13% thought there was too little new information presented, and 9.4% thought too much new information was presented. We discussed patient and family feedback with our physicians and modified
Sixty-three percent of families set goals with the physician, 22.6% stated they determined the goal on their own and the remaining simply listened to the goals set by the physician alone. There was a normal distribution of parents’ feeling of ease with the goal set, with a tendency of parents to feel that the goal was appropriately challenging. Parents reported that physicians explained handouts provided 98.5% of the time and thoroughly explained all components of each handout 97.1% of the time. Ninety-five percent of parents felt that the handouts they received would help them achieve the goals they had set during the office visit.

**POC Patient Educational Materials**

**Patient feedback guided the creation of educational materials.** Constructive criticism led to the development of effective materials and presentation of new information to parents and children receiving counseling on excess weight.

Again, starting from CHWN’s tertiary care counseling materials, we created handouts on the most commonly discussed topics in the CHWN clinic and piloted our handouts at the Hilltop clinic. Handouts on each of the ECR target behaviors were initially created as half sheets of paper within 2007 Microsoft Word (Figure 3.3 a). The initial drafts of our handouts contained brief content messaging around each of the nine ECRs. Some handouts contained an activity (color, word find, etc) for child participation. As physicians counseled more families, frequently asked questions and topics discussed were used to expand into our second draft of ECR handouts.

Extra funding was secured to undertake the work on patient/family-centered materials. With funding, handouts were revised and designed within 2007 Microsoft Publisher (Figure 3.3 b). We expanded handouts in several areas to include ECR content overview, a parent tip area (for frequently asked questions around that ECR topic), a goal
setting area, a self-monitoring form, and an area devoted to applying ECR content to the nutrition facts label. After several cycles using the revised handouts, it became apparent that for many families training on the nutrition facts label was too abstract a concept. To deal with the nutrition facts label independently from all other ECR targeted information, a new handout was created, explaining use of the label in a step-wise fashion. Families that expressed interest in understanding the nutrition facts label received this handout. Midway through the pilot we received additional funding which allowed us to translate and acculturate our materials for the Hispanic population. We obtained feedback from families on the newly revised and translated handouts. Families were asked to rate the amount of color, pictures, and number of words on handouts; 90%, 88%, and 98% of families felt that the color, number of pictures and amount of wording, respectively, was appropriate. Approximately 8% of families felt that there was still too much information included on handouts. However, overall, 91.4% of families liked the overall look and content of the handouts. Handouts were finalized by the graphic designer (Figure 3.3 c) for use in a formal study of primary care pediatricians in collaboration with the Ohio Chapter, American Academy of Pediatrics.

**Behavioral Index**

Many overweight and obese children were referred to our clinic with weight loss as the main outcome. It is crucial for clinicians to have the right outcomes in mind for their counseling to define what “success” means. For most, weight management was the primary goal. However, in POC, the main emphasis was on establishing a more healthful diet and activity behaviors as the foundational steps to later weight control. This redefinition of “success” was crucial to ensuring physician acknowledgment of incremental change. However, no such tool existed to measure small, sequential changes in a child's diet and
activity. To address this need, we created a tool that could be used to evaluate the effectiveness of physician counseling that captured incremental knowledge gained and behaviors changed within the families counseled – a behavioral index (Appendix F). Creation and validation of this tool proved to be a prolonged and challenging task, the progress of which is further discussed in Appendix F. The Behavioral Index was, therefore, unavailable for testing in the pilot phase or the later efficacy trial.
Figure 3.3 - Clockwise are versions of "Proper Portions." a) Initial draft of POC materials in Microsoft Word; b) Draft of POC materials in Microsoft Publisher (format with nutrition facts label); c) Final draft of POC handout used in learning collaborative.
**Physician Adherence**

Upon completion of the pilot, we reviewed children’s medical records retrospectively to evaluate Hilltop physician adherence to the national guidelines set by the ECRs. Height and weight were measured and documented at every initial visit. Overall, physicians calculated and recorded a child’s BMI 98% of the time at initial office visits. However, documentation of BMI percentile occurred less frequently, with only 75.8% of initial visits containing this anthropometric measure. Finally, blood pressure was measured and documented for 90.1% of initial visits. Table 3.1 displays documentation practices for each of the follow-up visits.

**Table 3.1 - Anthropometric documentation at POC follow-up visits (development phase).**

<table>
<thead>
<tr>
<th>Office Visit Number</th>
<th>Number Patients at Visit</th>
<th>Height</th>
<th>Weight</th>
<th>BMI</th>
<th>BMI %</th>
<th>Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>120</td>
<td>114 (95%)</td>
<td>116 (97%)</td>
<td>13 (89%)</td>
<td>27 (77.5%)</td>
<td>14 (88.3%)</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>73</td>
<td>71 (97%)</td>
<td>1 (99%)</td>
<td>5 (93%)</td>
<td>12 (83.6%)</td>
<td>10 (86.3%)</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>48</td>
<td>45 (94%)</td>
<td>3 (98%)</td>
<td>4 (92%)</td>
<td>5 (89.6%)</td>
<td>11 (77.1%)</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>21</td>
<td>21 (100%)</td>
<td>21 (100%)</td>
<td>21 (100%)</td>
<td>21 (100%)</td>
<td>4 (81%)</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>8</td>
<td>8 (100%)</td>
<td>8 (100%)</td>
<td>8 (100%)</td>
<td>8 (100%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2</td>
<td>2 (100%)</td>
<td>2 (100%)</td>
<td>2 (100%)</td>
<td>2 (100%)</td>
<td>2 (100%)</td>
</tr>
</tbody>
</table>

Documentation practices for children attending POC follow-up visits during the development phase, represented as total number of charts reviewed that contained documentation (percent containing documentation of measures).

**Office visit composition**

Typically, initial POC office visits averaged 24 minutes in length, with the longest office visit being 60 minutes in length. Follow-up office visits, regardless of being the first follow-up visit or the seventh, lasted 20 to 25 minutes in length (Table 3.2). The main
determinant of office visit length was whether or not the family spoke English and if they required an interrupter for their office visit.

Table 3.2 – POC office visit components (development phase).

<table>
<thead>
<tr>
<th>Office Visit Number</th>
<th>% Charts with Goals</th>
<th>Number of Goals Set</th>
<th>Minutes Counseled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Visit</td>
<td>99.6%</td>
<td>3.14</td>
<td>24.38</td>
</tr>
<tr>
<td>2nd Visit</td>
<td>98.3%</td>
<td>2.62</td>
<td>20.78</td>
</tr>
<tr>
<td>3rd Visit</td>
<td>100%</td>
<td>2.52</td>
<td>22.23</td>
</tr>
<tr>
<td>4th Visit</td>
<td>100%</td>
<td>2.12</td>
<td>19.79</td>
</tr>
<tr>
<td>5th Visit</td>
<td>95.2%</td>
<td>2.00</td>
<td>22.38</td>
</tr>
<tr>
<td>6th Visit</td>
<td>100%</td>
<td>1.87</td>
<td>25.00</td>
</tr>
<tr>
<td>7th Visit</td>
<td>100%</td>
<td>2</td>
<td>25.00</td>
</tr>
</tbody>
</table>

For patients attending office visits during the POC development phase: percent of charts containing documentation of a specific goal set, number of goals set and minutes counseled, presented as mean values.

Comparison of EMR for initial office visit encounters and parent interview responses (n=100) offered insight on the information that parents actually took away from office visits. Only approximately one-quarter of parents were able to accurately describe the discussion that they had with the doctor. Another 25.8% were able to provide at least one topic discussed during the office visit. However, almost three quarters of parents were able to identify at least one or all of the goals that they should be working on between the initial and follow-up office visit. Recurrent themes from parent interviews included several barriers parents felt that they would face as they start changing child and family behaviors; parenting techniques, environment, motivation, time, habits, child-centered factors, family lifestyle, price, and skills and knowledge. Parents commonly cited their child’s constant hunger, stubbornness of the child, unwillingness to conform, sudden shift in portion sizes,
motivation to initiate and begin changing behaviors, lack of control over eating environments outside of the home, and conflict between parents, as major barriers to achieving the individualized goals set during the office visit.

One final challenge addressed during the development and pilot phase was to enhance collaboration between Columbus City School nurses and the Hilltop Close To Home physicians to improve referral and response, given that the school nurses served as a referral source into the clinic. Previously, by policy, school nurses were unable to serve as a direct referral source into the primary care setting, creating a gap in care. Children who were identified as overweight or obese during yearly school health screenings had to take the initiative to follow-up on their own with their physician to obtain a referral. A Nationwide Children’s Hospital Nurse Practitioner was recruited to bridge the gap between school nurses and primary care physicians, receiving consent from families to schedule an appointment with our physicians on behalf of the family. The nurse practitioner expressed concern that the duration between school nurse screening and physician assessment may be too long to maintain family compliance. We had two physicians available to see patients one day a week. Initial assessments average one hour in length and follow-up office visits average 30 minutes in length, allowing our physicians to see a total of approximately three initial assessments and four follow-up visits each week. We adjusted clinic schedules accordingly to establish clinic days solely for new patients or solely for follow-up visits, to meet the needs of our school nurse practitioner and the patient population.

**Discussion**

Our unique approach to developing counseling tools and strategies allowed us to translate a tertiary care weight management model into a cohesive set of materials for use
by PCPs as they manage pediatric excess weight within the limitations of a primary care setting. Multiple formats of physician and patient feedback, and review of patient medical records allowed us to revise in real time the POC educational handouts to meet the needs of both those providing and receiving counseling. We were able to address inadequacies of the POC package within the actual counseling environment. Patient and physician satisfaction dictated when the POC package was complete. The POC package sought to remove a commonly cited barrier by PCPs: the lack of available resources and counseling strategies to manage pediatric excess weight.\textsuperscript{69, 74-76, 80}

Development and piloting of a primary care model, "A Pound of Cure," resulted in a final counseling package comprised of the following elements:

- Streamlined evaluation tool for child’s obesity-related health risk
- Patient educational resources to help guide physician counseling, based on the ECRs
- Structured office visit modules and a directed counseling process for primary care clinicians (which could be used by non-physicians as well, such as nurse practitioners, nurses, dietitians or parent educators)
- An electronic medical record (Epic) progress note with counseling materials and physician prompts,

We learned several important lessons.

- Strong need to develop and adhere to a template for scheduling. For an English-speaking physician working with English-speaking families, initial office visits tended to last 30-45 minutes and follow-up visits 15 to 20 minutes. However, when dealing with non-English speaking families, length of office visits increased dramatically as an interpreter was present, with some visits taking twice as long.
• History collection forms are a valuable source of patient information. Forms should be concise, yet capture pertinent dietary and physical activity behaviors, as these are the main mechanism to identify problematic behaviors for modification.
• The behavioral index, while unique in its ability to monitor the Expert Committee Recommendations and crucial to document changes in ECR behaviors after a series of counseling encounters, was not able to capture changes in family’s behaviors due to rapidly diminishing rates of follow-up and return.

Despite lessons learned, several outcomes differed from what we initially had anticipated. We intended to enroll approximately 100 families, anticipating a 25% no-show rate, over the course of a year. However, enrollment was completed after two and a half years. Scheduling appointments in limited available time slots presented many conflicts, primarily limiting the number of families seen by our physicians and extending the duration between initial and follow-up visits. Mid-way through the first year of the project, 42% of patients attending the clinic required an interpreter and were ineligible for the study. We had a 36% no-show rate, and our clinic time was reduced from two-four hour clinics to one-four hour clinic. Time limitations and lack of Spanish materials and consent forms early in the project made it difficult to enroll individuals who primarily spoke Spanish. In the Hilltop Clinic on the west side, the Hispanic population is substantial. Although the actual number of families eligible to enroll was lower than anticipated, we continued to develop office visit modules, improve materials, and incorporate counseling strategies and materials into Epic. Eventually, we received funding to translate and acculturate our materials into Spanish, removing one significant barrier to patient recruitment and enrollment.

Due to the in-hospital rollout of Epic, incorporation of our materials into the outpatient Epic electronic record was slowed. The Center for Healthy Weight and Nutrition
began using Epic in January 2010. Since then, the Center’s physicians have adapted well to the program and BMI is automatically calculated once height and weight are recorded, improving BMI and BMI percentile documentation. In May 2010, we had several meetings with an Epic programmer to streamline the documents developed for this project and placed them within the Center’s materials. From that point, all the Ambulatory clinics in the network had access to the same materials.

**Limitations**

We recognize the non-traditional approach to POC program design and materials development, but embrace the real-time, real setting strategy that led to its development. The POC clinic was a unique environment given that it was initially created to capture patient overflow from the tertiary-care multi-disciplinary weight management clinic. Its provision of highly experienced weight management clinicians seeing patients in a primary care clinic setting, without their usual support team. Office visit lengths and frequency were slightly longer and more frequent than what may initially be sustainable for most primary care settings. This initial phase was therefore a pilot trial, the results of which could not be extrapolated to the primary care office setting. On the other hand, primary care physicians have two advantages: one, they have a long-standing relationship with the family and child and, two, they have greater flexibility to see the child repeatedly over a relatively brief time frame.

**Conclusions**

Pediatric weight management within the primary care setting is a task that does not come without its challenges. The 2007 Expert Committee provided a comprehensive
framework for PCPs, which we used as a framework to guide development of the “A Pound of Cure” counseling strategy and materials. This package fills gaps in primary care weight management and also removes barriers that PCPs face when dealing with this topic. Provision of this package to PCPs works to facilitate the weight management process, eliminate barriers, and establish a standard of care around weight management to which PCPs should adhere. Reshaping PCP behavior toward a standard of care and family expectations around weight loss are the first steps to tackle the pediatric obesity epidemic.

Creation of a counseling model and materials were the primary objectives of our study at the Hilltop clinic – we developed a weight management curriculum. However, a secondary objective of the Hilltop pilot was to evaluate the efficacy of the newly developed “A Pound of Cure” curriculum in the pilot phase on patient weight-related outcomes. Chapter 4 describes the process and outcomes related to this secondary objective.
Chapter Four: “A Pound of Cure” Pilot– Secondary Patient Outcomes

Having developed a weight management curriculum “A Pound of Cure”, a secondary outcome was to evaluate the efficacy of this curriculum in managing weight of the overweight and obese pediatric population. This chapter highlights the weight management outcomes of patients who attended POC office visits during the development and pilot phase of “A Pound of Cure.”

Introduction

To support weight control and acquisition of healthy behavior in the families counseled, the essential first step is to create and sustain behavior change among the primary care providers (PCPs) doing the counseling. Until clinician’s fully engage in the effort to curtail obesity, families are unlikely to respond. Clinician behavior, like patient behavior, is not improved by education alone. Many PCPs fail to raise the issue of excess weight with the patients and parents in their practice. Many consider it futile, too time consuming, and poorly received; others simply feel unprepared to counsel effectively due to lack of self-efficacy, poor knowledge of the counseling topics and insufficient counseling materials.41, 69, 74 To overcome their perceived ineffective weight management in primary care practice settings, physicians requested well-designed materials to augment counseling. However, an even more significant perceived barrier was identified: their lack of time. Primary care physicians felt that their counseling was inefficient and insufficient to combat a physical disorder as complex as childhood obesity. Finally, a lack of insight into parental concerns and perceptions appeared to be a factor in the physician’s attitude toward weight management.
In the 21st Century, childhood obesity has emerged as society’s most complex and multifactorial public health problem. Not only are 32% of America’s youth overweight with 17% obese, but young children in their first decade are already showing the initial signs of serious co-morbidities.1, 2 Yet, medical science has demonstrated little capacity for effective intervention. With this in mind, many suggest approaching childhood overweight while the child’s lifestyle behaviors are still malleable and under parental control.13-16 Given that obesity rates rise steadily over the first years of life and that an obese child’s risk for adult obesity increases from 50% in preschool to 83% at the end of elementary school, should obesity persist into early teen years, intervention is most likely to be ineffective.6 Within the child’s first five years of life, the primary care physician (PCP) is the only one from the health care community who has consistent, regular access to the child and family. Primary care physicians have 12 scheduled visits to provide well-child visits, immunizations, and behavioral advice for families. These visits offer the best public health opportunity to instill proper nutrition and physical activity habits in young children and to gauge their progress.100

What are the current recommendations for PCPs to deal with childhood obesity?

Physician reticence to engage families of obese children has not been due to lack of clinical information or guidance. In 2007, 15 national organizations established the Expert Committee Recommendations (ECRs), a set of clinician guidelines that encouraged PCPs to provide preventative counseling, weight monitoring, and laboratory screening in order to intervene on excess weight.47 The Expert Committee suggests four staged interventions for treatment (Figure 1.1):

1. Stage One – “Prevention Plus” anticipatory nutrition and physical activity guidance for the primary care office
2. Stage Two – “Structured Weight Management” targeted nutrition and activity advice for the primary care office that offers goal setting, counseling, and guidance with close follow up.

3. Stage Three – “Comprehensive Multidisciplinary Intervention” more frequent and intense office visit encounters with the PCP augmented by counseling from specialists in a weight management, such as RDs or psychologists.

4. Stage Four – “Tertiary Care Intervention” an intervention for select, extremely obese youth that may involve medications, very low calorie diets, or surgery at a tertiary care center offering a comprehensive, team approach toward weight management.

The concerns of physicians about materials, time, effectiveness, and futility of weight management efforts need to be addressed using a well-structured, incremental approach to the problem that is easy to apply, fits into their practice style and can measure success. The initial step was to redefine “success” for the clinicians in terms of the available scientific literature.

We produced a series of modularized office visits for use by PCPs, entitled “A Pound of Cure.” The strategy was to define “success” as promoting the gradual adoption of those behaviors identified as effective by the Expert Committee on Obesity (the ECRs). “A Pound of Cure” was designed as a clinician-orientated training package that incorporates all nine of the ECRs, plus non-traditional diet and activity risk factors into the Expert Committee’s treatment algorithm within the context of Chronic Care Model for Childhood Obesity. The high quality intervention tools that we developed provided PCPs with a counseling model and handouts to direct behavior modification within families with overweight children. Parent educational materials, PCP resources, and a structured progress note (available for paper charts and for the Epic version of the electronic medical record, EMR) were included.
in the POC package and used to guide PCPs through the assessment, treatment, and counseling steps in the process. Ideally, when the PCP encounters a child with an elevated BMI percentile, or child with a rapidly rising BMI percentile trajectory during a well child visit, he is equipped to approach excess weight discussions with the patient and family. The office visit modules allowed for efficient collection of information, effective counseling, and distribution of ECR founded materials for child and family to reinforce messages delivered during a POC office visit. “A Pound of Cure” office visit modules were framed by the “Keeping it Balanced” handout, which served as an overview of the targets to be addressed. From that, the PCP was able to adapt messaging to meet the child’s individual obesogenic behaviors within the context of the family lifestyle.

Methods

While the primary objective of the Hilltop pilot was to develop a comprehensive pediatric weight management counseling process for PCPs, we did evaluate several patient level outcomes as secondary outcomes. Our physicians emphasized the importance of weight maintenance and acquisition of the healthy lifestyle behaviors outlined in the Expert Committee Recommendations; appropriately, our secondary objective was weight maintenance in the children attending the office visits through acquisition of healthy diet and activity behaviors. Throughout the course of our pilot, we monitored weight related outcomes of our patients.

Families with children identified as overweight or obese were referred to our clinic by their primary care doctor or by their school nurse. A subset of families (n=100) that attended weight management office visits at the Hilltop Primary Care Clinic (Nationwide Children’s Hospital, Columbus, Ohio) were interviewed on the counseling process and
materials, as described in the previous chapter. This population of families was enrolled in the POC development and pilot study from summer 2009 until February 2012. However, in addition, all families that attended an office visit during that time were included in the final analyses of initial and follow-up visits. Enrolled families received a $10 gift card for completing diet, activity, and family history intake forms and for participating in a brief interview prior to, and after, the initial visit. When families completed their final weight management office visit, they received a $20 gift card. Charts were reviewed for the 223 families that attended office visits during this three-year time span to extract information on the child’s initial obesity related health risk (medical risk, co-morbidities, nutrition and activity habits, family history, and laboratory values), anthropometrics, diagnosis, goals set, counseling discussion, and time spent counseling at each visit. Also, we reviewed the history collection forms of the subset of families enrolled during the development phase, for additional information around the child’s medical and behavioral risks. We evaluated the overall effect of POC counseling on weight-related outcomes: weight, BMI and BMI percentile; the obesity related health risk of children as they began POC counseling; patient adherence to the office visits; and physician input to office visits.

Statistical analyses were performed in IBM SPSS statistics version 20 and SAS 9.3. Completion of the POC program was considered to occur when patients’ weight stabilized, that is, when the provider felt that the family was in control of the behaviors cited by the ECRs, or when the family appeared to no longer be open to making changes, or when the family had not returned for a follow-up visit after a period of six-months. Each child’s BMI and BMI percentile were calculated using a SAS program for the 2000 CDC growth charts. Comparisons of weight related outcomes were conducted between the patient’s initial and final office visit attended using paired t-tests for significance of change. Linear models were utilized to determine what factors influenced the mean difference between initial and final
visit weight related outcomes. Additional, post-hoc comparisons were made for a subset of patients that had attended an office visit where weight was collected to further determine how the child’s weight trajectory were impacted by attending POC office visits. Statistical significance was set at p=0.05; however clinical significance warranted further consideration and discussion.

Results

Study Population

Of the 223 families that attended POC office visits, 116 returned for at least one follow-up visit and therefore were included in analyses of weight related outcomes. Only 3.1% of children seen were diagnosed as overweight (BMI percentile 85th – 94th percentile); the remaining children were obese, with the majority being diagnosed as severely obese, 65% (BMI ≥99th percentile). Table 4.1 displays the breakdown of follow-up office visits attended for the 116 children that returned for a follow-up visit; this table captures the last follow-up visit attended, i.e., for 44 of the 116 children the final visit was the second follow-up visit. Also included in Table 4.1 are the mean times between initial visit and final follow-up visit, as well as changes in BMI percentiles for children attending that follow-up visit. The child’s most recent follow-up visit, whether it was the first or sixth follow-up visit, was used as final POC office visit. Slightly more female children attended office visits (55.2%) and the majority of patients seen were either Caucasian (36.3%) or Hispanic (35.9%). The average age of children attending was 8.26 years old. Table 4.2 displays demographic data of the patient population that attended POC office visits during the development and pilot phase. Initially, the POC clinic served to counsel children that could not schedule appointments on the hospital’s main campus with the Center’s multidisciplinary team.
Therefore, children 2 to 18 years of age were included as Hilltop Clinic registrants.

However, several months into the development of the POC curriculum, we narrowed our curriculum to focus on children 2-11 years of age. This age group conformed to our desire to test the POC at a patient age when the parents and family were still influential in the child’s diet and activity behaviors. The majority of patients (70.8%) attending POC office visits at the Hilltop clinic were publicly insured.

### Table 4.1 – “A Pound of Cure” pilot population follow-up visit characteristics.

<table>
<thead>
<tr>
<th>Office Visit Number</th>
<th>Attendance</th>
<th>Time</th>
<th>Change in BMI percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>44 (37.93%)</td>
<td>94.22 days</td>
<td>-0.0620 %</td>
</tr>
<tr>
<td>3rd</td>
<td>27 (23.28%)</td>
<td>138.63 days</td>
<td>-0.3507 %</td>
</tr>
<tr>
<td>4th</td>
<td>24 (20.69%)</td>
<td>216.75 days</td>
<td>-0.5873 %</td>
</tr>
<tr>
<td>5th</td>
<td>13 (11.21%)</td>
<td>276.38 days</td>
<td>-0.2229 %</td>
</tr>
<tr>
<td>6th</td>
<td>6 (5.17%)</td>
<td>478.33 days</td>
<td>-0.4754 %</td>
</tr>
<tr>
<td>7th</td>
<td>2 (1.72%)</td>
<td>392.00 days</td>
<td>-0.1332 %</td>
</tr>
</tbody>
</table>

Each row represents data for the subset of patients who attended that office visit as their last office visit during the development and pilot phase of POC. Office visit attendance rates represented as number of patients who attended that office visit as their last office visit (percent of patients with respect to total follow up visit population). Time represented as mean days between initial and final follow-up visit attended. Mean change in BMI percentile for age and gender for population of children attending follow-up visits.
Table 4.2 – “A Pound of Cure” pilot patient demographics.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>44.8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>2-6 Yrs.</td>
<td>22.9%</td>
</tr>
<tr>
<td></td>
<td>6-12 Yrs.</td>
<td>71.7%</td>
</tr>
<tr>
<td>Race</td>
<td>Caucasian</td>
<td>36.3%</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>35.9%</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>16.1%</td>
</tr>
<tr>
<td>Weight Status</td>
<td>Overweight</td>
<td>3.1%</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>31.8%</td>
</tr>
<tr>
<td></td>
<td>Severe Obesity</td>
<td>65.0%</td>
</tr>
</tbody>
</table>

Demographics of patients that attended initial “Pound of Cure” office visits during the development and pilot phase from August 2009 to February 2012.

Table 4.3 - Medical risks for patients attending “A Pound of Cure” pilot office visits.

| Overweight Parent | Mom  | 38.1% |
|                   | Dad  | 21.5% |
| Parent with High Blood Pressure | Mom  | 14.3% |
|                   | Dad  | 11.24% |
| Pre-Hypertension (systolic) | 10.3% |
| Systolic Hypertension | 18.8% |
| Acanthosis Nigricans | 15.7% |

Medical risk as determined during history collection and physical exam at initial POC office visits during the pilot and development phase. Information collected from history collection forms completed at the initial office visit.
Table 4.4 - Obesogenic behaviors of patients attending “A Pound of Cure” pilot office visits.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast food (≥ 2x/week)</td>
<td>58.7%</td>
</tr>
<tr>
<td>Skips meals</td>
<td>12.1%</td>
</tr>
<tr>
<td>Large Portions</td>
<td>55.2%</td>
</tr>
<tr>
<td>2nd helpings</td>
<td>30%</td>
</tr>
<tr>
<td>Servings F (&lt;4 servings)</td>
<td>53.4%</td>
</tr>
<tr>
<td>Servings V (&lt;4 servings)</td>
<td>66.8%</td>
</tr>
<tr>
<td>Eats in front of screen</td>
<td>31.8%</td>
</tr>
<tr>
<td>TV in Bedroom</td>
<td>39%</td>
</tr>
<tr>
<td>Screen Time (&gt; 2hrs for all screens)</td>
<td>59.2%</td>
</tr>
</tbody>
</table>

Obesogenic diet and activity behaviors collected during initial POC office visit during the pilot and development phase. Information collected from history collection forms completed at the initial office visit.

Initial POC office visits permitted collection and evaluation of the child’s obesity-related health risk through the use of history collection forms and progress notes created during the development phase. The child’s medical risks as well as obesogenic behaviors were evaluated at this time (Tables 4.3 & 4.4). The child’s obesity-related health risk facilitated nutrition and activity discussions along with goal setting during POC office visits.

Parental Sense of Urgency

The subset of families interviewed during the development and piloting of the POC materials answered several questions at the initial visit about their child’s current health status. Parents (n=87) rated their concern about their child’s weight status of which 85.1% stated that they were worried; approximately half of parents were mildly or moderately concerned and 37.3% of parents were either very or extremely concerned about their child’s current weight status. However, less than half (44%) thought that their child was unhealthy at their current weight or believed that their child had health problems associated with their current weight (40.2%). Interestingly, 93.4% of parents believed that
their child would develop health problems in the future should weight continue to be an issue, but 94.2% believed that their child would grow out of their excess weight, almost negating their concern about future health problems. Parents were well aware of the health problems associated with excess weight, acknowledging that diabetes, high blood pressure, heart problems (stroke, heart attack), asthma, high cholesterol, cancer, fatty liver, joint issues, and psychological issues such as teasing were potential health issues that their child could face.

A small subset of families (n=6) completed all appropriate counseling encounters. Half of the parents were still concerned about their child’s weight, and 20% of parents still believed that their child was unhealthy at their current weight and that they would develop health problems in the future.

Table 4.5 - Weight-related outcomes of patients attending POC pilot office visits.

<table>
<thead>
<tr>
<th></th>
<th>Pre-POC</th>
<th>Post-POC</th>
<th>Initial POC Visit</th>
<th>Final POC Visit</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of Weight Gain</td>
<td>0.5833</td>
<td>0.4709</td>
<td></td>
<td></td>
<td>0.1435</td>
</tr>
<tr>
<td>(n=61)</td>
<td>kg/mo.</td>
<td>kg/mo.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (n=116)</td>
<td>1.32 m</td>
<td>1.35 m</td>
<td>0.000*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (n=116)</td>
<td>47.34 kg</td>
<td>50.25 kg</td>
<td>0.000*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI z-score (n=116)</td>
<td>2.498</td>
<td>2.399</td>
<td>0.000*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI Percentile (n=116)</td>
<td>98.81%</td>
<td>98.55%</td>
<td>0.0055*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rate of weight gained evaluated as the difference between weight gained between office visits prior to attending POC office visits and weight gained after attending at least one follow up office visit. Height, weight, and BMI percentile represent changes in patient anthropometrics from initial visit and final follow up office visit. * denotes statistical significance
Children's Weight Related Outcomes

Overall, children who attended a POC follow-up visit experienced weight maintenance and a moderate decrease in BMI percentile. Given that the mean age of children attending POC visits was 8.26 years, weight gain should be expected as part of normal development as children acquired height. Children tended to gain a mean of 2.91 kilograms between their first and last follow-up visit, with a range of -3.20 to 20.40 kilograms. On average, children's rate of weight gain prior to POC office visits was 0.58 and after was 0.47 kilograms/month (Table 4.5). Children's height acquisition mediated the effect of weight gain, resulting in a moderate decrease, or maintenance, in BMI z-score from 2.498 to 2.399 (p=0.000) and in BMI percentile of 98.81 to 98.55, a statistically significant decrease for the population of children that attended follow-up office visits (p=0.0055). Our regression model evaluated predictors around the maintenance or reduction of the child's BMI z-score. Degree of parental concern (p=0.008) and the child's BMI percentile (p=0.034) at the initial visit were significant predictors of change in BMI z-score.

Parental concern and the child's weight at the initial office visit were also strong predictors of the number of follow-up office visits that the family would attend. Our regression model is depicted (Tables 4.6). Only the child's weight status at the initial visit was found to be statistically significant; heavier children were less likely to attend additional office visits. While not statistically significant, parents that were moderately concerned at the initial office visit were more likely to return for follow-up office visits.
Table 4.6 - Regression Model for Follow-up Visit Attendance at POC pilot office visits.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Wald Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>56.622</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td>Parental Concern</td>
<td>12.023</td>
<td>4</td>
<td>.017</td>
</tr>
<tr>
<td>Wt1_kg</td>
<td>9.064</td>
<td>1</td>
<td>.003</td>
</tr>
</tbody>
</table>

Dependent Variable: Number of Visits
Model: (Intercept), Parental Concern, Wt1_kg

<table>
<thead>
<tr>
<th>Parameter</th>
<th>B</th>
<th>Std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>1.094</td>
<td>.1816</td>
<td>.000</td>
</tr>
<tr>
<td>[Concern=Extremely concerned]</td>
<td>.125</td>
<td>.1633</td>
<td>.442</td>
</tr>
<tr>
<td>[Concern=Mildly concerned]</td>
<td>-.122</td>
<td>.1885</td>
<td>.518</td>
</tr>
<tr>
<td>[Concern=Moderately concerned]</td>
<td>.226</td>
<td>.1234</td>
<td>.067</td>
</tr>
<tr>
<td>[Concern=Not concerned]</td>
<td>-.350</td>
<td>.2268</td>
<td>.123</td>
</tr>
<tr>
<td>[Concern=Very concerned]</td>
<td>0</td>
<td></td>
<td>.</td>
</tr>
<tr>
<td>Wt1_kg</td>
<td>-.008</td>
<td>.0027</td>
<td>.003</td>
</tr>
<tr>
<td>(Scale)</td>
<td>1</td>
<td></td>
<td>.</td>
</tr>
</tbody>
</table>

Dependent Variable: Number of Visits
Model: (Intercept), Parental Concern, Wt at Initial Visit
a. Set to zero because parameter is redundant
b. Fixed at displayed value

**Discussion**

Despite creation of a comprehensive counseling package and patient-centered educational tools, pediatric weight management still has its challenges. While 85% of our families stated that they were worried about their child’s weight, and slightly less than half of families thought that their child was unhealthy at their current weight, only 52% of families returned for at least one follow-up visit. While slightly higher, similar attrition rates have been noted in nearly all weight management centers.\(^{102-104}\) Attendance at follow-up visits further decayed as the number of follow-up visits increased. This relationship may be
connected with the overwhelming belief by parents that their child will just grow out of their excess weight; 94.2% of parents held this belief. Skelton, et al., has studied clinician perceptions around pediatric weight management programs and found that drop out rates were attributed to scheduling conflicts with school, lack of community resources, missed appointments leading to loss of momentum, low motivation since most patients were referred instead of voluntarily seeking treatment, and unrealistic expectations.\textsuperscript{103} The child’s primary care physician or school nurse were the referral source into our program; rarely did patients voluntarily seek treatment. Additionally, POC counseling was offered at only two times per week as 4-hour clinics available Wednesday afternoons and Friday mornings. Timing of office visits may have made it difficult for school aged children to attend multiple follow-up visit appointments and contributed to program drop out. Our physicians also found it beneficial for patients to return for follow-up visits approximately two to four weeks after the initial appointment. However, as more children were referred, a wait list was created for initial appointments and wait time between follow-up appointments became longer. The average number of days between the initial and first follow-up appointment was 94 days, which may have been a contributing factor for discouraging patient follow up.

Several parent-preferred support services may help improve program adherence and follow up: printed information, group based programs, and text messages or other forms of communication via social media are a few options to apply to obesity prevention and management.\textsuperscript{105} Lack of patient adherence to weight maintenance and attrition from weight management programs is not uncommon and is a trend seen in other weight management programs, both pediatric and adult.\textsuperscript{104}

Reshaping parental and child expectations for weight management program outcomes may be one way to combat attrition rates. Setting realistic expectations around
the weight management experience may improve patient follow up. Of the families that
were interviewed, most parents gave vague answers to the question “What do you think the
doctor will discuss?” Themes in parent response occurred, most of which started with “I
don’t know” but included concepts around eating more healthily, losing weight, and looking
into medical reasons for excess weight gain. Additional themes around attrition emerged
during Skelton’s study that could shape future weight management programs. Physicians
should begin the program by preparing families for participation, explaining what obesity
treatment entails and the value of obesity treatment, and most importantly, to help families
set realistic expectations around weight loss and maintenance. Use of motivational
interviewing techniques to identify patient-centered, achievable goals and acknowledging
acquisition of healthy lifestyle behaviors instead of dramatic weight loss may instill a sense
of accomplishment in families attending office visits of this nature. It also vests
responsibility for addressing the behaviors with the family, asking them to design their own
strategy for intervention. Stressing the significance of weight maintenance and reducing the
steep weight trajectory experienced by many of the children attending POC visit allows the
pre-pubescent child to acquire height, ultimately reducing BMI. Overall, children
experienced a modest but statistically significant reduction of BMI percentile that warrants
discussion, with PCPs and families. The large sample size and small standard deviation of
the pilot study population of severely obese children who attended POC development and
pilot office visits contributed to the statistically significant nature of this result. Yet,
flattening the BMI percentile and reducing the weight trajectory of severely obese children
is highly significant clinically, as these are young, growing children at highest risk for
additional weight gain and the associated health risks. Stable weight with additional height
will, over time, drive down their BMI percentile. However, health care providers and
families alike need to embrace this concept of delayed impact as “success” before we can expect full provider and patient program adherence.

In order for clinicians and families to appreciate slight behavior changes as significant steps in a long-term progression, a means of tracking those incremental changes is necessary. Capturing weight-related and medical outcomes proved much easier than evaluating behavioral changes. For instance, comprehensive chart reviews provided insight to changes in weight, BMI, BMI percentile, and the weight co-morbidities acquired by children. However, it became apparent that further resources were required to evaluate the complex nature of behavior change in a family setting. In response we set out to develop and pilot a behavioral index based on the Expert Committee Recommendations to assist in evaluation. Although several tools exist to evaluate diet and activity habits within families, a concise, functional survey built on the nine evidence-based behaviors does not exist, based on our review of the literature.\textsuperscript{108-110}

“\textit{A Pound of Cure}” effectiveness would be heightened if used early in the process of acquiring excess weight, rather than wait until the child is severely obese, as was the case for the children referred to the Hilltop clinic during the development phase. Additional focus should be placed on prevention of childhood overweight by instilling healthy lifestyle behaviors early in life through the use of diet and physical activity anticipatory guidance at well child visits, with the intention of eventually focusing on mom at preconception. "\textit{An Ounce of Prevention}" is one such mechanism to provide advice at all well child visits, birth to 18 years of age. Ideally, "\textit{A Pound of Cure}" should be utilized as the child’s weight trajectory crossing BMI percentile curves. Primary care providers should be monitoring a child’s weight for length (birth to two years) and BMI (after two years of age) to identify steep weight trajectories and promote early identification of unhealthy weight gain.\textsuperscript{52} The majority of children were diagnosed as obese or severely obese and referred to the POC
clinic for counseling. Even at a young age, weight management is difficult and behaviors can be difficult to reverse once they become habit. Acknowledgement by the provider and parent of excess weight gain in its early stages may make weight management more achievable.

This disconnect between attending weight management visits appears again as 93.4% of families thought that their child would experience health problems should excess weight continue to be a problem. Parents are fully aware of the health consequences associated with excess weight but perhaps do not recognize that their child’s current behaviors and health status shape future risk. Or, while parents acknowledge that there is long-term risk associated with their child’s weight status, it is not health consequences - but social consequences - that are of concern; the psychological toll of teasing and bullying are of more importance.\textsuperscript{111} However, the Social Cognitive Theory holds that health care providers have the capacity and position to further raise parental awareness, concern, and intrinsic motivation to promote behavior change that supports healthy lifestyle habits, despite a richly obesogenic environment. Engagement of the family through proper use of acceptable terminology concerning excess weight may begin this dialogue.\textsuperscript{45} Many families do not like physician use of the term obesity and the negative connotations it implies.\textsuperscript{111} Parents interviewed in our study expressed their preference for the term overweight, rather than obese. They understood that the degree of excess weight is tied with greater health risk when labeled obese, but disliked its sad, offensive, worrisome, and shameful tone in social terms. Starting weight related conversations on the right foot, establishing a rapport with the family, and offering a sympathetic, understanding tone is a crucial first step in managing childhood overweight.

Despite all these challenges, our patients did experience weight related improvements. Adjusting for age and gender, our patient population experienced
maintenance of their BMI percentile and for a subset of those children who had their weight trajectories recorded prior to engaging in the POC office visits, weight trajectory was reduced after attending at least one POC follow-up office visit. Patients and their providers should acknowledge and celebrate this clinically significant outcome.

**Limitations**

Our primary aim was to create a counseling package fitting the primary care clinician’s needs; to analyze the program’s efficacy on pediatric weight management was a secondary outcome. We did not conduct power analyses or structure recruitment in a stratified fashion. Instead, we analyzed patient outcomes based solely on the population who attended, a convenience sample, which happened to be a severely obese population. It should be noted that our patient weight related outcomes in the Hilltop pilot study may not be reflective of the response within the entire pediatric population, considering that it was a referral population with a very high BMI percentile relative to the general population of children and even relative to the overweight population of children. However, the POC materials that were created can be considered universal, given that they utilized and incorporated the evidenced based ECRs into the context of the primary care setting.

**Conclusions**

The development and piloting of “A Pound of Cure” sought to remove several barriers that primary care physicians face as they counsel on pediatric overweight and obesity. Despite its comprehensive nature, challenges still exist within the patient population. Family and child adherence to physician counseling and follow-up visit
attendance are barriers physicians will continue to face. Preventative counseling and early identification of excess weight gain are tools for abating excessive weight gain. However, when a child is identified as overweight or obese, reshaping expectations around weight management, acquiring healthy behaviors, raising parental awareness about obesity-related health risks, and providing patient centered care may help improve follow-up rates and patient weight management.
Chapter Five: Expansion of “A Pound of Cure” Primary Care Model

Primary care providers (PCPs), especially pediatricians, see many overweight and obese children at well child visits on a daily basis, yet infrequently diagnose, discuss, and formally counsel these families. Researchers are well aware of the many barriers that PCPs face when it comes to counseling the overweight pediatric population, however, in the face of a burgeoning health crisis, these can no longer be excuses.

The initial step to overcome the variety of cited barriers was the creation of patient education materials and a succinct counseling strategy for providers as they approach discussion on excess weight. However, counseling tools, strategies, and knowledge of counseling recommendations alone will not solve the problem of childhood obesity. Primary care providers will not be confident or proficient in their counseling abilities until their practice environment adapts and supports weight management practices. As the “Pound of Cure” model was packaged for PCPs, it incorporated the basic frameworks of and lessons learned by the Delaware, Maine, and Utah initiatives. But the POC initiative went further. By incorporating traditional quality improvement methodology, utilizing a modified version of the Institute for Healthcare Improvement’s (IHI) Breakthrough Series (BTS) Learning Collaborative Model (Figure 5.1)\textsuperscript{93, 95, 112}, the POC extended the process of obesity counseling into a Learning Collaborative exercise, one well established as a model to alter and improve physician clinical behavior.
Our mechanism for delivering POC to families is through PCPs within the context of the IHI Breakthrough Series Learning strategy. Although clinicians have access to expert knowledge to support the changes sought in childhood obesity management within the primary care setting, it seems that the conditions, resources, and/or inclinations to make these changes happen still serve as barriers. The Expert Committee Recommendations and Dietary Guidelines for Americans 2010 are our knowledge base for what and how primary care providers should approach obesity management. "A Pound of Cure" incorporated that knowledge, providing the resources to guide serial behavior change. But it was the learning collaborative that provided the system, environment, feedback, and
incentives to master delivery of the evidenced based knowledge in real time, with real providers and real patients.

Quality improvement was developed by the industry as a means to apply knowledge and evidence to minimize error and maximize quality during production. The healthcare industry adapted these methods to address medical errors and improve patient outcomes in the hospital setting. Improvements that previously were generated by traditional research (typically in rigorously controlled environments of randomized controlled trials) followed by clinician education, were now revamped in a continuous improvement program. To improve healthcare systems and behavior, traditional research sought to understand basic causal relationships, the “whats” of medicine, whereas quality improvement seeks to understand the “how” of the problem. In this approach, the question is whether we are able to adequately predict the outcomes of clinical practices across various environments and conditions. This approach allows each practice to uniquely address barriers and facilitators to implementation of a complex counseling paradigm and office visit structure in their own practice, irrespective of how it is structured. An intervention, such as POC, is incrementally incorporated into the practice setting – it can be continuously adapted and modified to meet the specific needs of the patient, provider, and practice setting. Quality improvement initiatives take an intervention, which will be measured repeatedly over time, serially improve the outcomes, and then ensure sustainability.

A quick literature review shows numerous studies on the benefits of particular dietary and activity habits that assist in weight loss and weight maintenance. We have a wealth of knowledge, captured by consensus documents, such as the ECRs and Dietary Guidelines for Americans. These scientific, evidenced-based messages provide the “whats;” what to do to treat and manage the childhood obesity epidemic. We incorporated these messages into the “A Pound of Cure” counseling package and educational handouts; a
package that can be tailored to meet the individualized dietary and activity needs of the child and family counseled.

The capacity to individualize intervention applies equally to families and providers alike. Just as obesity counseling is not “one size fits all families”, weight management package initiation, implementation, and sustainability in practice will be unique to the every provider’s practice. Our “how,” or the way we integrate the consensus information into practice, therefore is patient-, provider-, and environment-specific. Similar to other behavior change theories, we employed quality improvement methodology to incrementally move providers and their practice environment through a change continuum to support weight management systems. Improving PCP behavior and office systems are inextricably linked. Plan-do-study-act (PDSA) cycles facilitate these incremental improvements and foster learning as the means to incorporate best practices. Theory, subject matter knowledge, and belief drive the tests of change conducted in PDSAs; from the initial, small-scale development and pilot cycles at Hilltop to larger scale tests of effectiveness during a Learning Collaborative, the intent was to build confidence in the POC process to improve weight management practices and PCP behavior.

During planning, we specifically targeted provider knowledge, self-efficacy, and documentation behavior to be impacted at various points during the learning collaborative. The Social Cognitive Theory (SCT) was the complementary model to accompany QI methods to promote PCP behavioral change. Most importantly, components of the SCT were used to bolster PCP self-efficacy to counsel their overweight pediatric population. Several mechanisms within the POC Learning Collaborative facilitated the four main mechanisms to improve one’s sense of self-efficacy: mastery experience, social modeling, verbal persuasion, and improved emotional and physical states. These mechanisms were incorporated into the learning sessions, during monthly Action Period Phone Calls, in repeated contacts with the
POC Project Team, and during site visits. Teams also utilized PDSA cycles to incrementally increase their self-efficacy around tests of the changes that they had incorporated into their practice. Additionally, during collaborative phone calls, we reinforced additional constructs from the SCT that will influence self-efficacy, as well. These include:

- Reinforcing positive behaviors through group discussions on monthly data
- Group problem-solving to reduce barriers experienced
- Shifting expectations on what is considered successful during counseling on childhood overweight and
- Promoting self-control via monitoring of progress, setting goals to work on during the month, and rewarding one’s self for desired behavior (incentivizing).

Provider knowledge is built incrementally, beginning at the learning session and continuing throughout the collaborative. Learning occurs via didactic lectures at the learning session, on monthly Action Period phone calls, through peer interactions, and as PCPs participate in patient counseling encounters. Similarly, provider documentation behaviors, a proxy for the process of PCP counseling, are improved through comparable mechanisms. Some measures may improve as knowledge is acquired, but others require an increase in PCP self-efficacy or a change in their global practice environment.

The IHI’s learning collaborative model and team encounters facilitates the learning process, based around feasibility, practicality, and utility as physicians manage childhood overweight. Our “how”, then, incorporated the strategies to incrementally change the process of weight management at level of the individual and the system (the environment). Seeking to change provider behaviors while reshaping the support systems within the
primary care environment, created a new practice system. The new system, in turn, ensured sustainability. Our intended outcomes included:

1. Providers will show a significant improvement in knowledge of childhood obesity and its treatment, particularly, the national Expert Committee guidelines and responsibilities of the primary care clinician in the treatment algorithm.

2. Providers will show a significant improvement in their self-efficacy for counseling childhood obesity in their practice.

3. Providers will show a significant improvement in obesity-related documentation in the patient medical records.
Chapter Six: "A Pound of Cure" Pilot Learning Collaborative – Evaluation of Program Effectiveness

Thus far, we have developed and pilot a weight management program within a mock primary care setting. We have evaluated the efficacy of the program in managing weight in our pediatric population. Our next step was to spread the counseling package to the actual primary care setting. This chapter and chapter 7 highlight the effectiveness of “A Pound of Cure” curriculum in changing primary care provider behaviors toward a standard of care around obesity management.

Introduction

Within the context of Institute for Healthcare Improvement’s (IHI) Breakthrough Series (BTS) Learning Collaborative model, our Learning Collaborative focused on improving primary care provider (PCP) behavior to close the gaps between the proposed standard of care outlined in the 2007 ECRs and the providers’ usual practice around childhood obesity management. We embedded the “A Pound of Cure” curriculum in the Learning Collaborative framework to guide PCPs as they incorporated weight management processes within their practice through serially rapid improvement cycles.

Through a six-month quality improvement Learning Collaborative with several primary care practices in Ohio, the aim was to improve the overall clinical effectiveness of PCPs to direct obesity management sessions with their patients through the use of “A Pound of Cure” (POC). To accomplish this, the designed Learning Collaborative trained PCPs in overweight and obesity counseling, provided tips and tools to aid them, and used feedback on monthly data to measure their adherence to national guidelines. The intent of the Learning Collaborative process was to steadily improve the quality of their practice around
obesity, while removing commonly cited barriers to pediatric obesity management. The clinical effectiveness of PCPs relative to their pre-collaborative baseline period was the primary outcome measure. We proposed that by the end of the six-month *POC* Learning Collaborative, PCPs would have improved their:

1. Knowledge of childhood obesity and its treatment, particularly, the national Expert Committee guidelines and responsibilities of the primary care provider in the treatment algorithm, as compared to their pre-collaborative knowledge
2. Self-efficacy for counseling childhood obesity within their practice
3. Obesity-related documentation within the patient medical records
4. Office systems supporting obesity management.

**Methods**

*Learning Collaborative framework*

The Pound of Cure obesity management program followed a modified version of the IHI Breakthrough Series Learning Collaborative model. This model is depicted in Figure 5.1. The Pound of Cure Learning Collaborative incorporated the core components of the IHI Breakthrough Series, which are highlighted below and described in further detail in the following sections. The *POC* Learning Collaborative:

- Hosted a Learning Collaborative over the course of six months to allow for measurable improvements in the weight management of pediatric patients
- Provided practices with quality improvement training and support
• Provided PCPs with access to childhood obesity medical experts who provided coaching on how to apply proven strategies for management with overweight and obesity

• Hosted a day-long learning session, at the beginning of the collaborative

• Hosted six monthly Action Period calls after the learning session and

• Utilized a data infrastructure site to assist practices in reporting data.

The POC curriculum also embeds the Chronic Care Model for Childhood Obesity within the IHI’s Learning Collaborative process. Appendix B illustrates the dynamic nature of treatment and management of childhood overweight and obesity in the primary care clinic. This model is a more in-depth version of the NICHQ’s Child Care Model and emphasizes both process and outcome measures for the patient and provider that will lead to changes in provider behaviors and documentation to ultimately improve patient outcomes. This model suggests that by improving patient and family self-management support, the delivery system design, decision support, and clinical information systems, changes in the patient and providers’ behaviors should occur.

Briefly, the underlying quality improvement theory was the Model for Improvement. Within the Learning Collaborative framework, we sought to build PCP knowledge sequentially through a series of planned tests of change, determined by the individual clinicians and executed within each provider's unique practice setting. The Model for Improvement theory allows for learning to occur as practices pilot the POC materials and counseling strategy, incorporating the suggested interventions from our Key Driver Diagram (Appendix A). Consequently, PCPs also reduce their risk of full-scale implementation of the POC program that has not been uniquely adapted for the PCPs patient population within the context of their individual practice setting. The POC Learning
Collaborative asked each participating collaborative team three questions fundamental to the Model for Improvement:

1. *What are we trying to accomplish?* – through the collaborative and team specific aims
2. *How will we know that a change is an improvement?* – how the collaborative and teams plan to measure the test of change (contained within our measures table)
3. *What changes can we make that will result in improvement?* – small-scale changes that teams will test and evaluate using serial PDSAs throughout the *POC* Learning Collaborative process.

Plan-do-study-act cycles (PDSAs) are the direct means to facilitate the learning process and engage clinical practice teams as they test interventions for change, as identified in our *POC* Key Driver Diagram, or tests of change determined by the teams themselves. PDSA cycles initiate on a small scale, with one provider, one patient and over a small time frame. As the team gains confidence in the successfulness of each PDSA test of change, the scale increases until the change becomes fully embedded in daily practice.

*POC Learning Collaborative TOOLS and SURVEYS*

The medical content experts for the Learning Collaborative were the same physicians who assisted in developing and piloting the *POC* package in a diverse, urban clinic setting (described in Chapters 3 and 4). Content was reviewed and updated by the *POC* content experts, as necessary.
1. **Provider Self-Efficacy and Knowledge Surveys**

Several issues were considered during the development of the PCP survey on self-efficacy to counsel on pediatric overweight. The counseling process is comprised of several steps, each of which has its own degree of difficulty. Based on review the literature and our experiences at the Hilltop Clinic during the development and piloting phases of POC, we drafted a series of statements around pediatric weight management. The survey captures the comprehensive nature of the counseling process and therefore has statements to evaluate the providers’ sense of self-efficacy to manage tasks of varying degrees of difficulty. Therefore, the tool aimed to capture a provider’s unique ability to counsel around various components of a weight management encounter. Some of the steps in managing overweight are fairly easy, while others have several perceived barriers in place. Additionally, the conditions in which each step occurs may also play a role in how efficacious a provider feels.

Statements were phrased as “can do” to ensure that providers’ sense of capability rather than willingness to perform the behavior in the statement was captured. The Likert scale by which providers would rate their efficacy to perform a task ranged from 0 to 100, in increments of 10, to include the range of capability from “cannot do” to “certain can do.”

This ensured there were several answer options in order to differentiate efficacy of respondents around particular behaviors. A single judgment format was used; this format assumed that respondents believed that they could perform the task and were asked to rate their sense of capability to perform said task. The statements were categorized in to predetermined domains to capture sense of efficacy around specific concepts (Identification of Excess Weight, Assessment of Obesity Related Health Risk, Working with the Family during the Counseling Encounter, Management of Patient Excess Weight, and Utilization of Excess Weight Management Resources) of obesity management as well as global sense of self-efficacy.
The knowledge survey captures the provider’s sense of knowledge for obesity management. Self-efficacy requires knowledge of the task at hand. However, knowledge alone does not contribute to higher self-efficacy or behavior change. The Expert Committee document served as the foundation for the content of the knowledge survey. Additional questions around classification of weight status, prevalence of overweight and obesity, and outcomes were also included on the knowledge survey. Pre-defined domains: Statistics Around Overweight and Obesity, Treatment Strategies and Goals, and The Expert Committee Counseling Messages, comprised the concepts evaluated by this survey, in addition to overall knowledge.

Three nationally recognized childhood obesity experts (Drs. Andrew Wapner, Chris Bolling, and Michelle May) and a self-efficacy expert (Dr. Kay Wolf) reviewed provider surveys on self-efficacy to counsel families and on their knowledge of the ECRs. They assessed the surveys for content and face validity. The experts noted how questions and statements should be modified, prioritized for inclusion, and which should be removed. Surveys were revised according to the expert comments. Surveys are included in Appendix G. Providers completed the surveys prior to, and upon completion, of the POC Learning Collaborative as a measure of response to training.

2. Quality Improvement Tools

Additionally, several quality improvement (QI) tools were developed for the purpose of this Learning Collaborative. Quality improvement techniques were utilized to provide regular feedback on data to the PCPs to continuously reshape provider and practice behaviors toward specific goals. Our key driver diagram (Appendix A) highlights core aspects of our intervention that were to drive the hypothesized changes (interventions),
which were designed to affect the key components for excess weight management office visits and ultimately our project aim.

a. **Chart review measures** that the clinicians were asked to collect also were founded on the core components of an obesity management office visit, as outlined by the Expert Committee. The measures table, corresponding definitions, chart review tools, and chart review summary sheets can be found in Appendix H. Chart review measures were divided into two office visit types, *POC Initial Visits* and *POC Follow-Up Visits*. Baseline chart reviews were conducted on well-child visit charts of overweight or obese 2 to 11 year olds. Providers conducted a retrospective chart review comprised of 10 randomly selected charts of well-child visits from the past three months. Table 6.1 outlines the chart review measures collected at baseline, *POC Initial Visits*, and *POC Follow Up Visits*. Review of PCP charts on a monthly basis comprised one of the main components of data collected and reviewed during Action Period phone calls.

b. An **office systems inventory (OSI)**, a tool used to evaluate what processes and systems a practice currently has in place for office visits on excess weight, was adapted from a previous Learning Collaborative around the proposed interventions within our Key Driver Diagram (Appendix I). The OSI emphasizes how interventions will impact our three key drivers:

1. Efficient clinical processes for care delivery
2. Informed, engaged and activated patients and families
3. Culturally effective counseling on nutrition and physical activity

c. The *POC* Project Team also created several practice level evaluation tools. Every month following the learning session, practice teams completed a **practice narrative**. Practice narratives provided additional insight on the unique environment of each practice
as they approached pediatric weight management within their individual primary care setting (Appendix J). Questions from the practice narrative directed Action Period phone call topics and discussions, development of additional POC materials, and guided modifications for future waves of the POC Learning Collaborative.

Table 6.1 - Chart review measures for POC initial and follow-up visits.

<table>
<thead>
<tr>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI Percentile</td>
</tr>
<tr>
<td>Overweight Diagnosis</td>
</tr>
<tr>
<td>Obesity Diagnosis</td>
</tr>
<tr>
<td>Blood Pressure</td>
</tr>
<tr>
<td>Blood Pressure Category</td>
</tr>
<tr>
<td>Family History Collection</td>
</tr>
<tr>
<td>Nutrition History Collection</td>
</tr>
<tr>
<td>Physical Activity Collection</td>
</tr>
<tr>
<td>Obesity-related Comorbidities</td>
</tr>
<tr>
<td>Labs Ordered</td>
</tr>
<tr>
<td>Family Readiness</td>
</tr>
<tr>
<td>Nutrition Counseling</td>
</tr>
<tr>
<td>Physical Activity Counseling</td>
</tr>
</tbody>
</table>

Chart review measures collected for all POC initial and follow-up office visits attended by POC eligible patients during the pilot learning collaborative. Follow up visit measures are underlined.

d. Additionally, each practice team was asked to complete and submit two PDSA cycles to the POC Project Team. Submitted PDSA worksheets allowed the POC Project Team to understand how each team approached integration of POC into primary care practice and how each practice team adapted the POC curriculum to meet their unique practice needs.
e. **Site visits** were the final way the POC Project Team was able to identify the changes practice teams made around pediatric weight management and utilization of the POC curriculum. Midway through the POC Learning Collaborative, the POC Project Team scheduled site visits with the majority of practices. Several themes were explored during the site visits and included patient recruitment strategies, data management, POC materials, insurance issues around billing and coding, and additional insight provided by teams around barriers and successes.

f. For families, the **POC Behavioral Index** was developed prior to the learning collaborative; the tool is founded on the ECRs and includes queries on nine of the recommendations, as they pertain to families with children 2 to 11 years old (Appendix F). All families were asked to complete the questionnaire twice – once at the beginning, and once at the end of a series of POC obesity management office visits. Additionally, for the learning collaborative, **family feedback forms** were generated to evaluate parents’ perceptions on the office visit from wait time to office visit topics discussed (Appendix K).

**Recruitment**

The Pound of Cure Learning Collaborative recruited and registered 10 Ohio primary care practices to participate. We collaborated with the Ohio Chapter, American Academy of Pediatrics to ensure longevity and sustainability of the POC learning collaborative.

Providers in Central Ohio who were interested in counseling their overweight and obese pediatric patients and their caregivers were recruited for the POC Quality Improvement Collaborative through the Ohio Chapter, American Academy of Pediatrics (OAAP). The OAAP recruited practices in a tiered fashion, utilizing several mechanisms to recruit physicians. Recruitment efforts first targeted those practices that had already received obesity prevention training through the *Ounce of Prevention* program; this
program had trained approximately 50 practices in 2009-2010 through office-based trainings, regional trainings, or webinars. Additionally, practices with physicians who participated in the Healthy Kids Ohio - *Ounce of Prevention*, a previous Learning Collaborative, were high priority recruits. The recruitment efforts also focused on those practices with a high Medicaid population (30%-50%), as children who are publicly insured were more likely to carry excess weight than their privately insured counterparts (57.4% publicly vs. 47% privately insured children). As recruitment efforts neared completion, participation was expanded to all OAAP members that expressed interest in obesity management. Recruitment lasted approximately six weeks, in which emails were distributed according to the recruitment plan. State BEACON Quality Improvement Coordinators assisted in following up with practices by phone and email. Several informational sessions were held with interested practices. Recruitment efforts were standardized. Practice and provider demographics can be found in Table 7.1.

PCPs who had accepted healthy newborns into their practice within the past two years were recruited to ensure an adequate number of well-child visits to review in chart visits. Nationwide Children’s Hospital IRB approved the *POC* Learning Collaborative for continuing education credit, quality improvement, and research initiatives. Primary care providers were consented and signed the Learning Collaborative contract to participate in the 6-month Learning Collaborative. Pediatricians who completed the Learning Collaborative, satisfying all requirements, were eligible to receive American Board of Pediatrics Part IV Maintenance of Certification (MOC), for a total of 25 credits for their efforts in this collaborative. (Maintenance of Certification credit is a relatively new form of continuing medical education credit, emphasizing performance in practice, or quality improvement, which pediatricians are required to complete on a 5-year basis. This represented a considerable incentive for physicians to participate and document their
quality improvement and represents an important component of the social cognitive theory to facilitate behavior change).

**Prework**

Pre-work materials were provided to practices that expressed a strong interest in the “Pound of Cure” Learning Collaborative and were encouraged to participate in a pre-work call. The Pound of Cure Project Team hosted three Pre-Work calls in December 2011 and early January 2012 to provide information about the Learning Collaborative, shape provider and practice level participation expectations, and to highlight the work to be completed prior to the learning session. Pre-work activities included completion of provider surveys on self-efficacy and knowledge, practice office systems inventory, baseline chart reviews of overweight and obese 2 to 11 year old well child visits, and completion of several quality improvement (QI) tasks. The Pound of Cure Project Team asked each practice team to provide an Aim statement, a storyboard about the practice, and a persona of a typical overweight or obese patient seen at their practice.

**Learning session**

The goal of the group learning session was to equip PCPs with the “Pound of Cure” materials and counseling strategy to assist them with excess weight management office visits upon identification of an overweight and obese 2 to 11 year old child at well-child visits. Providers’ knowledge and experience from using Ounce of Prevention provided a foundation for counseling around excess weight. The POC medical experts reviewed the ECRs and Expert Committee treatment algorithm within the context of POC curriculum. Primary care providers received a POC binder which contained all POC educational materials, history collection forms, data collection tools, and supplemental tools on
Acanthosis Nigricans (a clinical skin sign indicating insulin resistance), Blood Pressure Guidelines, the ECR screening guidelines, laboratory values, coding information, and several pieces of literature which provide the foundation of POC. The learning session was comprised of several supplemental lectures to assist PCPs as they incorporated POC into their practice. One speaker presented on Motivational Interviewing and the overweight patient, as well as how to engage the patient and family when addressing behavior change around excess weight. We also hosted two clinical skills labs on co-morbidities associated with excess weight: proper identification of Acanthosis Nigricans, and how to properly take a child’s blood pressure.

The QI expert and BEACON QI coordinators provided information on quality improvement methods that would be utilized through the Learning Collaborative. Primary care practices received training on the Model for Improvement and Plan-Do-Study-Act Cycles and were introduced to the POC Learning Collaborative Key Driver Diagram. In between QI sessions, teams were encouraged to fine-tune their Aim statements, decide what test of change to conduct for their first PDSA cycle, and to present their practice storyboard and persona to session attendees. The learning session concluded with a discussion on monthly data collection requirements and data input into the data infrastructure system, SharePoint.

*Strategies for improving primary care standard of care*

The learning session was instrumental for providing practices with counseling strategies and re-defining weight management. We had several goals as we delivered learning session lectures on POC content, mainly to provide PCPs with the tools necessary to overcome the many barriers around pediatric weight management. Studies have found that pediatricians have an interest in learning behavioral management strategies, tips for
resolving family conflicts, and guidance in parenting techniques, and prefer to learn this information and acquire additional skill sets by referencing professional guidelines and taking CME courses.41

"A Pound of Cure" medical content experts defined "success," that is, they encouraged PCPs to set reasonable goals for counseling. They described that the primary objective of counseling should be to improve daily habits, de-emphasizing weight. Providers monitored their success by monitoring the patients' improvement around such markers as improved dietary choices, increased daily activity, and corresponding reduction in sedentary time. In addition, a more structured daily schedule, improved family commitment and confidence, as well as creation of a network of support surrounding the patient, are all fundamental for weight management. Weight is not the sole, or even the most important, early measure of success.75-77 Involvement of the family is crucial since parents, especially mothers, are the most powerful agents of change for a young child.13-16

Primary care providers were instructed during the Motivational Interviewing lecture about the importance of the family's confidence to influence their child's diet and activity patterns. Parents of children 2 to 11 years old were found to have higher self-efficacy to manage their child's lifestyle behaviors than did parents of children older than 12 years.61 Furthermore, parents of obese children tend to have lower levels of self-efficacy to modify their child's eating and activity behaviors.79 Thus, our PCPs should view the management of the child's weight as a stepwise, incremental process, enacted through a series of office visits.75 The intervention is individualized, designed in collaboration with the family, and initiated at the initial screening office visit.80,81

The physician was encouraged to 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 families with the knowledge and skills to
accomplish the defined goal.\textsuperscript{75,76} The brief negotiation approach, a modified version of motivational interviewing, could 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.\textsuperscript{82}

\textit{Action period}

Once trained in POC, PCPs could begin counseling children identified as overweight and obese during their well-child visits. Children were identified by the use of BMI percentile as part of routine care. Those children 2 to 11 years old and above the 85\textsuperscript{th} percentile were eligible for POC counseling visits. The manner in which families were approached for participation in the POC curriculum was left to the discretion of each practice, although we encouraged that patients identified as overweight or obese at well-child visits be introduced to POC and scheduled for their initial POC visit within two weeks. Patient exclusions included children who had chronic diseases, special nutritional needs, medications that might result in weight gain (steroids), or non-English or non-Spanish speaking families.

Families who agreed to attend POC weight management visits were asked to complete several pieces of paperwork. A comprehensive medical history and nutrition and activity behavior assessment were conducted prior to or at the initial POC office visit. Upon completion of each POC office visit (initial and follow-up), parents completed an anonymous feedback form on the office visit and PCP counseling.
Since the *POC* Learning Collaborative focused on modifying PCP behavior, the *POC* Project Team did not collect identifiable information on the child or their families.

Given the unique nature of the *POC* Learning Collaborative and chart review methodology, a patient registry was developed to facilitate provider management of patients. Traditional QI projects encourage random chart reviews for monthly data collection. However, in the *POC* approach, providers were not implementing the program with every patient, only with those overweight and obese patients. Therefore, providers only reviewed the charts of those children who were enrolled in *POC* to monitor patient progress. We generated a patient registry to “auto fill” several summary sheets on patient weight related outcomes and visits (initial and each follow-up) attended as providers entered patient information from the charts reviewed. To maintain patient confidentiality, the patient registry provided an ID number corresponding to patient information and to the forms completed by the family. The anonymous feedback forms and *POC* behavioral indices were submitted to the *POC* Project Team for secondary outcome analysis.

Practices and PCPs were responsible for gathering several types of data on a monthly basis:

- Review of all children’s charts who attended *POC* initial visits
- Review of all children’s charts who attended *POC* follow-up visits
- Completion of practice narratives
- Collection of completed family feedback forms and behavioral indices
- Update patient registry

In accordance with the MOC criteria, PCPs were responsible for conducting monthly chart audits for all *POC* Initial and Follow Up visits, of at least 20 *POC* eligible patients. Practices were encouraged to keep a patient registry of all patients enrolled in the *POC*.
program; this facilitated the process of what charts should be reviewed on a monthly basis and to assist in monitoring patient adherence to the POC curriculum and office visits. Data was submitted on the final day of each month to the Pound of Cure SharePoint Site, developed by the State of Ohio Data Infrastructure Team. Run Charts for each measure were generated and discussed on the Monthly Action Period Calls which were held the third Wednesday of the month from 12-1 p.m.

Teams participated in Monthly Action Period Phone Calls, typically led by the QI expert and BEACON QI coordinators. During these phone calls, collaborative aggregate data was reviewed and a weight management topic was presented. Weight management topics addressed included:

- Obesity Laboratory Evaluations
- Billing and Coding for “A Pound of Cure”
- Nutrition Management
- Physical Activity and Obesity
- “Pound of Cure” Successes by the 10 practice teams

Finally, at the conclusion of the POCLC, the Project Team developed closing interview questions. Closing interview questions were asked of each practice’s team leader by an interviewer with no association to the POCLC. The questions were developed to probe the successes and barriers around implementation of POC, overall perceptions of the POC curriculum and Learning Collaborative, suggestions for future POC resources, recruitment concepts, and counseling skills (Appendix L).
Analyses

Primary care providers received a summative score for overall and domain-specific knowledge of childhood obesity and its treatment, where 1 signified a correct answer and 0 an incorrect answer. Providers rated their level of self-confidence on a 100-point Likert scale (fixed, 10-point increments). Scores for each component of self-efficacy and overall self-efficacy to counsel the overweight or obese patient were determined. The higher the score, the greater the level of self-efficacy to counsel. A paired t-test was performed to determine significant improvements in PCP knowledge and self-efficacy around childhood obesity treatment and management pre- and post- POCLC. Regression analysis was performed to evaluate potential variables that predict improvements in provider knowledge and self-efficacy. Several covariates were considered in these analyses and included years in practice, level of POCLC participation, etc. Statistical significance was set at p<0.05. Collaborative level data was presented in a time series design, in run-chart format, annotations included. Each measure appeared as its own run-chart and overall changes in PCP documentation practices were determined.
Chapter Seven: “A Pound of Cure” Pilot Learning Collaborative – Provider, Practice, & Aggregate Results

Provider Recruitment

With assistance from the Ohio Chapter, American Academy of Pediatrics and the BEACON Quality Improvement Coordinators, we recruited 10 primary care practices and federally qualified health centers to participate in the “A Pound of Cure” Learning Collaborative (POCLC). Each practice, clinic, or health department formed a team comprised of at least three people. In total, 66 primary care providers (physicians, nurse practitioners, nurses, medical assistants, dietitians or front office staff) were enrolled; a subset of providers (n=28), namely physicians and nurse practitioners, completed surveys on provider self-efficacy and knowledge. The majority of participants were female (85.7%), physicians (71.4%), and white (92.9%). Providers were in practice for an average 12.86 years. On average, 53% of practices’ patient populations were publicly insured.

One practice (2 providers) dropped out of the learning collaborative shortly after attending the learning session, due to the intensity of the collaborative. Two practices (4 providers) were actively involved throughout the collaborative but were lost to follow up during the last month of the Learning Collaborative. Staff turnover and provider role contributed to practice drop out; at one practice, only nurse practitioners were participating and did not need the Maintenance of Certification Credit.
### Provider Outcomes

**Aim #1 - Self-efficacy to counsel the overweight patient**

The 41-statement, five domain self-efficacy questionnaire was administered to primary care providers (n=28) in January. Baseline self-efficacy was 78.27 points (out of 100-point Likert scale), suggesting that the participants were moderately confident of their abilities to address obesity in a global manner. The five domains making up the questionnaire were:

1. Identification of Excess Weight (IEW)
2. Assessment of Obesity Related Health Risk (AOR)
3. Working with the Family during Counseling Encounter (WWF)
4. Management of Patient Excess Weight (MPE)
5. Utilization of Excess Weight Management Resources (UEW)

Providers (n=19) completed the post-self-efficacy survey in June 2012, upon completion of the POCLC; overall self-efficacy increased to 89.18 points. There was a
statistically significant (p<0.000) 10.85-point increase in overall self-efficacy to counsel the overweight child and family. Self-efficacy domains around assessing obesity related health risks (p=0.000), managing patient excess weight (p=0.000), and utilizing weight management resources (p=0.0005) were improved throughout the course of the collaborative, achieving statistical significance (Table 7.2). Working with the family during the counseling encounter approached, but did not achieve, statistical significance.

Provider race (p=0.004) and years practicing medicine (p=0.008) were the only variables to reach statistical significance in our regression model explaining the provider change in self-efficacy. Provider gender (p=0.144) and provider type (p=0.146) were not significant predictors of changing provider self-efficacy. The number of Action Period calls (p= 0.146), practice narratives (p=0.073), and monthly data entries (p=0.389) did not contribute to our regression model, either. Our model suggests that as providers are in practice longer, their degree of confidence to counsel on obesity decreases. Additionally, this model suggests that Asian Americans were less self-efficacious in their ability to counsel than Whites.

### Table 7.2 - Results of provider self-efficacy survey.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Pre-POCLC</th>
<th>Post-POCLC</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEW</td>
<td>98.68 (2.81)</td>
<td>99.21 (2.51)</td>
<td>0.271</td>
</tr>
<tr>
<td>AOR</td>
<td>80.79 (15.83)</td>
<td>93.03 (8.18)</td>
<td>0.000*</td>
</tr>
<tr>
<td>WWF</td>
<td>76.74 (27.58)</td>
<td>85.93 (13.06)</td>
<td>0.065</td>
</tr>
<tr>
<td>MPE</td>
<td>76.88 (14.44)</td>
<td>89.55 (11.26)</td>
<td>0.000*</td>
</tr>
<tr>
<td>UEW</td>
<td>74.59 (16.96)</td>
<td>86.01 (11.53)</td>
<td>0.0005*</td>
</tr>
<tr>
<td>Overall</td>
<td>78.27 (15.61)</td>
<td>89.18 (9.82)</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

Provider self-efficacy survey by domain and overall scores, out of 100-point Likert scale, represented as mean (standard deviation). Pound of Cure learning collaborative (POCLC), Identification of Excess Weight (IEW), Assessment of Obesity Related Health Risk (AOR), Working with the Family during Counseling Encounter (WWF), Management of Patient Excess Weight (MPE), Utilization of Excess Weight Management Resources (UEW). * denotes statistical significance (p < 0.05)
Aim # 2 - Knowledge of the Expert Committee Recommendations

The 27-question knowledge questionnaire was administered to primary care providers (n=28) in January 2012. On average, primary care providers answered 18.52 (SD=1.98), out of 27 questions correctly at baseline. The questionnaire was comprised of three categories:

- Statistics around overweight and obesity
- Treatment strategies and goals
- The Expert Committee counseling messages

Post-collaborative surveys were distributed to providers in June 2012. Eighteen providers completed the post-knowledge surveys. Despite an increase in provider self-efficacy, provider knowledge remained constant (Table 7.3). Given that we did not see an increase in provider overall knowledge, we conducted a post-hoc analysis in which providers received partial credit for portions of “select all that apply” questions that they got correct; these scores are represented as their component scores. Even when examining providers’ answers when they received partial credit, there was no improvement in their knowledge (p=0.938). This suggests that between 2007 at the start of the pilot study and 2012 at the start of the efficacy trial the behavioral targets represented in the ECRs had fully penetrated the population of pediatric clinicians within Ohio. This is a strong indication that it was not a dearth of knowledge that resulted in diminished physician confidence to counsel. Physician awareness of the ECR recommendations resulted in a ceiling effect within the knowledge questionnaire, suggesting that a more difficult knowledge questionnaire may need to be developed to better capture the range of PCP knowledge about obesity intervention.
Table 7.3 - Results of provider ECR knowledge questionnaire

<table>
<thead>
<tr>
<th>Domain</th>
<th>Pre-POCLC</th>
<th>Post-POCLC</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>2.84 (0.83)</td>
<td>2.68 (0.82)</td>
<td>0.546</td>
</tr>
<tr>
<td>Treatment</td>
<td>5.52 (1.31)</td>
<td>4.63 (1.34)</td>
<td>0.013*</td>
</tr>
<tr>
<td>ECRs</td>
<td>10.15 (0.96)</td>
<td>10.52 (2.78)</td>
<td>0.593</td>
</tr>
<tr>
<td>Overall</td>
<td>18.53 (1.98)</td>
<td>17.84 (3.452)</td>
<td>0.470</td>
</tr>
<tr>
<td>Component Score</td>
<td>21.60 (1.49)</td>
<td>21.54 (2.81)</td>
<td>0.938</td>
</tr>
</tbody>
</table>

Provider knowledge survey by domain and overall score (27 questions), represented as mean (standard deviation) number of questions answered correctly. Pound of Cure learning collaborative (POCLC), Statistics around obesity - 4 questions (statistics); Treatment strategies and goals - 9 questions (Treatment), Expert Committee Recommendation counseling messages – 14 questions (ECRs). Partial credit awarded for multi-select questions answer partially correct (Component Score). * denotes statistical significance (p < 0.05)

Practice Level Outcomes

Practice teams completed and submitted several practice level questionnaires:

Office Systems Inventory

Prior to and upon completion of the Learning Collaborative practice teams completed a 33-question survey on weight management office systems within their practice (Table 7.4). The survey was comprised of three domains, directed at three, predefined, key drivers within our driver diagram:

- Efficient clinical processes for care delivery (ECP)
- Informed, engaged and activated patients and families (IEA)
- Effective counseling on nutrition and physical activity (CNPA)

All ten teams completed this survey at baseline, however, only the eight remaining teams submitted a post-survey. At baseline, practices on average had 19 systems in place. Only five of the office systems were in place in all practices: measuring weight-for-length, calculating and documenting of BMI percentile, measuring and recording blood pressure, and assessing a child’s risk for overweight and obesity. At the end of POCLC, practices had
almost 24 (p=0.069) systems in practice, approaching statistical significance. There was a statistically significant increase in office systems within the key driver of informed, engaged, and activated patients and families (p=0.014). Within that key driver, there were several systems that experienced a significant improvement: utilizes readiness assessments with children and families who are overweight or obese to determine whether families are ready to address change in eating and/or physical activity behaviors (p=0.0165), sets and documents goals with the child & family ready to make changes (p=0.0165) and schedules office visits to follow up on weight management outcomes (p=0.0165) (Table 7.5).

<table>
<thead>
<tr>
<th>Key Driver</th>
<th>Pre-POCLC</th>
<th>Post-POCLC</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECP</td>
<td>7.75 (1.39)</td>
<td>8.00 (1.41)</td>
<td>0.343</td>
</tr>
<tr>
<td>IEA</td>
<td>5.63 (3.11)</td>
<td>9.25 (2.12)</td>
<td>0.014*</td>
</tr>
<tr>
<td>CNPA</td>
<td>5.63 (2.83)</td>
<td>6.38 (1.77)</td>
<td>0.303</td>
</tr>
<tr>
<td>Overall</td>
<td>19.00 (5.50)</td>
<td>23.63 (3.62)</td>
<td>0.069</td>
</tr>
</tbody>
</table>

Practices completed the Office systems inventory pre and post Pound of Cure Learning Collaborative (POCLC). Domains of the inventory represent systems that support our key driver diagrams, key drivers: Efficient clinical processes for care delivery – 16 statements (ECP), Informed, engaged and activated patients and families – 11 statements (IEA), and Effective counseling on nutrition and physical activity – 6 statements (CNPA). Scores represented as mean (standard deviation). * denotes statistical significance (p < 0.05)

In addition to maintaining previously established office systems, an additional six office systems were adapted by all practices. These systems included: assessing a child’s eating and activity behaviors at all well-child visits, setting and documenting goals with families ready to make behavioral changes, scheduling follow-up weight management visits to monitor child’s progress, use of an obesity risk assessment at all well-child visits, and use of materials for referral of overweight and obese patients being accessible to all office staff.
Table 7.5 - Changes in individual office systems during the effectiveness phase.

<table>
<thead>
<tr>
<th>Office Systems Inventory</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Driver 1 - Efficient Clinical Processes for Care Delivery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systematically assesses child’s risk for ov/ob at all WCV (&gt;2 y.o.)</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Measures weight-for-length at all WCV birth to 2 y.o.</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Calculates BMI percentile on all WCV 2-18 y.o.</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Documents and interprets a child’s BMI percentiles.</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Documents a diagnosis of overweight or obese when a child is identified with a BMI greater than the 85th or 95th percentile, respectively</td>
<td>70%</td>
<td>87.5%</td>
</tr>
<tr>
<td>Take and record blood pressure at all WCV (&gt; 3 y.o.)</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Interprets a child’s blood pressure at all well-child visits</td>
<td>70%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Has a specific place in the medical record to document discussions on a child’s obesity-related health risk</td>
<td>60%</td>
<td>75%</td>
</tr>
<tr>
<td>Has a specific place in the medical record to document discussions on a child’s weight management counseling</td>
<td>70%</td>
<td>75%</td>
</tr>
<tr>
<td>Has a patient registry to monitor outcomes of overweight and obese patients</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Key Driver 2 - Informed, engaged, and activated patients and families</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has a tool to capture changes in a child’s physical activity &amp; nutrition behaviors</td>
<td>30%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Assesses the child’s current eating behaviors at all well-child visits</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Assesses current physical activity behaviors at all well-child visits</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Assesses the child’s family history for obesity-related health risks.</td>
<td>50%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Utilizes readiness assessments with children and families who are overweight or obese to determine whether families are ready to address change in eating and/or physical activity behaviors</td>
<td>10%</td>
<td>50%*</td>
</tr>
<tr>
<td>Routinely use open-ended questions (or reflective statements) when we discuss behavior change with children and families</td>
<td>60%</td>
<td>87.5%</td>
</tr>
<tr>
<td>Providers in our practice are comfortable using effective family-centered techniques</td>
<td>20%</td>
<td>37.5%</td>
</tr>
<tr>
<td>Engages children and families to select their own approach to healthy nutrition and activity habits</td>
<td>60%</td>
<td>75%</td>
</tr>
<tr>
<td>Emphasizes family lifestyle changes and family health improvement</td>
<td>70%</td>
<td>87.5%</td>
</tr>
<tr>
<td>Sets and documents goals with the child &amp; family ready to make changes</td>
<td>30%</td>
<td>100%*</td>
</tr>
<tr>
<td>Utilizes strategies to address cultural differences of our patient population</td>
<td>40%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Schedules office visits to follow-up on weight management outcomes</td>
<td>50%</td>
<td>100%*</td>
</tr>
<tr>
<td><strong>Key Driver 3 - Effective counseling on nutrition and physical activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has educational materials available in waiting room/exam rooms that address pediatric overweight/obesity</td>
<td>70%</td>
<td>37.5%</td>
</tr>
<tr>
<td>Has educational materials in both English and Spanish that address pediatric overweight/obesity</td>
<td>70%</td>
<td>50%</td>
</tr>
<tr>
<td>Uses an obesity risk assessment that is incorporated into all well-child visits</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Providers a community resources list to families</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Practice provides obesity prevention materials at all well-child visits</td>
<td>80%</td>
<td>87.5%</td>
</tr>
<tr>
<td>Makes referrals to specialty care when needed</td>
<td>90%</td>
<td>87.5%</td>
</tr>
<tr>
<td>Regularly update resource information about overweight &amp; obesity resources</td>
<td>20%</td>
<td>50%</td>
</tr>
<tr>
<td>The materials we use for referrals relating to overweight and obesity are organized and accessible to all staff in the practice</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Utilizes a referral tracking system</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Use a standardized referral form or have a standard way to communicate written information about patients we refer</td>
<td>70%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Have a standard way to request written information back from the referral agency</td>
<td>30%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

* denotes statistical significance (p < 0.05)
**Practice Narratives**

Every month, practice narratives were collected from each team in an effort to gain additional insight to the unique nature of each practice. This information was beneficial to helping the Project team tailor POCLC to the practice teams participating. On a monthly basis, teams reported on the POC tools that they tested, system process changes, tests of change planned for the coming month, and barriers and successes, in a series of responses that gradually increased in scope.

Initially, "Pound of Cure" tools that were tested focused primarily on establishing and fine-tuning office systems. Initial office visit handouts – “Keeping it Balanced”, history collection forms, and the behavioral index – were the first items to be tested. As the learning collaborative progressed, teams tackled more foundational and fundamental office systems. Teams implemented BMI with the nursing staff, measured and recorded blood pressure and height at all well-child visits, established a referral process between providers, and created folders to distribute to families attending visits. As patients enrolled, practice team members were assigned to monitor and update the patient registry and to complete monthly data entry. Further changes to weight management systems included a standardized EMR template for the obesity visits and trialing of group meetings with six children enrolled in "Pound of Cure." Teams were encouraged to tailor POC materials to meet the unique needs of the practice; one team tailored the “Pound of Cure” history collection forms for excess weight visits while another team modified the forms to obtain diet, physical activity and family history during well child visits. Additional tests of change are contained within Table 7.6.

The Project Team wanted to understand any barriers that practices experienced as they implemented POC. Each month the practice narratives explored new and continuing challenges. As providers began to counsel patients, billing and coding was a common
barrier, as was difficulty in recruiting families that were required to pay a co-pay, particularly given the frequent number of visits required for counseling. Furthermore, billing occasionally bounced back if the sole diagnosis was coded as “obesity.” One practice also reported they were initially testing the “Pound of Cure” materials on Medicaid patients only, because they did not have a co-pay. The Project Team recruited a national expert to address billing and coding on our second Action Period call, alleviating many of the issues around this topic.

Recruitment and Retention

The main barrier experienced was recruitment, enrollment, and retention of patients and parents into the “Pound of Cure” program. Families failed to commit to POC despite a variety of provider efforts. One provider stated: “We had difficulty getting parents to commit to the study. We spent extra time showing parents the upward trend of weight gain their child has demonstrated and the consequences of that gain.” Practices mailed letters to patients inviting them to participate in the “Pound of Cure” program, used follow-up phone calls, and messages were left, all with minimal success. Many providers cited a lack of response and poor patient compliance throughout the duration of the collaborative. Transportation and school requirements contributed to the child and family’s inability to attend office visits. These were themes throughout the learning collaborative, frequently expressed during each monthly practice narrative and on the early monthly Action Period calls.

Since providers continually voiced concern over patient recruitment and retention, the Project Team asked practices to cite their experiences while enrolling patients into POC. Parents at first seemed optimistic and were interested; one provider stated that “several parents expressed hope that something may exist to help their family gain control of their
weight issues” and another that “some patients are very excited to have help in attacking this problem.” Some families “left motivated”, “were eager for education regarding nutrition and were excited to set attainable goals.” Others were in “shock and awe...when you show them the BMI chart. They can see concretely what is going on with their child”. Providers stated that families felt overwhelmed by the scope of changes and the expense associated with such changes or that they were frightened because of the long-term consequences of obesity. Yet, some families were not ready to make changes, but at least were able to start thinking about the problem. There was a wide range of experiences around the initial discussions with families.

As patients attended the initial office visit, providers discussed what occurred during these foundational encounters. Providers realized that obesity visits required more time than traditional well-child visits (around 15 minutes). For instance, explanation of POC and the history collection took longer than 15 minutes to complete. The “Pound of Cure” curriculum targets children 2 to 11 years of age, however, several providers experienced difficulty in engaging the really young children. They also expressed that “many obese patients in great need of the program are too old to fit enrollment criteria”.

Despite some of these challenges, providers conducted the initial visits following the POC format. Discussions during initial visits typically included a description of POC and how it will help set patient-specific, realistic goals, discussions on BMI, health consequences, and risk for comorbidities based on history collection, while stressing the importance of making whole family, lifestyle changes. Parent interest, patient readiness, and information on history collection forms guided initial visit discussions. Parents and providers worked together to “pick one or two areas that they felt were a deterrent to their weight management.” Handouts, pertinent to the goals set, were discussed in detail and were encouraged to be a concrete referral source when parents returned home; handouts
supported fundamental discussions on the behavior change of interest and provided supplemental information.

In similar fashion, providers were asked to describe what they experienced while working with the “Pound of Cure” patients during follow-up visits. Follow-up visits were more frequent as the collaborative progressed. Those patients who were motivated and interested began to attend follow-up visits, yet success of follow-up visit attendance hinged on patient and family participation – “patients seem to be on their own time frame, it’s completely what they see as important”. Some patients were motivated enough achieved their goals; others “didn’t seem to understand the importance of dietary changes on a daily basis” or “drop out quickly when they see a lack of immediate results”. Providers probed additional reasons for attrition. Poor follow-up attendance was attributed to transportation, time away from school, parental perception that dietary suggestions are too difficult to follow, and lack of time to come to the office. Families often were not ready to make a change, frustrated with lack of a quick fix, or did not view weight as a priority, according to provider perceptions.

Providers utilized several mechanisms to monitor and track patient attendance. One practice used a notebook devoted to “Pound of Cure” clients, another used a patient list and phone calls to follow-up, and some used the patient registry to monitor patients as they enrolled. Those practices using the registry were able to follow families as they were scheduled for a follow-up visit, allowing the providers to see who was overdue for a visit and call families to remind them about their office visits.

Benefits of POC

Despite the inherent barriers of weight management, particularly in the pediatric population, the Project Team encouraged practice teams to stay positive. Each month,
during the practice narrative teams were asked to highlight one success. Teams cited weight management systems, improved office flow with BMIs done by nursing staff, and the use of a file folder system to organize POC materials as successes. Providers were encouraged when receptive patients returned for a POC visit, when counseled families enjoyed the handouts, and when patients achieved weight stabilization or weight loss, especially in younger kids. Even when families did not enroll in POC, “there was much greater discussion and education about the problem itself, raising awareness” and “clarification and identification of pre-hypertensive children…this was eye opening, team building, and exciting to see kids participate in their health”.

The Project Team was interested in ways to continually improve POC and to address the comments and concerns of providers. Early in the collaborative, initial efforts focused on creating a better guide for how to structure the initial and follow-up POC visits. In response, we developed “A Guide to Pound of Cure Office Visits” to outline material use, office visit topics, and data collection. Questions became more specific as providers counseled more patients. They asked for help determining realistic age-appropriate serving and portion sizes, more motivational interviewing techniques, how to code newly identified overweight and obese patients, and specific meal and activity ideas for the families being counseled.
### Table 7.6 - PDSA cycles conducted by practice teams during the effectiveness phase.

<table>
<thead>
<tr>
<th>AIM</th>
<th>PLAN</th>
<th>DO</th>
<th>STUDY</th>
<th>ACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase documentation of BMI at all WCV &gt; 2 y.o.</td>
<td>- Teach clinical staff BMI calculation</td>
<td>- Test carried out as planned</td>
<td>- Observed some confusion   - Reinforce BMI documentation   - One-on-one education</td>
<td>Adapt change &amp; continue to monitor</td>
</tr>
<tr>
<td>Weight control or maintenance use of group or individual therapy Counseling for nutrition</td>
<td>- Assess family readiness for change</td>
<td>- Test carried out as planned</td>
<td>- Results matched prediction</td>
<td>Adapt plan</td>
</tr>
<tr>
<td>Evaluate behavioral index vs. information currently use</td>
<td>- Determine if behavioral index is feasible and acceptable to parents</td>
<td>- Test carried out as planned</td>
<td>- Results matched prediction</td>
<td>Adopt and formalize process</td>
</tr>
<tr>
<td>Determine best method of getting enrollment forms completed</td>
<td>- Give behavioral index and history forms to family at time of enrollment, to be completed at home</td>
<td>- Plan was carried out as expected</td>
<td>- Results matched prediction</td>
<td>Adapt – give paperwork before seeing doctor at time of visits</td>
</tr>
<tr>
<td>Utilize EMR for POC notes and charting</td>
<td>- Use EMR for initial POC visit to document HPI, PE, diagnosis, and management plan</td>
<td>- Plan was carried out as expected</td>
<td>- Results matched prediction</td>
<td>Adapt – revise HPI for POC</td>
</tr>
<tr>
<td>Develop a plan to summarize goals for each visit</td>
<td>- Develop an action plan including patient specific goals, follow up, handouts, lab work, and referral</td>
<td>- Plan was carried out as expected</td>
<td>- Results matched predictions</td>
<td>Adapt – revise plan to separate goals achieved and goals to work on</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Table 7.6 Continued</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use a recall system to reschedule missed or not schedule follow up appointments</strong></td>
</tr>
<tr>
<td><strong>Identify best method of identifying overweight and obese patients</strong></td>
</tr>
<tr>
<td><strong>Efficient, organized system of sharing POC educational materials</strong></td>
</tr>
<tr>
<td><strong>At height and blood pressure to all WCVs</strong></td>
</tr>
</tbody>
</table>

- Results did not match predictions
- Patients still failed to follow up, though may have captured a few patients
- If patients do not take the initiative it is unlikely to get the follow up and recall

- Use a recall system to reschedule missed or not schedule follow up appointments
- Results did not match predictions
- Use registry to see who is overdue, front office staff to call to schedule, see if appointment scheduled is kept

- Staff to call all POC patients overdue for a follow up to schedule a follow up visit
- Use registry to see who is overdue, front office staff to call to schedule, see if appointment scheduled is kept

- 1 recall – appointment not kept
- 2 recall – never scheduled
- 2 recall – appointment made and kept

- Test ICD-9 codes on EMR system to determine number of patients who are ov/ob and which codes work with the system
- Compare this list providers and nurses put together
- Build report and run, compare to memory list

- Plan was carried out as expected
- Only came up with a few names by using ICD9 codes
- Obtained more names by asking staff for names and then looking up BMI or wt.-for-length

- Organize POC structure before recruit 1st patient
- Copy forms from POC binder, set up folder of POC papers, refer and contact patients/families to recruit, designate staff to assist with recruit, standardized method for referral

- Plan was carried out as expected
- Took a while to print forms for folder within our hospital, required time to collate into separate patient folders
- Difficult to recruit families because of copay for visits, frequency of visits and lack of motivation to change
- Designated one person to enter data into registry
- Designate one person to assist in collecting charts for recruited patients and make appointments for families

- Results did not match predictions
- Creating new systems in an office and coordinating with four physicians is very challenging

- Decide when to initiate and evaluate flow over 1 week
- Plan to note significant bottlenecks or back ups in patient flow over the week as incorporate ht. and BP to all visits over age of 2

- Plan was carried out as expected
- New vitals helped with EMR meaningful use, visit coding and more data for normal BPs and abnormal BPs
- Most delays in work flow were due to physician delay not in increased number of vitals

- Results matched the predictions
- Improved performance
- More vitals gave us more information
**Learning Collaborative Outcomes**

*Aim # 3 - Documentation within the Medical Record*

On a monthly basis, providers submitted chart review data comprised of “Pound of Cure” initial and follow-up visits attended, directly into our database infrastructure, SharePoint (Table 7.7). Data entry was performed by PCPs as a requirement of their American Board of Pediatrics Part IV Maintenance of Certification (MOC). Data entry was verified for accuracy as PCPs turned in their monthly summary sheets. For all measures, the Project Team set a goal that 90% of charts should contain documentation of said measure.

### Table 7.7 - Documentation percentages for initial & follow-up office visit chart reviews during the POC Effectiveness Phase.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre-POCLC</th>
<th>Post-POCLC</th>
<th>Follow-Up Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI Percentile</td>
<td>93%</td>
<td>100%</td>
<td>92%</td>
</tr>
<tr>
<td>Overweight Diagnosis</td>
<td>44%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Obesity Diagnosis</td>
<td>62%</td>
<td>100%</td>
<td>88%</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>95%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Blood Pressure Category</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Family History Collection</td>
<td>68%</td>
<td>100%</td>
<td>NA</td>
</tr>
<tr>
<td>Nutrition History Collection</td>
<td>90%</td>
<td>100%</td>
<td>NA</td>
</tr>
<tr>
<td>Physical Activity Collection</td>
<td>84%</td>
<td>100%</td>
<td>NA</td>
</tr>
<tr>
<td>Obesity-related Comorbidities</td>
<td>49%</td>
<td>100%</td>
<td>92%</td>
</tr>
<tr>
<td>Labs Ordered</td>
<td>27%</td>
<td>88%</td>
<td>NA</td>
</tr>
<tr>
<td>Family Readiness</td>
<td>28%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Nutrition Counseling</td>
<td>93%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Physical Activity Counseling</td>
<td>90%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Prior to the Pound of Cure Learning collaborative (POCLC), providers conducted chart reviews on 2-11 year old overweight or obese children attending well child visits, which represent baseline data. Post-POCLC charts were comprised of POC eligible children attending initial POC office visits. Follow up visits did not exist prior to POCLC, only post POCLC data on follow-up visit children are presented. Not applicable (NA).
In the preparatory phase, baseline data consisted of 10 charts reviewed per provider for overweight or obese 2 to 11 year old well child visits, collected prior to the January 18th learning session. Providers were at or exceeded the goal of 90% documentation for several measures: documentation of BMI percentile, blood pressure, nutrition history collection, nutrition counseling, and physical activity counseling. At baseline, classification of blood pressure category (normotensive, pre-hypertensive or hypertensive) was not documented by any practice. Approximately, 50% of charts noted the child’s comorbid status and 27% of charts contained documentation of labs ordered (when appropriate). Weight management follow-up visits were non-existent and therefore, baseline data was not collected. By the end of the Learning Collaborative, all measures reached 100% documentation with the exception of laboratory assessment (88%). Similarly, for follow-up visits all measures except BMI percentile, obesity diagnosis, and obesity-related comorbidities were documented 100% of the time.

The Project Team presented run charts on aggregate data during monthly Action Period phone calls (Figures 7.1 – 7.5 and Appendix M). Documentation of most measures improved shortly after the learning session, improvements were apparent by February’s data collection. Variation appeared in several measures, particularly in documentation around overweight and obesity diagnoses, comorbidities, and labs.

Providers were responsible for reviewing charts of any POC patient that attended an initial or follow-up visit for that month. As a result, the number of charts reviewed each month was not fixed; as the collaborative progressed, the number of initial visit charts reviewed decreased and the number of follow-up visit charts reviewed increased, reflecting themes of patient recruitment and retention. Initially, we intended to evaluate the chart review data by provider and practice. However, small subgroup size prevented us from doing so – only collaborative-wide, aggregate data was compiled and presented on Action
Period phone calls. This lack of personal transparency for the individual participant’s results within the collaborative potentially weakened the full impact of the method on practice outcomes.

![Weight Status](image)

**Figure 7.1** - Run chart on weight status measures for POC initial visits during the effectiveness phase.
Figure 7.2 - Run chart on blood pressure measures for POC initial visits during the effectiveness phase.

Figure 7.3 - Run chart on medical risk assessment measures for POC initial visits during the effectiveness phase.
Figure 7.4 - Run chart on history collection measures for POC initial visits during the effectiveness phase.

Figure 7.5 - Run chart on counseling measures for POC initial visits during the effectiveness phase.
Family Feedback on Counseling

Family feedback forms were received from a convenience sample of families (n=62). Nearly half of families had to wait to see their provider, waiting on average 10.83 minutes. Once in the office, all patients reported that they spend “about the right” time with their provider. During the office visit, families reported that the provider spoke to them about their child’s BMI (64.5%), their family history (58.1%), dietary history (85.5%), physical activity history (88.7%), and discussed their progress on goals set at previous visits (59.7%). Additionally, when asked about specific dietary and activity habits discussed, families reported that the provider spoke to them about having breakfast daily (41.9%), fruit and vegetable consumption (69.4%), family meals (32.3%), fast food consumption (27.4%), achieving 60 minutes of physical activity daily (58.1%), limiting TV time to 2 hours or less (46.8%), limiting sugary beverage consumption (35.5%), establishing a routine sleep schedule (22.6%), age-appropriate portions (43.5%), proper juice consumption (21%), and healthy snacks (56.6%). All families reported that the doctor told them information specific to their child’s needs, that the visit was helpful, and that the doctor answered all their questions. On average, families received four handouts, and all thought that the number of handouts they received was appropriate. Families also reported that the doctor discussed all portions of the handout with them. Nearly 95% of families set a goal during the office visit. On average families, together with the doctor, set three goals per visit. Finally, all families felt that they waited an appropriate amount of time between office visits.

Patient registry

The patient registry served to facilitate provider monitoring of patients enrolled in POC and office visits attended. Providers who chose to use the patient registry submitted de-identified registries to the Project Team at the end of the Learning Collaborative. Five
practices submitted their patient registries; information of 88 patients was reviewed.

Table 7.8 - Demographics of POC learning collaborative patients – effectiveness phase.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male 67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>2-6 Yrs.</td>
<td>18.2%</td>
</tr>
<tr>
<td>6-12 Yrs.</td>
<td>81.8%</td>
</tr>
<tr>
<td>Weight Status</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>8.1%</td>
</tr>
<tr>
<td>Obese</td>
<td>41.9%</td>
</tr>
<tr>
<td>Severe Obesity</td>
<td>48.8%</td>
</tr>
</tbody>
</table>

Demographics of Pound of Cure eligible patients attending learning collaborative office visits during the effectiveness phase.

The majority of children were 6 to 12 years of age, the average age of 8.5 years. (Table 7.8) There were slightly more males (67%) and almost an equal distribution of children between obesity and severe obesity categories. More than half of the children attended at least one follow-up visit (63.6%). Adjusting for age and gender, there was an overall decrease in BMI z-score of 0.067 (p=0.0005) BMI percentile of 0.313% (p=0.067), despite an average weight gain of 0.137 kg (Table 7.9). The average time between the initial visit and last follow-up visit attended was 52.9 days. Table 7.10 demonstrates changes in BMI percentile by follow-up visit attended.
Table 7.9 - POC learning collaborative patient weight-related outcomes.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Initial Visit</th>
<th>Last Follow Up Visit</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>50.93 (24.79) kg</td>
<td>51.07 (24.97) kg</td>
<td>0.261</td>
</tr>
<tr>
<td>Height</td>
<td>1.33 (0.182) m</td>
<td>1.34 (0.179) m</td>
<td>0.000*</td>
</tr>
<tr>
<td>BMI z-score</td>
<td>2.297 (0.5574)</td>
<td>2.232 (0.5542)</td>
<td>0.0005*</td>
</tr>
<tr>
<td>BMI Percentile</td>
<td>97.81(2.87) %</td>
<td>97.50 (3.30) %</td>
<td>0.067</td>
</tr>
</tbody>
</table>

Pound of Cure eligible patient anthropometrics during the learning collaborative- effectiveness phase. Height, weight, and BMI percentile demonstrate changes between initial and last follow up office visit attended, represented as mean (standard deviation). * denotes statistical significance.

Table 7.10 - POC learning collaborative follow-up visit characteristics.

<table>
<thead>
<tr>
<th>Office Visit Number</th>
<th>Attendance</th>
<th>Time</th>
<th>Change in BMI %ile</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>29 (51.79%)</td>
<td>39.48 (20.17) days</td>
<td>-0.480 %</td>
</tr>
<tr>
<td>3rd</td>
<td>21 (37.5%)</td>
<td>64.45 (26.32) days</td>
<td>-0.017 %</td>
</tr>
<tr>
<td>4th</td>
<td>6 (10.71%)</td>
<td>78.83 (26.35) days</td>
<td>-0.473 %</td>
</tr>
</tbody>
</table>

Each row represents data for the subset of patients who attended that office visit as their last office visit. Office visit attendance rates represented as number of patients who attended that office visit as their last office visit (percent of patients with respect to total follow up visit population). Time represented as mean days (standard deviation) between initial and final follow-up visit attended. Mean change in BMI percentile for age and gender for population of children attending follow-up visits.

Closing Dialogues – Lessons learned for moving forward

Site Visits

During the last two months of POCLC, the Project Team conducted site visits with each practice team (n=8). Many of the topics we discussed with teams were based on responses from the monthly practice narratives. Several of the themes were explored in detail, such as recruitment, billing and coding, use of materials, and any additional concepts.
teams wanted to discuss with the Project Team in person. We approached each of the themes by asking what worked and what required improvement, then asking where teams needed additional assistance. Because site visits were conducted at the end of the learning collaborative period, most of the lessons learned were used to guide improvement of future POCLCs.

Recruitment

Many providers expressed concern over their ability to meet the 20 patient requirement necessary to earn their Maintenance of Certification credit from the American Board of Pediatrics. As we conducted site visits, many of our practices still had not recruited 20 patients. Several practices drafted an informational letter around the POC curriculum and sent this letter out to their overweight and obese patient population to assist in recruitment efforts. Two practices stated that they sent out 27 and 80 informational letters, respectively. However, despite this effort, the informational letters brought in few new patients. The practice that distributed 27 letters, had recruited seven families by the time of the site visit; half of these children were identified through well child visits and the remaining from the informational letters. The other practice that distributed 80 letters felt that most of their patients were recruited from well child visits. Even when providers had successfully identified and recruited a family to enroll in the POC counseling curriculum, many families were lost to follow up before they even attended their initial POC office visits.

Practice teams also fostered and improved connections with two referrals sources. One health department, established a working relationship with school nurses in their community, so that as children were screened for BMI, those children with higher BMIs would receive a letter informing them about their BMI, as well as a note about the POC program offered at the health department. This referral source worked well during the
school year but providers feared at the end of the school year that there would be a decline in referrals and participation. A second team asked other providers in their practice (those not participating in POCLC) to refer overweight patients to POC trained providers; this method posited the POC trained individuals as an “obesity champion”. Teams provided ideas for how the Project Team could assist in their recruitment efforts. Teams suggested brochures explaining POCC to distribute at well-child visits and flyers for the waiting rooms, a POCC website that allows parents and children to interact, and incentives, especially for poorer areas of the community, offering such things as zoo passes, jump ropes, balls and Frisbees.

POC Materials

The Project Team then addressed POCC materials to receive practice feedback. One practice provided families with all POCC materials as they went into the room to review history and check on readiness to change. Other practices implemented food recalls at all well-child and POCC office visits, handing out the behavioral index, and having families complete initial paperwork right in the office. Most practices either incorporated POCC charts into their paper charts or developed an EMR template for their system. However, one provider suggested that the comorbidity section could be removed from follow up charts, while the goal setting and plan documentation collapsed into one section to help charting flow better. One practice found the blood pressure graph and diagram helpful, laminating it to facilitate discussions with families. As a result they found more children in the pre-hypertensive category than expected. Finally, providers commented on ways to improve how the Project Team guides and ways to integrate POCC visit formats into practice. Further, they suggested providing more specific handouts on serving and portion size, and developing handouts around parental involvement and good role modeling.
 Billing, Coding and Insurance

During site visits we also explored insurance issues. Providers found that coding using the term “high blood pressure without hypertension” was helpful in monitoring blood pressure, having families return, and receiving reimbursement. Use of the billing code “abnormal weight gain” made billing rejections occur less frequently, especially if the child did not have a weight-related comorbidity to justify the repeated return visits. However, privately insured patients were more difficult to recruit, given the frequent co-pays required for office visits. The “working poor” were also difficult to recruit, as this population was just barely above the cutoffs for Medicaid, but not affluent enough to manage the financial burden of repeated follow-up visits. One health department stated that they consumed costs associated with labs because they were not getting reimbursed, suggesting that despite the national guidelines supporting laboratory draws for obesity, insurance companies did not yet assume that responsibility.

Additional Concerns and Closing Interviews

The final portion of each site visit was an open dialogue around any additional provider insight or concern. Several practices were interested in participating another wave of the learning collaborative, especially if the age range was expanded to include 12 to 18 year olds, if additional information was provided on actual weight loss and more aggressive treatment strategies, if additional materials were created on comorbidities, such as hypertension, diabetes, insulin resistance, and so forth, and if they could receive additional part IV MOC credit for the deeper engagement on obesity.
This first wave of 10 clinical practices was a pilot for POCLC, proving to be an excellent training for the Project Team. Closing interviews were used as a strategy to assess the POC and plan for a revision in preparation for a second wave of practices. Physician leaders were contacted by phone to reflect on their team’s experience and their overall thoughts on POCLC. Seven of the ten teams participated in the closing interviews.

Generally, providers were pleased with their experience in the learning collaborative. They expressed that the “package was really good” and that “the program was very well organized and the information was fabulous,” “it’s just such a hard problem to address.”

Interview responses highlighted the need to enhance delivery of the POC counseling framework, mainly at the initial learning session. Despite remedying many of these concerns during monthly Action Period calls, a more thorough description of the counseling format was necessary, from patient identification and enrollment to use of handouts at follow-up visits. Providers felt the explanation of counseling process was vague and left them unsure about where in the process and in what order to use handouts most effectively. Developing a more flexible, tailored approach to each patient and family by individual practitioners would be valuable, for example. One provider stated: “you’ll look at their initial intake and whatever they say they’re willing to work on, you’ll just grab that handout. But it doesn’t flow quite that easily.” They desired more detailed examples about how to guide various types of patients through office encounters, especially identifying which POC

“Well, I guess the biggest thing is that this is so desperately needed in pediatrics, and I’m so excited to have the tools to be able to approach this.”
handouts should be used. Providers wanted definitive laboratory assessments to conduct when patients were first identified and enrolled into POC. Additionally, a more streamlined process around history collection, the “overwhelmingness of counseling,” and goal setting with families using motivational interviewing techniques.

“I like that there’s almost like a toolkit...you’re looking for your overweight and obese patients who are ready to change...when all was said and done, it was a really nice step by step approach...it was a really good start to finish approach to counseling for obesity.”

Standardization and consistency of care were noted as key features of POC and the learning collaborative for providing quality care to the overweight pediatric population, especially given it is “guideline based, proven and studied.” Teams felt more aware of the related health risks. Also, provider perceptions of gaps in knowledge were minimized. Furthermore, having specific recommendations assisted providers in making more concrete recommendations that were consistent in form. Many commented on the POC materials, which handouts were most useful and which less so. Practice team leaders enjoyed having the ability to provide written materials on nutrition and activity concepts to families. One physician used the food diary as a conversation starter for nutrition goals. Another clinician used “A Guide to the Food Groups” handout to help families track and follow goals set. Another practice expressed concern over calories and food groups suggested by MyPlate (felt there was too much emphasis on starches). Some providers were interested in age specific serving and calorie goals and tips for shopping, but also felt that many more handouts would make the POC “package overwhelming and difficult to keep up with.” Intake
questionnaires were also particularly useful in standardizing and identifying risk factors for POC enrolled patients. Several practices modified these and incorporated them into the EMR system. However, the follow up charting forms required modification. As providers became more comfortable counseling, they wanted more area to write about discussions rather than checking boxes around different counseling of motivational interviewing.

Several family characteristics made counseling challenging. Family situation, particularly generational poverty or situational poverty due to the economy, posed a substantial financial barrier for families as they attempted to institute new dietary habits. Familial overweight and obesity presented separate challenges for engaging entire family units in the weight management process. Additional sessions were suggested as one mechanism to ensure buy in by the whole family and getting everyone equally committed to the program. Patient buy-in was the most frequently mentioned barrier. Providers felt that the education they received from POC was adequate, but that “finding that hook that pulls in parents” was difficult. Getting patients interested and committed to follow through, even for those patients who were initially excited, was a common problem for many providers from the beginning of the collaborative. Even if the children were interested, parental buy-in often was difficult to obtain, or vice versa. Physicians perceived this as especially difficult if parents were obese themselves. “We thought, ‘Oh, that will be great!’ you know? We can at least get them involved, and get them doing the same thing. But if there was any effort involved, they just didn’t want to do it.” Although family and patient buy in was a challenging task, when families participated as a unit, they seemed enthusiastic about it. “If they get some results, they drop a few pounds, that really fires them up. So that’s worthwhile.” Providers were optimistic when families attended follow-up visits - “We’ve taken a small step, but I think it’s a reasonable step and a good one.”
In general, providers expressed that they felt good about their ability to offer counseling and information despite high patient volume. Limited POC enrollment made it difficult for providers to routinely use and hone their POC counseling skills. One pediatrician stated, “I went from totally terrified, ‘I’m not qualified to do this at all’...to feel(ing) very comfortable as a first stop for my patients.” Many felt positive about their counseling ability and recognized that “what has to happen has to happen within the families, that they have to want it as much as we want it for them.” While counseling may not work for every family, they had a structured starting place to begin to make an impact. Simply having accessible, reliable materials assisted physicians as they raised awareness around excess weight and helped hold families accountable for the goals that they set. Setting goals and using motivational interviewing techniques equipped providers with a skill set to identify more patient-specific, incremental goals lending to a feeling of “a much higher success rate than in our prior discussions with families about health and nutrition.” To further hone counseling skills, one suggestion was to shadow our obesity experts to understand and learn from their example. Teams also thought it would be extremely helpful to have access to a nutritionist to provide more specific, situational recommendations around eating behaviors, additional handouts on physical activity ideas and local resources, and counseling materials for children 12 to 18 years of age to facilitate discussions around weight loss – skills providers felt that they lacked. Overall, providers expressed that they feel they just went through the preparatory period, now understood the materials, and “need an additional six months to just play around with the counseling process” especially to reduce the time burden and gain practice-wide acceptance.
Revising the Preparatory Period for the Learning Collaborative

A portion of the preparatory period included establishing an identification and recruitment system. We asked physicians to provide additional recruitment strategies and tips for future participants. The initial recruitment mechanism was through well child visits with patients who they routinely counseled. Some practices conducted baseline chart reviews to ascertain who fit POC enrollment criteria, while others already had children in mind who needed to be involved in the program for medical reasons. Those patients were called or sent a referral letter to invite them to participate, or their charts were marked for when they returned for a future appointment. When time allowed, children were also recruited from sick visits or when they presented for another problem, especially if the child’s labs were indicative of medical risk. Additional strategies included routine BMI screenings at schools, collaborating with the practice’s nursing department, and using an in-office referral form denoting that a POC eligible patient should receive an informational letter at check out.

The final portion of the preparatory phase was getting organized and approaching the office visits with the right frame of mind. Time was devoted to putting together a unique practice office flow. The process began with screening and obtaining vitals, organizing POC materials for office visits, collecting data, and initiating counseling. This initial routine was very time intensive for the lead physician. After office visit flow was structured, the majority of time was spent counseling patients. Some time was required to replenish POC materials and enter monthly chart review data on those patients attending office visits. The only suggestion around data collection was to adjust the due date, shifting it from the last day of the month to a later time, to accommodate patients seen on the last day of the month.

Most of the tips around approaching office visits focused on family readiness and family motivation to prevent feelings of provider discouragement. These perceptions
closely followed the vision of the Trans theoretical Model. “Start with the families that seem to be ready. And don’t stress over the ones who aren’t,” suggested one provider who went on to suggest shaping perception by viewing the percent of patients within the practice who were overweight. “You’re making a bigger impact than what you feel like you’re doing.” Reshaping one’s perspective to realize that all patients are not ready to change was a form of encouragement for providers. While not knowing the key to fuel intrinsic motivation within families, providers acknowledged, “I gave them the facts. I’d like to think that I’ve planted a little seed” that could be the initial step to behavior change.

The POC Learning Collaborative Process

Project Team support was a major strength of the learning collaborative. Some of the most valuable things that made teams feel successful were constant access to the Project Team, along with obesity experts, and the repetition of information from the learning session on monthly calls. One team leader stated, “You guys went out of your way to come and meet with me, work with me, and help me figure it out, that was absolutely wonderful.” Monthly Action Period calls were well received. “These were some of the best, informative, helpful, lunchtime meetings.” The Project Team also provided practices with several types of...
incentives (water bottles, pedometers) to give to families when they returned for follow-up office visits. One provider explained, “I was like, honestly, they're not going to care...but I was completely wrong, you know, every single child has been excited.” Incentives were a small way for physicians to reward and provide continued encouragement for healthy behavior acquisition. Although small, incentives benefited providers and patients; they did not consume practice resources.

**Conclusions – Utility of the Learning Collaborative Model**

From participant recruitment to implementation of POC, the Learning Collaborative model provided the right environment for assisting interested physicians in managing pediatric excess weight. Just as PCPs guide their patients through a series of behavior changes to achieve a healthy lifestyle and weight maintenance, we felt it was appropriate to do the same for primary care physicians as they incorporated obesity visits into their practice.

Obesity counseling is not for everyone, physician and family alike.

“We’ve asked the other providers in our practice, cause they really don’t have an interest so that any of their kids that have a BMI above the 85th percentile, to circle referral on our well form, and the front desk simply gives them the letter that explains it (POC), and they can make the appointment if they are interested.”

Interested PCPs and their practices were recruited to participate in the POCLC. While our recruitment strategy may limit generalizability to all PCPs, not all PCPs may be interested in addressing pediatric obesity, as noted in the quote above from a POCLC participating provider. Therefore, “obesity champion” physicians are needed within the
primary care environment to serve as a first stop, expert referral source to manage the overweight patients within their practice. Similarly, not all families will be interested in making changes and only those ready to make changes will participate in and benefit from POC counseling.

At the end of the Learning Collaborative, weight management counseling needed to be sustainable. Consequently, incentives were minimal for participating physicians and families. Physicians received only a portion of their Maintenance of Certification credit for participating in POCLC; POCLC is one of several Learning Collaboratives and MOC opportunities, allowing physicians to choose what manner they would like to earn their credit. More importantly, participating families only received plastic water bottles, pedometers, and/or stickers for tracking sheets, based on the goals that they set during office visits. Should practices be interested in continuing incentives, the financial burden would be minimal. Additionally, the monetary value of incentives was small, patients returned to office visits on their own volition and intrinsic motivation.

"A Pound of Cure's" standard of care and treatment steps around obesity management were firm, but delivery of those steps were fluid. However, by the end of the pilot Learning Collaborative, recommendations for delivery of POC's standard of care became less fluid, moving towards best practices for obesity management. Strategies for patient identification and recruitment, documentation practices within the medical record, history collection, material use and accessibility, billing and coding, and patient follow-up were developed and polished during POCLC. These best practices will become the “interventions” within our Key Driver Diagram that will facilitate collaborative aims being met in future Learning Collaboratives.

We had several mechanisms by which we taught physicians treatment skills. An overview of POC, motivational interviewing skills, and information on comorbid conditions
were provided as part of the didactic lectures at the in-person learning session. Additional content knowledge and treatment strategies were presented on monthly Action Period phone calls; the Project Team had topics planned for these calls prior to the start of the collaborative.

The strength of the Learning Collaborative was in our ability to adapt and modify what we (the Project Team) thought were important concepts to convey on Action Period phone calls to information that teams thought were important topics. Feedback from the learning session and on monthly practice narratives influenced how the Project Team approached topics for Action Period phone calls so that we discussed information that was relevant and timely to the challenges that teams currently faced. Reimbursement and insurance issues presented a challenge during the first two months of the collaborative. Had practice narratives not queried providers, we would not have known that reimbursement was a barrier to care for participating providers and families. Consequently, a coding expert, Dr. Rick Tuck, addressed reimbursement issues on an Action Period call. Resolving reimbursement issues for physicians and payment issues for families removed a financial barrier and burden for weight management visits within POCLC and another commonly cited barrier to obesity counseling.

The Project Team provided physicians with additional resources and strategies to supplement the POC package; unlike a traditional research project, we provided materials on an as-needed basis, removing barriers as they were identified, instead of waiting until project’s end. In general, a learning collaborative aims to improve the quality of care that patients receive – while our learning collaborative focused on provider behaviors, ultimately, improved patient care and health will be the main objective of future collaboratives. If our teams found something that impacted patient care, we wanted that change to be accessible to all teams as soon as possible, changing either materials or
delivery of materials. One practitioner stated, "you guys as the resource, all the information that we were given and then those learning sessions each month based on that information, [and] having the experts to call at any point as we’re discovering some of these issues, [were] some of the most valuable things and made us successful." Open communication and a learning environment facilitated discussions between the Project Team and PCPs ensured that limitations to POC were resolved in real time and that patients received high-quality care. The flexibility of the Learning Collaborative permitted constant learning from PDSA cycles on incremental tests of changes and implementation of those changes.

Monthly Action Period phone calls were a vital component of the learning collaborative and a mechanism for improving self-efficacy. Providers were able to vicariously learn from their peers’ experiences. Teams were able to discuss how they overcame challenges, what led to a successful counseling encounter with a patient and family, and their concerns on problems they faced. On Action Period calls, the Project Team and obesity experts reviewed the progress physicians made during the past month. Successes were celebrated, areas for improvement were noted, and encouragement was provided during times PCPs felt frustrated with the process and counseling experiences.

Removing barriers is one method to assist providers in managing pediatric excess weight. As barriers are removed, sustainable practices should be incorporated. During POCLC, new weight management systems and processes were established and existing ones improved. Environmental supports assisted in maintaining provider behaviors established during POCLC. Fundamental processes such as weight-for-length and blood pressure measurements and BMI percentile calculation were continued during POCLC and provided a foundation for excess-weight discussions. Systematic assessment of a child’s overweight or obesity risk was bolstered by an improvement in assessments around the child’s eating and activity behaviors, which now occur at all well-child visits. Together, these systems have the
ability to facilitate provider identification and recognition of the overweight child. With these systems in place, providers should be able to identify the child approaching the 85th percentile for BMI or as the child rapidly crosses BMI percentile curves.21

Regardless, when physicians identify an overweight child, they have additional office systems in place to facilitate the office encounter. Physicians utilize readiness assessments to determine whether families are ready to make changes, and for those families that are ready, physicians have progress notes with a location to note goals set during the office visit and an established schedule for follow-up appointments.

Reshaping family perceptions, utilizing discussions around BMI (open dialogue strategies from POC) and raising parental concern are first steps to bridging this gap. Simply having the clinician acknowledge and mention a child’s BMI status makes parents more likely to correctly ID their’ child’s weight status and may help to raise parental concern and urgency.28, 29 “A Pound of Cure” and a learning collaborative environment can facilitate these discussions, particularly with parents of younger children and children approaching overweight or at overweight.

Provider perceptions of obesity management are influenced by their experience with the weight management process. A future role of the learning collaborative is to mediate providers’ pessimistic perceptions about patient weight loss. Similar to providers surveyed nationally, many of our providers expressed frustration with patient engagement and follow-up visit attendance.36 The POCLC Project Team will work to resolve frustration as we approach barriers with the patient population. Reshaping providers’ experiences, despite the patient outcome, may improve provider perceptions toward and satisfaction with the counseling process. 38
Limitations

There are some limitations to our intervention. We recognize that there may be a selection bias in those providers and families who participated and this may limit the generalizability of our results. Even with a strong incentive like Maintenance of Certification (MOC) credit, not all primary care providers will be interested in managing the overweight pediatric patient. Therefore, “obesity champions,” those providers with a vested interest in managing the overweight population, are the population to which our results apply. However, MOC was a strong enough incentive to ensure that most providers completed the learning collaborative; additional mechanisms need to be established to encourage even the most interested provider to approach and integrate POC into practice, given the intensity required to establish a new series of office visits. While we lacked a control group, providers’ served as their own controls. Around data presentations during monthly conference calls, we lacked the transparency that is typical of larger Learning Collaboratives, those containing data comprised of larger subgroups. Due to difficulties recruiting patients and diminished patient follow-up, we were not able to present data on an individual provider or practice level. Presentation of identifiable provider or practice level data encourages discussion around improvement strategies and fosters friendly competition, a powerful tool for quality improvement. Finally, each provider collected and submitted baseline data as one subgroup. This limited our ability to extend the baseline period and prevented us from learning about the stability of baseline measures. Additionally, the collaborative was only 6 months in length and therefore, made it difficult to determine special and common cause variation in our measures. Replication and sustainability evaluations during longer collaboratives will allow us to determine causes of variation with more data points to establish upper and lower control limits.
Chapter Eight: Concluding Discussions

Weight management may be the most challenging task faced by the current generation of primary care providers (PCPs). They face challenges related to personal bias, skills, practice style and habits, environmental, cultural, and patient related barriers as they approach discussions on excess weight with families of overweight children. Although a national strategy to create a single standard of care for obesity management within the primary care setting has been published, it is by no means straightforward to implement. "A Pound of Cure" sought to assist practitioners by establishing sustainable systems and processes and removing commonly cited barriers, as a means to engage clinicians in addressing childhood obesity in practice. Physicians cite numerous barriers around pediatric weight management, and in doing so, reference the traditional medical model: identify symptoms, diagnose, and prescribe a didactic, broad, non-specific directive as a treatment plan. Overweight and obesity, while easily identified, requires that physicians move to a more patient-centered, interactive, negotiated course of treatment in order to progress through the steps involved in controlling the behaviors controlling weight, and consequently, health risk.

A Unique Treatment Paradigm

Tertiary care weight management centers approach treatment of pediatric obesity with a unique skill set employed by a diverse team of clinicians, including physicians and nurse practitioners, psychologists, registered dietitians, physical and recreation therapists. The process is costly, labor intensive and, from a population perspective, inefficient. The
sheer volume of overweight pediatric patients – currently one-third of all children -- cannot be dealt with through tertiary care centers. Primary care providers are at the frontline, seeing overweight children on a daily basis. They are in an ideal position to provide preventative counseling and, through regular screening, counsel overweight in its earliest stages. Counseling on weight management, however, requires novel skills and tools that are not part of the typical primary care practitioner’s experience. With "A Pound of Cure" we aimed to translate the tertiary care model’s team approach into a process for primary care, founded on scientific, evidenced-based literature reviews, to provide a set of tools most useful for the busy, practicing clinician.

Development of "A Pound of Cure" occurred in an urban primary care clinic in Central Ohio with a diverse, low-income population. Pediatricians specializing in the care of obese children established a clinical practice at the primary care site without ancillary team members available. Through a series of structured patient and physician interviews and chart reviews, multiple revisions of their methods and materials were made to capture the counseling strategy utilized in tertiary care, resulting in a modularized package applicable to primary care practice. While POC was created in a single practice setting, it was intended for use within a variety practice settings by a diverse group of clinicians. In its final version, the POC program that was crafted proved to be flexible, making it unique to each patient, provider, and primary care practice. However, the core of the POC curriculum is the behavioral modification constructs – goal setting and self-monitoring – embedded in patient handouts that promote incremental changes and within the learning collaborative process. The educational tools may be used in various situations and by various provider types, independent of the POC Learning Collaborative process, yet, the power of the handouts are in their ability to move the patient sequentially towards a healthy diet and activity behaviors. Equally, the entirety of POC curriculum provides a process through which the
PCP guides the family toward sustainable behavior change; the provider through incremental steps, layers new skill sets which lend to improved self-efficacy to counsel and primary care system changes. The same behavioral modifications that are useful for the family apply equally to the physician changing behavior to counseling on obesity management.

Weight management is not "one size fits all". The inherently individualized nature of weight, with its interplay of diet, activity, attitude, emotion, and environment, required a novel approach to achieve behavior change. We used the Model for Improvement methodology, embedded within a quality improvement Learning Collaborative to guide primary care providers towards a standard of care around obesity management that allowed for individualized practice adaptation of the model and patient-specific messages and goals. This format had many advantages. By design, rapid improvement cycles (PDSAs) allowed providers to incrementally build their belief in the weight management systems and processes embedded within the POC (see “interventions” in our Key Driver Diagram, Appendix A). Skill building and experiential knowledge gradually emerged as providers sequentially changed their personal style and counseling processes to form a more coherent identification, evaluation, and management strategy – clinicians were more self-aware and acknowledged gaps in their standard of care. The collaborative model offered a regular flow of new data, which reflected changes in provider behavior and progress towards practice adaption of POC. This in turn increased providers’ belief in POC and therefore, served as a mechanism to foster self-efficacy, the concept at the core of behavior change theory. Importantly, this model also created a peer group of colleagues within a learning environment.

Overall, the theoretical underpinnings of the Model for Improvement allowed us to use the POC curriculum to assist PCPs as they developed a new skill set for pediatric weight
management. The Learning Collaborative process allowed the Project Team to be in constant contact with PCPs as they integrated POC into their every day practice, providing guidance and assistance when needed. Based on the quality improvement paradigm, it was not appropriate to simply teach physicians about POC and then return after several months to evaluate the extent that physician behaviors, knowledge, and self-efficacy had improved – instead, it is the strength of this model that it represents a guided development, in contrasted to traditional approaches of research which tend to offer an “either/or” dichotomy. Learning and growth occurred throughout the 6-month collaborative process. The information presented at the initial in-person learning session served only as the foundation for future learning that occurred during Action Period phone calls, practice narratives, and site visits. On a monthly basis, practitioners and the Project Team were able to reflect about what did and did not work about the POC program. Additional shared learning occurred as teams reported on how they uniquely adapted the POC counseling package and materials for their practice, while still adhering to the basic POC framework.

_Incorporating Behavior Change Theory into Clinical Practice_

The “Pound of Cure” Learning Collaborative emphasized creating sustainable systems and processes within the primary care environment to support best practices around weight management. Self-efficacy, the foundation for much of behavior change, was improved as constructs within the theoretical framework of the Social Cognitive Theory (SCT) were applied during the learning collaborative. For example, reciprocal determinism was established as providers conducted sequential PDSA cycles to embed weight management systems within the surrounding primary care environment in support of their counseling efforts. The environment consisted of systems and processes as well as interactions with colleagues – whether other practitioners within the practice were
supportive of Learning Collaborative participants strongly influenced this relationship. Therefore, “obesity champions”, to serve as a referral source within their practice, were extremely important to the success of participating providers. The POC package and support of the Project Team facilitated this process. Collectively, the practice teams and the Project Team were able to identify and remove multiple common barriers, furthering empowering physicians. The Project Team reshaped providers’ expectations and expectancies around weight management outcomes. The learning session and follow-up monthly Action Period phone calls continually reminded providers that weight-related health risk reduction through acquisition of healthy diet and activity behaviors were objectives of POC, and not solely weight loss. This was a crucial revision of success expectations. Patient registries provided insight to the outcomes of the POC Learning Collaborative, however the results of maintenance of BMI percentile could not be presented to this group during the efficacy study – registries were collected at the end of the collaborative. However, the results of the registries and clinically significant mediation of child weight gain are important outcomes that can be used in future collaboratives to continually reshape weight management expectations. Additionally, altering markers of health (reducing elevated blood pressure), as a result of maintenance of BMI percentile, can also be used to reshape provider and collective expectations. Peer interaction on monthly phones also helped to reshape provider expectations around feasible strategies that could be useful for patient engagement and recruitment. Providers were able to learn not only from obesity experts, but also from their peers during the learning session, a fundamental component of observational learning. Particularly influential were peer interactions given that practice teams were all facing the same challenges while incorporating a complex counseling model into their busy practice. This presented teams with similar barriers. Providers who were successful in this endeavor were invaluable to other teams. As a collaborative, goals (both global and specific aims cited
within the Key Driver) were set around specific processes, such as office documentation practices, while providers monitored their progress towards each goal. On a monthly basis, during Action Period phone calls, providers received tangible feedback on their performance. The Project Team and providers discussed areas for improvement and methods by which to improve. Goal setting, self-monitoring, and feedback served to assist providers in self-regulating their behaviors. Monthly Action Period phone calls were a vital component of the learning collaborative and a mechanism for improving self-efficacy. On Action Period calls, the Project Team and obesity experts reviewed the progress physicians made during the past month. Successes were celebrated, areas for improvement were noted, and encouragement was provided during times PCPs felt frustrated with the process and counseling experiences.

**Overcoming Cited Barriers**

The primary care environment is the ideal place to treat pediatric overweight. However, clinicians commonly cite many barriers, which inhibit them from fully embracing this task. An overwhelming number of providers feel that there is lack of an effective treatment paradigm, particularly one that includes the requisite counseling tools to facilitate behavior change in their patients. This is particularly challenging given the time and process constraints of an office visit. Furthermore, PCPs lack confidence in their ability to counsel; that is, they recognize that patient-centered counseling around specific behavioral targets is a dialogue, not a prescription.

“A Pound of Cure” equipped providers with a succinct, modularized approach to weight management office visits from identification of obesity-related risks to provision of incremental, approachable goals – eliminating two critical barriers: the lack of patient educational materials and the need for detailed counseling strategies. Patient...
materials and the physician process filled gaps in counseling resources, meeting the needs of the pediatric patient population in an office setting. The POC materials allowed for quick identification of patient specific counseling topics upon review of the child’s history, framed around the concept of energy balance that unfolded in an ordered fashion to guide both the physician and family through a series of patient-selected behaviors.

The purpose of the Learning Collaborative strategy was to overcome barriers to obesity management as discussed in the literature, while addressing barriers specific to our practice teams at the same time. Specifically, teams were interested in additional learning on criteria for laboratory evaluations, billing and coding, and more specific nutritional and counseling recommendations around the ECRs – topics also common to PCPs nationally. Prework performed in preparation for the in-person Learning Collaborative session, emphasized how PCPs were currently handling overweight and obesity during their well-child visits. The awareness of the baseline behavior set the tone for later improvements in practice systems, processes, and individual behaviors during the counseling encounter.

Skills, such as identification of excess weight, assessment of medical and behavioral risk, identification of comorbid conditions, acquisition of appropriate laboratory tests, and application of targeted counseling strategies to promote the ECRs, all were addressed during the follow up period. By incorporating the POC package within the context of a Learning Collaborative, the process afforded the Project Team opportunities to introduce treatment skills and support services repeatedly over time, when requested by the practices, confronting two troublesome barriers cited by physicians. The most important new skill introduced to the clinicians was patient-centered motivational interviewing techniques, a technique in which PCPs expressed a low sense of self-efficacy. This was a particular target throughout the six-month learning session. Obesity experts and content experts for billing and coding, nutrition and physical activity were recruited to address
providers’ concerns and questions during Action Period phone calls. To facilitate improvements, interventions for PDSA cycles appeared on the Key Driver Diagram (Appendix A). Initial discussions for improvement cycles occurred at the learning session and on a monthly basis teams reported on changes tested and outcomes. Teams’ progress toward project goals and specific aims occurred when monthly chart review data was presented on phone calls – PCP adherence to the POC counseling framework was continually addressed, showing collaborative performance and incrementally closing the gap between prework baseline and current practices.

Provider expectations around counseling encounters were reshaped during the POCLC. The initial goal of weight management programs should be acquisition of healthy lifestyle behaviors. It is through the adoption of healthier behaviors that weight is controlled and health risks are ameliorated.47 The behavioral index, a tool developed during the Hilltop pilot phase, was specifically designed to assist physicians to measure small, incremental changes in patient and family behavior. This tool redefined success by turning the focus away from patient weight as the critical outcome measure. As such, for future Learning Collaboratives, this tool will be at the center of evaluating PCP counseling ability to move families towards healthier dietary and activity behaviors. Currently, the behavioral index is being validated for use with children two to eleven years of age.

**Outcomes from Participation in POC**

“A Pound of Cure” Learning Collaborative participants achieved a new standard of care around obesity management, specifically adapted to their practice environment. Many barriers commonly cited by PCPs were remedied throughout the course of the collaborative. This is especially encouraging given that the Expert Committee released its recommendations around obesity prevention and management in 2007, nearly 6 years ago.
Despite this, our prework suggested that these national guidelines had not permeated clinical practice, even with an improved awareness (knowledge survey). Yet, in the very brief, 6-month Learning Collaborative our providers and their practice environment improved an array of office systems and modified their behaviors around obesity management. Much of this success can be attributed to the unique nature of the collaborative, which permitted constant contact between the Project Team and providers to ensure that barriers were removed and individual needs were met in a timely fashion. Office systems that support improved provider counseling were established, which ensured sustainability. Fundamental support systems – measurement, documentation, and interpretation of vitals, assessment of ECR behaviors, designation of areas within the medical record to document components of the counseling encounter and accessibility of materials – were established during the collaborative. Provider knowledge of the ECRs and treatment algorithm remained high before and after participation, indicating that the key behavioral targets of the ECRs were commonly recognized. But it emphasizes that knowledge does not necessarily translate into behavior change, either by the clinician or by the families that they treat – this has been a crucial reason for Maintenance of Certification (MOC) credit to replace Continuing Medical Education (CME) credit as a measure of physician growth. The transition from CME to MOC credit moves providers away from a didactic learning model to one that encourages implementation of quality care improvement practices. However, once physicians were more self-confident in their counseling ability, they experienced an almost 11-point increase in overall measures of self-efficacy to counsel. This, in turn, was apparent in improved documentation within the medical record. Documentation, the proxy for physician counseling behavior, met and exceeded our 90% goal for most measures. Of importance, improvements in provider behaviors were documented for assessment of medical risk, laboratory evaluations,
categorization of blood pressure status, diagnosis of weight status, and assessment of family readiness to change. Families were satisfied with their office visits that were tailored to the specific needs of their children, finding them informative. Yet, the most common individual and family barriers to treatment – caregivers’ failure to perceive excess weight as a problem and lack of parent involvement – persisted throughout the learning collaborative.\textsuperscript{69, 74}

Patient and family involvement, follow-up visit attendance, and caregiver perception of weight were recurring themes that first appeared when we began our work at the Hilltop clinic and persisted throughout the learning collaborative study.

In both Hilltop and the POCLC, nearly all of the children counseled were obese, the majority being severely obese (> 99\textsuperscript{th} percentile BMI). For example, nearly half of POCLC children and nearly two-thirds of those seen at the Hilltop site were severely obese. It was expected that more Hilltop children were severely obese as this clinic absorbed patient overflow from the tertiary care obesity treatment center, the Center for Healthy Weight and Nutrition. However, POCLC physicians had the ability to enroll any child above the 85\textsuperscript{th} percentile for BMI. Providers expressed that they started counseling with families that were ready to make a change, the majority of whom were frankly obese. This observation is consistent with the literature, which suggests that both provider and family more easily recognize obesity as requiring intervention than overweight.\textsuperscript{28, 29} This further highlights the need for BMI screening. Early identification and discussions around excess weight need to occur well before the child progresses to the obese status. It is interesting to speculate on the potential outcomes from truly early intervention in practices. “A Pound of Cure” was designed to be a structured approach to weight management developed for patients two to eleven years old.\textsuperscript{47} While the strategies and behavioral recommendations within \textit{POC} are applicable to older children, the counseling strategies are aimed toward identification and management of childhood overweight, particularly in its early stages, when behaviors of
children are more amenable to change and under parental control.\textsuperscript{9,13-16} Recent NHANES data suggests that accumulation of excess weight and obesity prevalence are occurring earlier in life. It was preschool aged children who experienced the highest increase in obesity prevalence in national surveys, whereas prevalence of obesity among school aged and adolescent children was more stable.\textsuperscript{2,9,10} Furthermore, capturing children as they approach first approach overweight (show BMI curves crossing percentiles) might prove to decrease the likelihood of being an overweight adolescent and adult, and potentially alleviate the many chronic health challenges associated with weight.\textsuperscript{6,10,11} Still, our participating physicians regularly stated their need for a more aggressive counseling package and for a treatment strategy to assist in weight loss for children 12 to 18 years of age, suggesting that this group is especially frustrating for pediatricians.

\textit{Recruitment and Retention as Fundamental Barriers}

During the development and pilot phase of POC, office visit attendance was a consistent challenge. No-show rates for initial office appointments were 36\% and only 52\% of families returned for at least one follow-up visit. Although slightly higher in the POCLC, only 63.6\% of counseled children returned for at least one follow-up visit. But, a larger percentage of children attended a second and third office visit within the POCLC collaborative than children at Hilltop, 52\% and 38\% compared to 38\% and 24\% of children, respectively. This offers a testimony to the power of the more personal relationship of primary care to engage families, compared with a referral relationship.\textsuperscript{42} Improved follow-up office visit attendance during POCLC may have been influenced by shorter time between office visits, as well. At Hilltop, children typically waited 95 days between their initial visit and first follow-up visit, whereas POCLC families waited for only half that time (40 days) to attend their first follow-up visit. During the collaborative, the average time between the
initial and third visit and initial and fourth visit was 64 days and 79 days, respectively, whereas at Hilltop, 139 days lapsed between the initial and third visit and nearly 216 days until the fourth office visit. This greatly hampers the counseling process. However, all POCLC families that completed an after-visit feedback form reported that they felt time between appointments was appropriate, suggesting that they may be unwilling to fully engage in a concentrated counseling process. Provider rapport, more frequent office visits, and family comfort with time between appointments may have been contributing factors to the 0.0656 decrease in BMI z-score and 0.31% decrease in BMI percentile observed during the brief six-month learning collaborative, statistically -- and certainly clinically -- significant results. Dolinsky et al. observed similar results, however, children participated in a more intense counseling experience – after an initial visit, families attended 5 follow up visits every 4 to 6 weeks, followed by maintenance visits that occurred every 6 months until the children reached 23 years of age. In this primary care study, patients experienced a mean decreases in BMI z-score of 0.10. In a cross over design study by Siwik et al, patients participated in 12 group sessions over the course of 3 months; their intervention (a predefined program in which families self-selected goals around diet and activity) resulted in a 0.046 decrease in BMI z-score. Relative to the more intense and frequent office visits in these two interventions, the POC curriculum achieved similar results to Dolinsky et al, in a shorter period of time, and better results that Siwik et al. in approximately the same amount of time.

Participating physicians continually expressed concern about patient engagement and adherence to the POC curriculum on monthly practice narratives, Action Period phone calls, and during site visits. This collective frustration may influence and reshape provider perception about patient involvement and parental concern. National data demonstrates that parents believe obesity is an important topic to be addressed during office visits, yet
many inaccurately perceive their child's weight status and show little concern about the topic.\textsuperscript{26-28,34} Our experience at Hilltop revealed that while 85\% of parents stated that they were concerned about their child’s weight, a surprising 94\% believed that their child would grow out of excess weight. Furthermore, less than half believed that their child was unhealthy at their current weight, even though 93\% of those parents thought that their child could develop a weight related health problem in the future should excess weight persist, a startling confirmation of the fact that knowledge does not change behavior. Parental misperceptions about weight status and obesity-related risk may strongly influence POC office visit attendance, but POCLC providers should find comfort in their ability to have positively impacted those patients and families who were involved in POCLC. Two-thirds of families who initiated counseling attended a follow-up visit. Furthermore, children who stayed in the POC collaborative experienced a reduction in their BMI and BMI percentile, accompanying their changes in diet quality and daily activity. While modest, prior to POCLC participation, weight management visits were not commonplace and usually resulted in a referral to a weight management. Physicians established a new type of office visit, made obesity counseling into a sustainable practice, and positively impacted the engaged children’s health in a short period of time. These successes should be celebrated, reinforcing physician behavior and reshaping perceptions about the counseling experience. Use of this information during future POCLCs could assist in reshaping provider perceptions around poor attendance at follow-up visits and improve opening dialogues around excess weight discussions.

The pilot “A Pound of Cure” learning collaborative produced a revised, more polished version of the POC counseling package. It also offered a series of best practices to assist primary care providers in managing pediatric excess weight. Replication and sustainability of best practices is currently being evaluated during a second learning collaborative study.
an 11-month experience. Five teams that participated in the pilot POCLC and 10 new teams were recruited to participate in the second learning collaborative where lessons learned during the pilot collaborative and best practices were applied. The second collaborative ends in June 2013.

Remedying the patient and family reluctance to work with their physicians on the issues of diet, activity, fitness, health risk, and weight is the future direction of this work. Now that physicians have been shown to establish a new standard of care in their practices, that represents a framed, but individualized treatment strategy, the challenge will be on demonstrating to families, particularly to mothers, that they can alter the trajectory of their child’s weight to ensure long term health. This will make patient level outcomes, namely the acquisition of healthy lifestyle behaviors, the target of future endeavors in this field.

**Limitations**

We recognize that there are several limitations of our POC curriculum, from all stages of program evaluation – development, pilot efficacy, and effectiveness of our weight management curriculum. “A Pound of Cure” educational handouts for parents and counseling materials for providers were not in their final draft when we piloted the curriculum; we developed and piloted handouts and materials within a unique “mock” primary care environment, with feedback from a severely obese patient population. However, the content of the handouts and the counseling paradigm is one that is applicable to the child approaching overweight and the severely obese child – the Expert Committee and the Dietary Guidelines for Americans 2010 both noted the same behavior targets, as habits to modify to achieve weight maintenance. Additionally, the Hilltop Clinic in which we developed and piloted POC materials allowed for longer, yet infrequent, office visits. We addressed this limitation during the effectiveness phase, when POC was implemented and
delivered within an actual primary care setting. Length of office visits was more appropriate for the primary care setting and time between follow-up visits better promoted behavior modification.

Likewise, there were limitations during the efficacy and effectiveness phase, the Learning Collaborative. Providers and families chose to participate in POC, quasi-experimentally designed weight management curriculum. While application of this counseling model may be limited to providers who desire to be obesity champions and families with a vested interest in their child’s health – we feel that this is more a strength than a limitation. We acknowledged how to effectively guide physicians and families toward a standard of care and acquisition of healthy behaviors, respectively, uniquely adapting the counseling process for each population. Additionally, we lacked a control group of non-participating providers to which we could compare the effectiveness of modifying behavior. However, in the collaborative model physicians served as their own control and improvements were evaluated through the use of run-charts. Future learning collaboratives will seek to replicate our results in providers and patients as well as address issues of sustainability. An additional focus will be placed on determining how to incentivize physicians outside of Maintenance of Certification.
References


36. Ferrante JM, Piasecki AK, Ohman-Strickland PA, Crabtree BF. Family physicians' practices and attitudes regarding care of extremely obese patients. *Obesity (Silver Spring).* 2009;17(9):1710-1716.


53. Maalouf-Manasseh Z, Metallinos-Katsaras E, Dewey KG. Obesity in preschool children is more prevalent and identified at a younger age when WHO growth charts
are used compared with CDC charts. The Journal of nutrition. 2011;141(6):1154-1158.


91. Jacobson D, Gance-Cleveland B. A systematic review of primary healthcare provider education and training using the Chronic Care Model for Childhood Obesity. *Obes Rev.*


Appendix A: “A Pound of Cure” Learning Collaborative Key Driver Diagram

Figure A. 1 - "A Pound of Cure" Pilot Learning Collaborative Key Driver Diagram.
Appendix B: Chronic Care Model for Childhood Obesity

Figure B. 1 - Chronic Care Model for Childhood Obesity (Jacobson et al.)
Appendix C: Initial Visit History Collection Forms

![Figure C. 1 - Initial Visit history collection form (side one).](image)

Page 1 of 2
Figure C.2 - Initial Visit history collection form (side two).
Appendix D: “Keeping it Balanced” Handout

Energy In = Food and Drink

Energy Out = Activity

Energy balance is when what you eat and drink equals the activities you do. 

[Diagram showing scales with Energy In and Energy Out]

Office Visit Topics

Energy Balance
- Go over diet, activity, and family history
- 3 day food diary
- A Guide to Your Food Groups
- A Guide to Servings

Excess Calories
- Review food diary
- Proper portions
- Snack foods
- Sugary beverages
- Milk
- Juice

Keeping Active
- Physical activity
- Screen time
- Screens in the bedroom

Routine is Important
- Breakfast
- Family meals
- Eating away from home
- Sleep

Nutrient Rich Foods
- Fruits and vegetables
- Nutrition facts label
- Shopping guide
- Eating on a budget

Figure D. 3 - “Keeping it Balanced” Handout
Appendix E: “A Pound of Cure” Progress Notes

![Progress Notes](image)

**Figure E. 1 - Initial Visit Progress Note (Paper Version).**
**VITAL SIGNS (1st Follow Up Visit)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT</td>
<td>in/cm</td>
</tr>
<tr>
<td>WT</td>
<td>lb/kg</td>
</tr>
<tr>
<td>Change in WT</td>
<td>lb/kg</td>
</tr>
<tr>
<td>BMI</td>
<td>kg/m²</td>
</tr>
<tr>
<td>BP Category</td>
<td>normal</td>
</tr>
<tr>
<td>Abnormal lipids</td>
<td>normal</td>
</tr>
<tr>
<td>Abnormal weight gain</td>
<td>normal</td>
</tr>
<tr>
<td>Anaemia</td>
<td>normal</td>
</tr>
<tr>
<td>Asthma</td>
<td>normal</td>
</tr>
<tr>
<td>Disordered Eating (Rage, food seeking, etc)</td>
<td>normal</td>
</tr>
<tr>
<td>GERD</td>
<td>normal</td>
</tr>
<tr>
<td>Mental Illness (e.g. Depression, Anxiety)</td>
<td>normal</td>
</tr>
<tr>
<td>NASLD or NASH</td>
<td>normal</td>
</tr>
<tr>
<td>Metabolic syndrome</td>
<td>normal</td>
</tr>
<tr>
<td>Obstructive issues/joints/bone problems</td>
<td>normal</td>
</tr>
<tr>
<td>Other</td>
<td>normal</td>
</tr>
</tbody>
</table>

**DIAGNOSIS AND CO-MORBIDITIES**

- Elevated blood pressure; hypertension (not diagnosed)
- Obesity
- Abnormal lipids
- Abnormal weight gain
- Mental Illness (e.g. Depression, Anxiety)
- NASLD or NASH
- Metabolic syndrome
- Obstructive issues/joints/bone problems
- Other

**BEHAVIORAL ASSESSMENT - 1st Follow up Visit**

Did the family attempt the goal set during the initial visit?  Yes  No
Was it a successful attempt?  Yes  No

Were any tracking forms returned?  Yes  No

Nutritional Re-assessment since last visit.  No Change
Relevant New Findings
Resolved or Improved

Was a 3-day food diary returned?  Yes  No
Relevant Findings:

Activity Re-assessment since last visit.

Comments:

Family/Patient Concerns.

Comments:

Did you discuss any ambivalence to change that the family may be feeling?  Yes  No

Did you help the family discuss the pros and cons of changing their behavior?  Yes  No

Is the child/family ready to make an additional change(s)?  Yes  No

Was a target behavior(s) identified (only for those who are engaged and ready)?  Yes  No

If so, what:

- Increase physical activity
- Decrease screen time
- Eat more family meals
- Eat less fast food
- Eat more fruits & vegetables
- Reduce sugary beverages
- Regulate portion sizes
- Structure eating patterns
- Structure sleeping patterns
- Change dietary habits

What handouts were the family given?  Note in the initial visit form.

What specific goal(s) was/were set?

Plan:

Time spent counseling  minutes

---

**Figure E. 2 - Follow up Visit Progress Note (Paper Version).**
HWN Assessment 1

Informant: [HISTORIAN:20013359]

History Of Present Illness: Scarlett Fryes is a 12 months female who is here for her Healthy Weight and Nutrition Assessment 1. The parents are [HWN LIST OF DEGREE OF CONCERN:50288814] concerned about Scarlett's weight. The parents became concerned about her weight when Scarlett was {10/09} years of age. The parents are [HWN LIST OF DEGREE OF CONCERN:50288814] concerned about Scarlett's elevated cholesterol. Things tried to control weight include: [HWN MODULE DIETARY INTERVENTIONS:50288830].

PAST MEDICAL HISTORY:
She has a past medical history of Jaundice of Newborn, Thrush (10/10/2009), and Citiis Media (12/14/2009).
She has no surgical history on file.
She has Citiis Media on her problem list.
Her family history includes Allergies in her father and No Known Problems in her mother.

Medications: [MEDICATIONS:20017306] "As reviewed in the Medication Activity."

ROS:
General: [HWN GENERAL ROS:50281506]: "no weakness, headaches or blurry vision".
Sleep Habits: [HWN SLEEP HABITS ROS:50281508]: "no difficulty with sleeping, no need to sleep upright, no interruption, no fatigue, snoring or falling asleep during the day"
Heart Problems: [HWN HEART PROBLEMS ROS:50281507]: "no chest pain, heart skipping, passing out or turning blue"
Breathing Problems: [HWN BREATHING PROBLEMS ROS:50281508]: "no shortness of breath, wheezing, cough with exercise or chest tightness"
Stomach Problems: [HWN STOMACH PROBLEMS ROS:50281509]: "no stomach pain, nausea, vomiting, diarrhea, constipation, stool leakage, blood in stool, mucus in stool, heart burn, food getting stuck, yellow eyes or dark urine"
Muscle/Joint Pain: [HWN MUSCLE/JOINT PAIN ROS:50281510]: "no pain in hip, pain in back, pain in arms, pain in legs, or joint swelling"
Skin: [HWN SKIN ROS:50281511]: "no acne, rash or sores"
Endocrine: [HWN ENDOCRINE ROS:50281512]: "negative"
Psychology: [HWN PSYCHOLOGY ROS:50281513]: "no psychological problems"
Post-op Patients: [HWN POSTOP PT ROS:50281514]: "no issues"

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

Figure E. 3 - Screenshot of electronic medical record progress note (continued on next page).
Eating & Activity Behaviors:

- **Water:** (HWN FOOD CATEGORY FREQUENCY: 50288829)
- **Vegetables:** (HWN FOOD CATEGORY FREQUENCY: 50288828)
- **Fruits:** (HWN FOOD CATEGORY FREQUENCY: 50288824)
- **Fried Foods:** (HWN FOOD CATEGORY FREQUENCY: 50288828)
- **Regular Soda:** (HWN FOOD CATEGORY FREQUENCY: 50288829)
- **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)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td>Several times a week</td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td></td>
</tr>
<tr>
<td>Less than once a month</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
</tr>
</tbody>
</table>

- **BMI:** There is no height or weight on file to calculate BMI. Normalized BMI data available only for age 2 to 20 years.

- **Vital Signs:** There were no vitals filed for this visit. No weight on file.

- **Measurements:** Neck 1 cm, Waist 1 cm

- **Impression:**

  No diagnosis found.

- **Plan:** (HWN PLAN: 50288842)

- **Goals Set:**

  - **Proper Portions:** (PROPER PORTIONS PLAN: 50288832)
  - **Sugary Beverages:** (SUGARY BEVERAGES PLAN: 50288836)
  - **Snack Foods:** (SNACK FOODS PLAN: 50288843)
  - **Dairy:** (DAIRY PLAN: 50288844)
  - **Physical Activity:** (PHYSICAL ACTIVITY PLAN: 50288833)
  - **Screen Time:** (SCREEN TIME PLAN: 50288834)
  - **Breakfast:** (BREAKFAST PLAN: 50288836)
  - **Eating Away From Home:** (EATING AWAY FROM HOME PLAN: 50288838)
  - **Family Meals:** (FAMILY MEALS PLAN: 50288838)
  - **Sleep:** (SLEEP PLAN: 50288842)
  - **Fruits & Veggies:** (FRUIT VEGETABLE PLAN: 50288838)

**Figure E. 4 - Screenshot of electronic medical record progress note.**
Appendix F: Behavioral Index

Quantifying Progress within the Counseling Process

Many overweight and obese children were referred to our Hilltop Primary Care Clinic with weight loss as the main outcome of their office visits. However, it is crucial for clinicians to have the right outcomes in mind for their counseling to define what “success” means. Based on the ECR algorithm, while weight loss is appropriate for some children and adolescents, weight management and acquisition of healthy behaviors was the goal for most of our patient population. In addition, every child has a different set of risky behaviors to be addressed. So a fundamental challenge for counseling physicians is to measure incremental improvements in the child or family’s behavior on the diet and physical activity targets. For all participating children, the primary emphasis was on healthy, life-long diet and activity behaviors as the foundational steps to weight control. So, we created a tool that could be used as a quality control measure for the strength of physician counseling on excess weight and how that relates to the knowledge gained and behaviors changed within the families counseled. Based on a review of the literature, no single survey instrument existed that had the ability to capture incremental behavioral changes of children as they participated in healthy lifestyle or weight management programs. Creation and validation of this tool proved to be a challenging task.

Clinicians cannot spare time for multiple approaches toward diet and activity assessment. They need a concise, succinct measure of the child’s behavioral risk as well as a means to determine whether they are having an impact in guiding the family. Our research
team created a **behavioral index**, which includes queries on nine of the ECRs, as they pertain to families with children 2 to 11 years old. Similar to the drafting process of parental ECR handouts during the development phase of POC, we conducted multiple revisions throughout the 2-year pilot period at Hilltop to develop the behavioral index seen below. Statements, several represented pictorially, were written at the sixth grade reading level, or lower to encapsulate the behavioral and knowledge-related concepts for prevention and management of excess weight. Each child’s obesity-related health risk, and therefore counseling experience, is unique. Given the individualized nature of weight management, we had to phrase statements to capture incremental changes in each targeted behavior; statements are “fill in a blank” not only to broaden the range of answers but to capture the smallest increments of changes.

Another challenge was defining the end point or “final” weight management visit. We had designed POC to follow a framework of diet and activity topics, the order of which we determined through chart reviews and physician interviews. Yet, despite this framework, we left room for physicians and families to choose how to approach the counseling experience based on patient-specific identified behaviors. With this degree of flexibility, it was difficult to determine when to distribute the final index. Since our program lacked a defined endpoint and we experienced rapidly diminishing follow-up from the participants, we were not able to thoroughly evaluate the efficacy of our tool in monitoring patient lifestyle behaviors and effectiveness of physician counseling during the pilot phase. Despite those challenges, we created a tool with the potential to quickly, concisely, and effectively monitor patient outcomes.

We intended to distribute this tool during the POC learning collaborative to POC eligible children. We proposed that families would complete the index prior to their initial visit and upon completion of their final POC office visit. A large portion of the learning
collaborative was devoted to implementing POC and integrating weight management processes into the primary care environment – providers did not have adequate time to distribute additional paperwork to their POC patient population. Similar to our Hilltop experience, we did not have an appropriate number of pre and post behavioral indices to evaluate changes in family diet and activity behaviors during the effectiveness phase of POC program evaluation. Validation of the behavioral index and determining its ability to capture behavioral modifications of families who receive POC counseling is an ongoing part of our work in establishing a standard of care around pediatric weight management.
Please complete this survey. This will help your doctor learn about your child’s diet and activity patterns.

1.) CIRCLE the appropriate way to make a child’s plate.

2.) MATCH the picture of the hand used to measure the food group.

   A.) Fat (salad dressings, dips)
   B.) Starch (pasta, rice, potatoes)
   C.) Snack Food
   D.) Meat
   E.) Fruit or Veggies
   F.) Cheese

   A thumb can be used to measure a portion size of __________.
   A handful can be used to measure a portion size of __________.
   A thumb tip can be used to measure a portion size of __________.
   A tennis ball can be used to measure a portion size of __________.
   A palm can be used to measure a portion size of __________.
   A fist can be used to measure a portion size of __________.

3.) My child eats breakfast ______ days a week.
   My child usually eats just one helping of each food during meals.
   YES  NO
   My child eats ______ servings of fruits a day.
   My child eats ______ servings of vegetables a day.
   My child eats ______ meals and ______ snacks a day.
   My child eats dinner at the table with the family ______ a week.
   My child eats fast food ______ times a week.
   My child drinks ______ sugary beverages a day.
   My child drinks ______ servings of 100% fruit juice a day.
Figure F. 2 - Behavioral Index (Side Two)
**Appendix G: “A Pound of Cure” Primary Care Provider Surveys**

This questionnaire is designed to help us gain a better understanding of the kinds of difficulties clinicians face when managing childhood obesity within the primary care setting. Please rate how certain you are that you can do the things discussed below by checking the appropriate box below. When we reference the Expert Committee we are referring to the 2007 document entitled: “Expert Committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity”. Your answers will be kept strictly confidential. EC = Expert Committee

*Please rate your degree of confidence by recording a number from 0 to 100 using the scale given below:*

<table>
<thead>
<tr>
<th>Cannot do at all</th>
<th>Moderately can do</th>
<th>Highly certain can do</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 10 20 30 40 50 60 70 80 90 100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Identification of Excess Weight**
- Using a child’s height and weight, I can calculate his/her BMI.
- I can interpret a child’s BMI percentile to correctly diagnosis his/her weight status.

**Assessment of Obesity Related Health Risk / Status**
- I can identify a child’s problematic eating behaviors specified by the EC.
- I can identify a child’s problematic physical activity behaviors specified by the EC.
- I can identify a child’s problematic sedentary behaviors specified by the EC.
- I can inquire about the child’s family history specified by the EC.
- I can perform a physical exam on an overweight child as specified by the EC.
- I can perform a physical exam on an obese child as specified by the EC.
- I can order the appropriate labs for an overweight child with identified health risks.
- I can order the appropriate labs for an obese child with identified health risks.

**Working with Family during Counseling Encounter**
- I can help families discuss their ambivalence to change their current diet and/or activity behavior.
- I can raise family awareness of the pros and cons of changing a diet and/or activity behavior.
- I can express empathy and understand a family’s unique perspective.
- I can assess a family’s readiness to change their nutrition and/or activity related behaviors.
- I can help families set incrementally challenging goals during each office visit.
- I can problem solve difficulties that may arise as families attempt to change dietary behaviors.
I can problem solve difficulties that may arise as families attempt to change physical activity habits.
I can avoid arguments when a family becomes defensive about changing the discussed behavior.
I can continue to provide effective counseling even when parents are resistant to change.
I can support the family’s sense of self-efficacy.
I can counsel effectively regardless of cultural differences between the patient and myself.

Management of Patient Excess Weight
I can inform families of the co-morbidities associated with excess weight gain in children.
I can help a family identify individualized strategies to reduce their child’s sugary beverage consumption.
I can help a family identify individualized strategies so that their child is active for 60 minutes a day.
I can help a family identify individualized strategies to decrease their child’s screen time.
I can help a family identify individualized strategies to increase their child’s fruit and vegetable servings.
I can help a family identify individualized strategies for their child to eat breakfast every day.
I can help a family identify individualized strategies to eat more meals as a family.
I can help a family identify individualized strategies to reduce meals at fast food places and restaurants.
I can help a family identify individualized strategies to have their child establish a regular sleep schedule.
I can help a family identify individualized strategies to provide their child with appropriate portion sizes.
I can help a family identify individualized strategies to have scheduled meals and snacks.
I can counsel on the EC Recommendations given a family’s financial resources.
I can treat childhood obesity regardless of my previous failures or unsuccessful treatment experiences.

Utilization of Excess Weight Management Resources
I can manage childhood obesity within the primary care setting.
I can provide effective counseling without a dietitian on site.
I can manage childhood obesity during serial 30 minute office visits.
I can use Pound of Cure educational materials during obesity management office visits.
I can accurately document the obesity management office visit within the medical record.
I can refer my patient to tertiary care when necessary.
I can accurately code and bill for an obesity management office visit.
This questionnaire is designed to help us determine what primary care clinicians know about the Expert Committee Recommendations. When we reference the Expert Committee we are referring to the 2007 document entitled: "Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity". Your answers will be kept strictly confidential.

1.) Overweight is classified as a child who is at or above the
a. 75th percentile for BMI for age and gender.  
  b. 85th percentile for BMI for age and gender.  
  c. 90th percentile for BMI for age and gender.  
  d. 95th percentile for BMI for age and gender.  
  e. 97th percentile for BMI for age and gender.

2.) Approximately, _____ children in America are overweight.
   a. 5%  b. 15%  c. 20%  d. 30%  e. 45%

3.) Obesity is classified as a child who is at or above the
a. 75th percentile for BMI for age and gender.  
  b. 85th percentile for BMI for age and gender.  
  c. 90th percentile for BMI for age and gender.  
  d. 95th percentile for BMI for age and gender.  
  e. 97th percentile for BMI for age and gender.

4.) Approximately, _____ children in America are obese.
   a. 5%  b. 15%  c. 20%  d. 30%  e. 45%

5.) WHO growth charts should be used to monitor weight for length (<2 years old) and CDC growth charts for BMI (≥2 years old).
   a. True  
   b. False

6.) Select all that apply. The Expert Committee suggests a medical assessment that includes the following to identify a child’s obesity-related health risk:
   a. BMI percentile  
   b. Skinfold thickness measurements  
   c. Waist circumference measurements  
   d. Parental Obesity  
   e. Family history of Type 2 diabetes mellitus  
   f. Family history of hypertension  
   g. Family history of hyperlipidemia

7.) Select all that apply. The Expert Committee recommends that physicians review the following weight-related problems during a review of systems.
   a. Sleep problems  
   b. Abdominal pain  
   c. Menstrual irregularities  
   d. Hip, knee or leg pain  
   e. Urination  
   f. Thirst  
   g. Depression

8.) Select all that apply. The Expert Committee recommends that physicians review the following weight-related problems during a physical examination for all children above the 85th percentile for BMI:
   a. Blood Pressure  
   b. Acanthosis Nigricans  
   c. Tonsils  
   d. Goiter  
   e. Tender Abdomen  
   f. Liver  
   g. Bowing of legs  
   h. Limited hip range of motion  
   i. Skin inflammation

9.) Select all that apply. The Expert Committee recommends that the following laboratory tests be ordered for an overweight child, without any medical risks:
   a. No tests are necessary  
   b. A fasting lipid panel  
   c. Fasting glucose  
   d. AST/ALT

194
10.) **Select all that apply.** The Expert Committee recommends that the following laboratory tests be ordered for an obese child, regardless of medical risks:
   a. No tests are necessary
   b. A fasting lipid panel
   c. Fasting glucose
   d. AST/ALT

11.) What should be the treatment goal for an overweight child less than 5 years old with health risks?
   a. No goal is necessary
   b. Weight Velocity maintenance
   c. Weight maintenance or slow weight gain
   d. Gradual weight loss (1 lb./month)
   e. Weight loss (max is 2 lbs./week)

12.) What should be the treatment goal for a 9 year old overweight child without health risks?
   a. No goal is necessary
   b. Weight Velocity maintenance
   c. Weight maintenance or slow weight gain
   d. Gradual weight loss (1 lb./month)
   e. Weight loss (max is 2 lbs./week)

13.) What should be the treatment goal for a 9 year old obese child?
   a. No goal is necessary
   b. Weight Velocity maintenance
   c. Weight maintenance or slow weight gain
   d. Gradual weight loss (1 lb./month)
   e. Weight loss (max is 2 lbs./week)

14.) **Please select all that apply.** To assess eating behaviors, the Expert Committee recommends that physicians address:
   a. The frequency of eating food prepared outside the home
   b. Frequency of family meals
   c. Cups of sugar-sweetened beverages consumed each day
   d. Age-appropriate portions
   e. Cups of 100% fruit juice consumed each day
   f. Frequency of breakfast
   g. Number of fruits and vegetable servings consumed in a day
   h. Cups of milk consumed each day

15.) **Please select all that apply.** To assess physical activity, the Expert Committee recommends that physicians address:
   a. Time spent in moderate physical activity each day
   b. Participation in organized and unstructured activities
   c. Screen time
   d. Sleep patterns

16.) Children should work towards at least ____ age-appropriate servings of fruits and vegetables each day.
   a. 3  b. 5  c. 7  d. 9  e. 10

17.) Sugar-sweetened beverages (Kool-Aid, Hi-C, Sports Drinks, etc) should be limited to ____ servings per day.
   a. 0  b. 1  c. 2  d. 3

18.) 100% juice should be limited to ____ ounces a day for children under 6 years of age.
   a. 3-5 oz.  b. 4-6 oz.  c. 5-7 oz.  d. 6-8 oz.

19.) Parents should transition children from whole milk to lower fat milk options at the age of ____.
   a. 1 year old  b. 2 years old  c. 3 years old  d. 4 years old

20.) Families should limit consumption of fast food meals eaten by preparing more meals at home.
   a. True  b. False

21.) Families should try to eat at least ____ meals at home together each week.
   a. 3  b. 4  c. 5  d. 6  e. 7

22.) Serving size on the nutrition facts label and portion size are always the same quantity for each individual.
   a. True  b. False
23.) Children should engage in at least ___ minutes of active play every day.
   a. 10 minutes  b. 30 minutes  c. 60 minutes  d. 90 minutes

24.) Children 2 years of age and older should limit screen time to no more than ___ hours per day.
   a. 1 hour  b. 2 hours  c. 3 hours  d. 4 hours

25.) All screens should be removed from the child's primary sleeping area.
   a. True  b. False

26.) Please select all that apply. Screens may be considered:

27.) Please select all additional components that are important for success in weight management programs.
   a. Involving the whole family in lifestyle changes  d. Consuming a healthy breakfast everyday
   b. Scheduled meals and snacks  e. Focusing solely on the child's lifestyle
   c. Consuming only water between meals
Appendix H: "A Pound of Cure" Chart Review Materials

![Image of POC initial visit chart review tool.](image)

**Pound of Cure (POC) Initial Office Visits**

**Monthly Chart Review Tool**

<table>
<thead>
<tr>
<th>MR#</th>
<th>Reviewer</th>
<th>Date of Visit</th>
<th>Birthdate</th>
</tr>
</thead>
</table>

**Instructions** - Each clinician is responsible for the following:
- Each month, review the charts of patients who attended a POC initial office visit. When reviewing charts for initial POC office visits, enter the patient into the patient registry.
- It may be best to review and save the registry at the end of each day.

1. Was **BMI percentile** of overweight/obese children ages 2-11 years of age documented?
   - Yes, if yes please note:
     a. Ht _____ cm/in
     b. Wt _____ kg/lb
     c. BMI %tile _____
   - No or not documented

2. Was **overweight (ovwt) diagnosis** (for children with BMI percentile between the 85th and 95th percentile) of overweight/obese children ages 2-11 years old documented?
   - Yes
   - No or not documented
   - NA – the chart reviewed was not of an ovwt child

3. Was **obesity diagnosis** (for children with BMI percentile greater than the 95th percentile) of overweight/obese children ages 2-11 years old documented?
   - Yes
   - No or not documented
   - NA – the chart reviewed was not of an obese child

4. Was **BP** of overweight/obese children ages 2-11 years of age measured and documented?
   - Yes, if yes fill in S/D
   - No or not documented
   - NA (child <3 years old)

5. Was **BP category** of overweight/obese children ages 2-11 years of age documented?
   - Yes, if yes note category:
   - No or not documented
   - NA (child <3 years old)

6. Was **family history collection** of overweight/obese children ages 2-11 years of age documented?
   - Yes
   - No or not documented

7. Was **nutrition history collection** of overweight/obese children ages 2-11 years of age documented?
   - Yes
   - No or not documented

8. Was **physical activity and sedentary behavior history collection** of overweight/obese children ages 2-11 years of age documented?
   - Yes
   - No or not documented

9. Were **obesity-related co-morbidities** of overweight/obese children ages 2-11 years of age documented?
   - Yes
   - No or not documented

10. Were **labs ordered** for overweight/obese children ages 2-11 years of age documented?
    - Yes, if yes, were additional labs ordered for a child <10yrs? ☑ Yes ☑ No
    - No or not documented

11. Was **family readiness to make changes** of overweight/obese children ages 2-11 years of age documented?
    - Yes
    - No or not documented

12. Was **counseling for nutrition** of overweight/obese children ages 2-11 years of age documented?
    - Yes
    - No or not documented
    - NA – counseled on PA

13. Was **counseling for physical activity or sedentary behaviors** of overweight/obese children ages 2-11 years of age documented?
    - Yes
    - No or not documented
    - NA – counseled on nut.
**Instructions** Using the individual POC initial office visits monthly chart review tool, for each question:
- Tally up the number of charts that met (Yes’s) or did not (No’s) meet the specified criteria
- Simply enter the number of charts that met the specified criteria in the grey numerator box
- Total the Yes and No responses and enter into the grey denominator box
- Enter the numerator and denominator into the data infrastructure space for each clinician
- Each month, you will receive feedback on individual clinician, practice and total collaborative performance.

<table>
<thead>
<tr>
<th>QUESTION FROM CHART REVIEW SHEET</th>
<th>Numerator = total # yes answers</th>
<th>Denominator = total yes and no answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Was <strong>BMI percentile</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>2. Was <strong>overweight diagnosis</strong> (for children with BMI percentile between the 85th and 95th percentile) of overweight/obese children ages 2-11 years old documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>3. Was <strong>obesity diagnosis</strong> (for children with BMI percentile greater than the 95th percentile) of overweight/obese children ages 2-11 years old documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>4. Was <strong>BP</strong> of overweight/obese children ages 2-11 years of age measured and documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>5. Was <strong>BP category</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>6. Was <strong>family history collection</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>7. Was <strong>nutrition history collection</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
<tr>
<td>8. Was <strong>physical activity and sedentary behavior history collection</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes _______</td>
<td># of No _______</td>
</tr>
</tbody>
</table>

**Figure H. 2 - Image of POC initial visit summary sheet (side one).**
<table>
<thead>
<tr>
<th>QUESTION FROM CHART REVIEW SHEET</th>
<th>Numerator = total # yes answers</th>
<th>Denominator = total yes and no answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Were <strong>obesity-related co-morbidities</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of Yes_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of No_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Were <strong>labs ordered</strong> for overweight/obese children ages 2-11 years of age documented?</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of Yes_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of No_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Was <strong>family readiness to make changes</strong> of overweight/obese children ages 2-11 years of age documented?</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of Yes_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of No_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Was <strong>counseling for nutrition</strong> of overweight/obese children ages 2-11 years of age document</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of Yes_______</td>
<td></td>
<td></td>
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<tr>
<td># of No_______</td>
<td></td>
<td></td>
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<tr>
<td># of NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Was <strong>counseling for physical activity or sedentary behaviors</strong> of overweight/obese children ages 2-11 years documented?</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of Yes_______</td>
<td></td>
<td></td>
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<tr>
<td># of No_______</td>
<td></td>
<td></td>
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<tr>
<td># of NA</td>
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</tr>
</tbody>
</table>

**Figure H. 3 - Image of POC initial visit summary sheet (side two).**
**Well Child Office Visits (WCV) - Birth to 11 years of age - Monthly Chart Pulls**

Each physician is responsible for reviewing charts of 5 children attending well child office visits during that month for the measures below in blue.

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Definition</th>
<th>Target Population</th>
<th>Numerator</th>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Documentation of weight for length at (&lt; 2 years of age) or BMI percentile (2-11 years old) WCVs</strong></td>
<td>In order to select &quot;Y&quot; for this measure, the child’s weight, length, and weight for length must be documented for &lt;2 years of age OR the child’s weight, height and BMI percentile must be documented for 2-11 year olds in the medical record. Notation of only weight or height or weight for age is not sufficient.</td>
<td>Children birth-11 years of age seen for WCV</td>
<td>Number target population charts containing documentation of weight-for-length percentile.</td>
<td>Total number target population charts reviewed</td>
</tr>
</tbody>
</table>
| **Documentation of counseling for nutrition or referral for nutrition education at birth -11 year old WCVs** | 1) Counsel re: exclusive breastfeeding x first 4-6 months (if appropriate) or limit sugar-sweetened drinks or portion sizes and 2) One of the following:  
   - Providing family Ounce of Prevention Materials  
   - A note stating engagement in discussion of current nutrition behaviors (e.g., eating habits, dieting behaviors)  
   - A checklist indicating nutrition was addressed  
   - A note documenting counseling or referral for nutrition education  
   - A note that the patient/family received educational materials on nutrition  
   - A note indicating anticipatory guidance for nutrition.                   | Children birth to 11 years of age seen for WCV                                   | Number target population charts containing documentation of nutrition education.                                                                                                                        | Total number target population charts reviewed                                                                                                                   |
| **Documentation of counseling for physical activity at birth -11 year old WCVs** | 1) Counsel on keeping infant moving, i.e. tummy time, etc and to restrict TV viewing and 2) One of the following:  
   - Providing family Ounce of Prevention Materials  
   - A note stating engagement in discussion of current activity behaviors (e.g., tummy time, no screen time, etc)  
   - A checklist indicating activity was addressed  
   - A note documenting counseling or referral for activity education  
   - A note that the patient/family received educational materials on activity  
   - A note indicating anticipatory guidance for activity.                   | Children birth to 11 years of age seen for WCV                                   | Number target population charts containing documentation of counseling for physical activity.                                                                                                              | Total number target population charts reviewed                                                                                                                   |

Continued
Table Continued

**Pound of Cure (POC) Initial Office Visits - Monthly Chart Pulls**
Each physician is responsible for the following: For the months of February through June, review the charts of patients who attended a POC initial office visit during that month. When reviewing charts for initial POC office visits, enter the patient into the patient registry. It may be best to review and save the registry at the end of each day.

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Definition</th>
<th>Target Population</th>
<th>Numerator</th>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation of BMI percentile at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, the child’s BMI percentile must be documented in the medical record. Notation of only height and weight or only BMI is not sufficient.</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of BMI percentile</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of overweight diagnosis (for children with BMI percentile between the 85th and 95th percentile) at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, the child’s diagnosis of overweight must be documented in the medical record for a child whose BMI percentile is between the 85th and 95th percentile.</td>
<td>Overweight children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of overweight diagnosis</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of obesity diagnosis (for children with BMI percentile greater than the 95th percentile) at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, the child’s diagnosis of obesity must be documented in the medical record for a child whose BMI percentile is greater than the 95th percentile.</td>
<td>Obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of obesity diagnosis</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of BP at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, the child’s BP must be documented in the medical record. May select NA only if the child is less than 3 years of age.</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of BP</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of BP category at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, the child’s BP category must be documented in the medical record. Must have normal BP (BP &lt; 90th %ile), pre-hypertensive (BP 90th – 95th %ile), or hypertensive (stage 1 = BP 95th-99th %ile + 5mmHg; stage 2 = BP&gt;99th %ile + 5mmHg) noted in the medical record. See supplemental charts in the Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk for guidelines on characterization of BP category (tables 0-1, 0-3 and 0-4). Tables 0-3 and 0-4 follow this chart. May select NA only if the child is less than 3 years of age.</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of BP category</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of family history collection at 2-11 year old POC initial visits</td>
<td>1) An assessment of overweight weight status of child’s biological parents and 2) Two of the following, a family history of: acanthosis nigricans, diabetes, gestational diabetes, stroke, high cholesterol, heart attack, high triglycerides, high blood pressure, heart disease before age of 55 years old</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of history collection</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of nutrition history collection at 2-11 year old POC initial visits</td>
<td>1) An assessment of one of the following: fruit and vegetable consumption or sugar sweetened beverages consumption or portion sizes and 2) Two of the following: • # days breakfast is eaten • # of family meals each week • daily # of meals and snacks • daily servings of 100% juice • daily servings of water • daily servings of calcium rich foods, • # of meals eaten away from home (fast food, sit-down restaurants)</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of nutrition history collection</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of physical activity and sedentary behavior history collection at 2-11 year old POC initial visits</td>
<td>1) An assessment of: time spent in moderate to vigorous physical activity each day (number of days child is active for 60 minutes or more that increases the child’s heart rate) and time spent watching TV and 2) One of the following: • TV in the bedroom • hours spent sleeping • hours watching DVD/videos • hours spent using the computer • participation in gym class, recess, school sports or community sports</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of physical activity and sedentary behavior history collection</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of obesity-related co-morbidities at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, specific co-morbidities or no existing co-morbidities must be documented within the medical records for a child with a BMI percentile greater than the 85th percentile</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of child’s specific co-morbidities</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of labs ordered at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, the child must fall into one of the following categories and have the listed lab ordered: 1.) is greater than 2 years of age and between the 85th and 95th BMI percentile without medical risk and had a fasting lipid profile ordered (You may still select “Y” for this measure should your clinical judgment lead to additional labs being ordered so long as at least fasting lipid profile is documented within the chart). 2.) is between the 85th and 95th BMI percentile and that is 10 years or older with medical risk and had a fasting lipid profile, AST/ALT, and fasting glucose ordered 3.) is above the 95th BMI percentile, that is 10 years or older, regardless of medical risk, and had a fasting lipid profile, AST/ALT, and fasting glucose ordered</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of labs ordered</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of family readiness to make changes at 2-11 year old POC initial visits</td>
<td>In order to select &quot;Y&quot; for this measure, family readiness to make dietary, physical activity or sedentary behaviors must be documented within the medical record for a child with a BMI percentile greater than the 85th percentile</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of family readiness</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Documentation of counseling for nutrition at 2-11 year old POC initial visits</td>
<td>In order to select “Y” for this measure, there must be 1. Documentation of a setting a nutrition goal AND 2. Documentation of specific nutrition related ECR discussed (can be any of the following ECRs): • Eat breakfast daily • Eat more family meals • Eat less fast food • Dairy consumption • Eat more fruits &amp; veggies • Decrease sugary beverages • Regulate/ eat age appropriate portion sizes • Develop structured meal and snack patterns that occurs in the one of the following formats: • A note stating engagement in discussion of current nutrition behaviors (e.g., eating habits, dieting behaviors) • A checklist indicating nutrition was addressed • A note documenting nutrition counseling • A note that the patient/family received educational materials on nutrition ECR topic ***You may only select NA if there was documentation for physical activity or sedentary behavior is discussed.</td>
<td>Overweight &amp; obese children 2-11 years at POC initial visits</td>
<td>Number target population charts containing documentation of nutritional counseling</td>
<td>Total number target population charts reviewed</td>
</tr>
</tbody>
</table>
In order to select “Y” for this measure, there must be 1. Documentation of a setting a physical activity or sedentary behavior related goal and 2. Documentation of specific physical activity or sedentary behavior related ECR discussed (can be any of the following ECRs): • Decrease screen time (TV, DVD, videos, computer time) • Increase physical activity to 60 minutes a day • Establish structured sleep schedule that occurs in the one of the following formats: • A note stating engagement in discussion of current physical activity or sedentary behaviors • A checklist indicating physical activity or sedentary behavior was addressed • A note documenting physical activity or sedentary behavior counseling • A note that the patient/family received educational materials on physical activity or sedentary behavior ECR topic: ***You may only select NA if there was documentation of nutrition discussed.

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Definition</th>
<th>Target Population</th>
<th>Numerator</th>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation of BMI percentile at 2-11 year old POC follow up visits</td>
<td>In order to select “Y” for this measure, the child’s BMI percentile must be documented in the medical record. Notation of only height and weight or only BMI is not sufficient.</td>
<td>Overweight and obese children 2-11 years of age seen for POC follow up visits</td>
<td>Number target population charts containing documentation of BMI percentile</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of overweight diagnosis (for children with BMI percentile between the 85th and 95th percentile) at 2-11 year old POC follow up visits</td>
<td>In order to select “Y” for this measure, the child’s diagnosis of overweight must be documented in the medical record for a child whose BMI percentile is between the 85th and 95th percentile.</td>
<td>Overweight Children 2-11 years of age seen for POC follow up visits</td>
<td>Number target population charts containing documentation of overweight diagnosis</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of obesity diagnosis (for children with BMI percentile greater than the 95th percentile) at 2-11 year old POC follow up visits</td>
<td>In order to select “Y” for this measure, the child’s diagnosis of obesity must be documented in the medical record for a child whose BMI percentile is greater than the 95th percentile.</td>
<td>Obese Children 2-11 years of age seen for POC follow up visits</td>
<td>Number target population charts containing documentation of obesity diagnosis</td>
<td>Total number target population charts reviewed</td>
</tr>
</tbody>
</table>
## Table Continued

<table>
<thead>
<tr>
<th>Documentation of BP category at 2-11 year old POC follow up visits</th>
<th>In order to select &quot;Y&quot; for this measure, the child’s BP category must be documented in the medical record. Must have normal BP (BP &lt; 90th %ile), pre-hypertensive (BP 90th – 95th %ile), or hypertensive (stage 1 = BP 95th-99th %ile + 5mmHg; stage 2 = BP&gt;99th %ile + 5mmHg) noted in the medical record. See supplemental charts in the Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk for guidelines on characterization of BP category (tables 8-1, 8-3 and 8-4). Tables 8-3 and 8-4 follow this chart. May select NA only if the child is less than 3 years of age.</th>
<th>Overweight or obese children 2-11 years of age seen for POC follow up visits</th>
<th>Number target population charts containing documentation of BP category</th>
<th>Total number target population charts reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation of obesity-related co-morbidities at 2-11 year old POC follow up visits</td>
<td>In order to select &quot;Y&quot; for this measure, specific co-morbidities or no existing co-morbidities must be documented within the medical records for a child with a BMI percentile greater than the 85th percentile</td>
<td>Overweight or obese children 2-11 years of age seen for POC follow up visits</td>
<td>Number target population charts containing documentation of child’s specific co-morbidities</td>
<td>Total number target population charts reviewed</td>
</tr>
<tr>
<td>Documentation of family readiness at 2-11 year old POC follow up visits</td>
<td>In order to select &quot;Y&quot; for this measure, family readiness to make dietary, physical activity or sedentary behaviors must be documented within the medical record for a child with a BMI percentile greater than the 85th percentile</td>
<td>Overweight or obese children 2-11 years of age seen for POC follow up visits</td>
<td>Number target population charts containing documentation of family readiness</td>
<td>Total number target population charts reviewed</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Documentation of counseling for nutrition at 2-11 year old POC follow up visits</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to select &quot;Y&quot; for this measure, there must be 1. Documentation of a setting a nutrition goal <strong>AND</strong> 2. Documentation of specific nutrition related ECR discussed (can be any of the following ECRs): • Eat breakfast daily • Eat more family meals • Eat less fast food • Dairy consumption • Eat more fruits &amp; veggies • Decrease sugary beverages • Regulate/eat age appropriate portion sizes • Develop structured meal and snack patterns that occurs in the one of the following formats: • A note stating engagement in discussion of current nutrition behaviors (e.g., eating habits, dieting behaviors) • A checklist indicating nutrition was addressed • A note documenting nutrition counseling • A note that the patient/family received educational materials on nutrition ECR topic ***You may only select NA if there was documentation for physical activity or sedentary behavior is discussed.</td>
<td>overweight or obese children 2-11 years of age POC follow up visits</td>
<td>Number target population charts containing documentation of nutritional counseling</td>
<td>Total number target population charts reviewed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Documentation of counseling for physical activity or sedentary behaviors at 2-11 year old POC follow up visits</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to select &quot;Y&quot; for this measure, there must be 1. Documentation of a setting a physical activity or sedentary behavior related goal <strong>AND</strong> 2. Documentation of specific physical activity or sedentary behavior related ECR discussed (can be any of the following ECRs): • Decrease screen time (TV, DVD, videos, computer time) • Increase physical activity to 60 minutes a day • Establish structured sleep schedule that occurs in the one of the following formats: • A note stating engagement in discussion of current physical activity or sedentary behaviors • A checklist indicating physical activity or sedentary behavior was addressed • A note documenting physical activity or sedentary behavior counseling • A note that the patient/family received educational materials on physical activity or sedentary behavior ECR topic ***You may only select NA if there was documentation of nutrition discussed.</td>
<td>overweight or obese children 2-11 years of age POC follow up visits</td>
<td>Number target population charts containing documentation of physical activity or sedentary behavior</td>
<td>Total number target population charts reviewed</td>
</tr>
</tbody>
</table>
Figure H. 4 - Image of POC follow-up visit chart review tool.
**POC Data Collection**

**Follow up POC Visit Summary Sheet**

**Data Collection Month**  
**Provider**

**Instructions** Using the individual POC follow up office visits monthly chart review tool, for each question:

- Tally up the number of charts that met or did not meet the specified criteria
- Simply enter the number of charts that met the specified criteria in the numerator box
- Total the Yes and No responses and enter that into the denominator box
- Enter the numerator and denominator into the data infrastructure space for each clinician

<table>
<thead>
<tr>
<th>QUESTION FROM CHART REVIEW SHEET</th>
<th>Numerator = total # of yes</th>
<th>Denominator = total # of yes &amp; no</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Was BMI percentile of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>2. Was overweight diagnosis (for children with BMI percentile between the 85th and 95th percentile) of overweight/obese children ages 2-11 years old documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>3. Was obesity diagnosis (for children with BMI percentile greater than the 95th percentile) of overweight/obese children ages 2-11 years old documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>4. Was BP of overweight/obese children ages 2-11 years of age measured and documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>5. Was BP category of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>6. Were obesity-related co-morbidities of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>7. Was family readiness to make change of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td>8. Was counseling for nutrition of overweight/obese children ages 2-11 years of age documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
<tr>
<td>9. Was counseling for physical activity or sedentary behaviors at of overweight/obese children ages 2-11 years documented?</td>
<td># of Yes ______</td>
<td># of No ______</td>
</tr>
<tr>
<td></td>
<td># of NA ______</td>
<td></td>
</tr>
</tbody>
</table>

**Figure H. 5 - Image of POC follow-up visit summary sheet.**
Appendix I: Office Systems Inventory

This Office Systems Inventory (OSI) will help your practice assess the office systems in place so that every child receives appropriate preventive care, evaluation, and treatment for pediatric overweight and obesity. This tool will help you determine the degree to which systems exist in your practice to support the key drivers as described in our charter:

1. Efficient Clinical processes for care delivery
2. Informed, engaged and activated patients and families
3. Culturally effective counseling on nutrition and activity

This survey will help us to understand the systems you currently have in place for these drivers. This will help us plan activities for the collaborative as a whole. We want to learn what different sites are doing; we do NOT expect that all of these systems will be in place at any one site. We will request you take the inventory again at the end of the project.

Completing the system inventory:

Who: The OSI should be completed by your Practice Improvement team. It is important to involve your team members including your lead clinician, lead nurse, office administrator, and one or two other clinicians and staff in order to get complete information. Complete the Office Systems Inventory as a team. Each team member could complete the paper form; your team can discuss all answers as a group and then submit your final answers online.

When: Please complete the OSI by January 16, 2012. We will also ask you to complete this at the end of the collaborative to determine the extent to which you were able to implement the collaborative changes.

How: For each specific change listed in the four areas of the OSI, please check off each process that your practice currently has in place.

The purpose of this tool is to help a practice team assess the office systems in place in your practice that so that every child receives appropriate preventive care, evaluation, and treatment for pediatric overweight and obesity. It is recommended that the entire project team complete this tool together. The project team in each office may vary somewhat; it may include the lead project clinician, lead nurse, office administrator, and one or two other clinicians and staff. This tool will help you assess the degree to which systems exist in your practice in the following areas from our key driver diagram:
1.) Please check all that apply. Efficient Clinical Processes for care delivery.

☐ Our practice systematically assesses a child’s risk for overweight and obesity at all well-child visits for children over two years (e.g. nutrition and activity behaviors, BMI percentiles)
☐ For infants 0-2 yrs., our practice measures weight to length at all well-child visits
☐ Our practice calculates BMI percentiles on all children seen for well-child visits
☐ Our practice documents BMI percentiles in a specific place in the medical record (e.g. flow sheet, template electronic health record)
☐ Our practice documents a diagnosis of overweight or obese when a child is identified with a BMI greater than the 85th or 95th percentile, respectively
☐ Our practice takes and records a child’s blood pressure at all well-child visits
☐ Our practice interprets a child’s blood pressure at all well-child visits
☐ Our practice has a specific place in the medical record to document discussions on a child’s obesity related health risk (nutrition and physical activity, family history, laboratory values, obesity related co-morbidities)
☐ Our practice has a specific place in the medical record to document discussions on a child’s weight management counseling (nutrition and physical activity discussions, goal setting, changes in laboratory values)
☐ Our practice has a patient registry to monitor outcomes of overweight and obese patients as they receive counseling on weight management

2.) Please check all that apply. Informed, engaged, and activated patients and families:

☐ Our practice has a tool/survey to capture changes in a child’s physical activity and nutrition related behaviors.
☐ Our practice assesses the child’s current eating behaviors at all well-child visits
☐ Our practice assesses current physical activity behaviors at all well-child visits.
☐ Our practice assesses the child’s family history for obesity related health risks.
☐ Our practice utilizes readiness assessments (e.g. readiness rulers) with children and families who are overweight or obese to determine whether families are ready to address change in eating and/or physical activity behaviors
☐ The providers in our practice routinely use open-ended questions (or reflective statements when we discuss behavior change with children and families
☐ All the providers in our practice are comfortable using effective family-centered techniques (e.g. family and self management support, motivational interviewing)
☐ Our practice engages children and families to select their own approach to healthy nutrition and activity habits.
☐ Our practice emphasizes family lifestyle changes and family health improvement when counseling children and families about overweight and obesity
☐ If a child is overweight or obese and the family is ready to address behavior change, our practice sets and documents goals with the child and family
☐ Our practice utilizes strategies to address cultural differences of our patient population
☐ Our practice schedules office visits to follow up on weight management outcomes

3.) Please select all that apply Culturally Effective counseling on nutrition and physical activity.

☐ Our practice has educational materials available in waiting room/exam rooms that address pediatric overweight/obesity

210
- Our practice has educational materials in both English and Spanish that address pediatric overweight/obesity.
- Our practice uses an obesity risk assessment (e.g. 5-2-1-0, Ounce of Prevention) that is incorporated into all well child visits.
- Our practice provides a community resource list (e.g. healthy eating, physical activity programs) to families.
- Our practice provides obesity prevention materials (e.g. nutrition, activity, other) at all well-child visits.
- Our practice makes referrals to specialty care when needed (nutritionist/dietician, mental health, weight management center).
- Someone in our practice is responsible for regularly updating the practice’s resource information regarding overweight and obesity resources (e.g., checking contact information for specialty referral or nutritional consultation).
- The materials we use for referrals relating to overweight and obesity are organized and accessible to all staff in the practice.
- Our practice utilizes a referral tracking system (e.g. registry or log that notes which children have been referred, to what clinicians or agencies, and whether follow up has been received).
- To coordinate referrals with community agencies or specialists, we currently use a standardized referral form or have a standard way to communicate written information about patients we refer.
- To coordinate referrals with community agencies or specialists, we currently have a standard way to request written information back from the referral agency (e.g., non-carbon forms).
Appendix J: Monthly Practice Narrative Questions

January Narrative
1. What is your practice’s payor breakdown? OR What is your practice’s pediatric patient payor breakdown?
2. Please provide us with an idea of the ethnic and language breakdown of your patient population.
3. Please rank the topics, listed below, in terms of importance for addressing, to aid your practice in successfully implementing the Pound of Cure materials within your practice. (Rank from 1-5 with 1 being the most important and 5 being the least important)
4. If you chose nutrition, what specific nutrition questions do you have or what topics would you like addressed?
5. List and briefly describe any Pound of Cure tools your team tested this month. Write "NA" if none were tested.
6. List and briefly describe any system or process changes your team tested this month. Write "NA" if no changes occurred.
7. What, if any, new changes do you plan to test next month?
8. Please describe any barriers you encountered this month and discuss how you overcame them.
9. Please share any of your successes so far during this collaborative (during a patient encounter, improving office flow, etc).
10. Please list any other things that you would like help with. Write "NA" if you don’t require any additional help.
11. Please list any supplemental materials you would like for the Pound of Cure counseling package.
12. Do you have any other suggestions for monthly Action Period phone calls or listserv discussion?
13. Is there anything else you would like to report?

February Narrative
1. How many times did your team meet during the month of February?
2. List and briefly describe any Pound of Cure tools your team tested this month.
3. List and briefly describe any system or process changes your team tested this month.
4. What, if any, new changes do you plan to test next month?
5. Please describe any barriers you encountered this month and discuss how you overcame them.
6. Please share any of your successes so far during this collaborative (during a patient encounter, improving office flow, etc).
7. Please describe what your practice has experienced while enrolling patients into the Pound of Cure Program.
8. Please describe what you have experienced while working with Pound of Cure patients during initial office visits.
9. Please describe what you have experienced while working with Pound of Cure patients during follow up office visits.
10. Please list any other things that you would like help with.
11. Please list any supplemental materials you would like for the Pound of Cure counseling package.
12. Is there anything else you would like to report?
March Narrative
1. How many times did your team meet during the month of March?
2. Does your practice measure height with a:
3. How often is your weight scale calibrated?
4. What is the make and model of your weight scale?
5. How does your office calculate the BMI?
6. List and briefly describe any system or process changes your team tested this month.
7. Please describe any barriers you encountered this month and discuss how you overcame them.
8. Please share any of your successes so far during this collaborative (during a patient encounter, improving office flow, etc).
9. What does a typical initial visit POC discussion entail?
10. How do you decide what topics to first discuss with patients?
11. Please describe what you have experienced while working with Pound of Cure patients during follow up office visits.
12. How do you use POC materials during a counseling encounter (initial and follow up visits)?
13. If you feel that incentives for patients and families would be beneficial, what would be an ideal form for incentives?
14. Please list any other things that you would like help with.
15. Please list any supplemental materials you would like for the Pound of Cure counseling package.
16. Are there any specific nutrition-related topics you would like discussed on April's Action Period Phone Call?
17. Is there anything else you would like to report?

April Narrative
1. How many times did your team meet during the month of March?
2. Please choose what best describes your teams preferences should these options have been available.
3. Are there any specific physical activity-related topics you would like discussed on May’s Action Period Phone Call?
4. List and briefly describe any system or process changes your team tested this month.
5. Please describe any barriers you encountered this month and discuss how you overcame them.
6. What billing and coding issues has your team encountered?
7. Please share any of your successes so far during this collaborative (during a patient encounter, improving office flow, etc).
8. How does your team monitor and track attendance at POC initial and follow up visits?
9. Please describe what you have experienced while working with Pound of Cure patients during follow up office visits.
10. Have you done any inquiry as to why families are not returning to follow up visits? What did this inquiry include (timing between visits, insurance difficulties, etc.)?
11. Why do you feel that families are not returning to follow up visits?
12. Please list any other things that you would like help with.
13. Please list any supplemental materials you would like for the Pound of Cure counseling package.

May Narrative
1. How many times did your team meet during the month of May?
2. Where do you feel that your team has made the biggest impact since the start of the collaborative?
3. What will your team do to sustain the changes that you've already made?
4. Do you plan to participate in wave two of the Pound of Cure learning collaborative? If no, please skip to question 10.
5. If you answered yes to question 5: Would your team be interested in mentoring a team new to the Pound of Cure collaborative during wave two?

6. If you answered yes to question 5: What does your team feel would be beneficial to new practices that are participating in wave two (comments, suggestions as we plan our agenda for the learning session)?

7. If you answered yes to question 5: What does your team expect to get out of the wave two learning session?

8. If you answered yes to question 5: Do you anticipate changes in your core team for wave two? If so, what type of changes?

9. Please rate the following experiences and services of the Pound of Cure Learning Collaborative.

10. Finally, we would like you to evaluate your team’s performance using this scale. We realize that outcomes such as change in BMI percentile and weight require more time so we would like you to focus on the measures collected during chart reviews, integration of POC into your practice, system changes, etc. Please briefly justify your score.

Score

Definition

a. 0.5 - Intent to Participate -- Team has signed up to participate in the collaborative

b. 1.0 - Forming team -- Team has been formed; target population identified; aim determined, information gathering, and baseline measurement begun.

c. 1.5 - Planning for the project has begun -- The team has studied the QI/change framework for the collaborative. Team is meeting, discussions are occurring. The team’s aim and measures are consistent with the charter for the collaborative.

d. 2.0 - Activity, but no changes--Initial plans for the project have been made. Team actively engaged in development, information gathering, data collection, and discussions, but no changes have been tested. Simply just reporting data.

e. 2.5 - Changes tested, but no improvement -- Changes are being tested, in all well child and overweight/obese 2-11 age groups, but no improvement in process measures has been noted. Data on key measures are reported and tests are connected to the change package.

f. 3.0 - Modest improvement -- Initial test cycles have been completed in both well child and overweight/obese 2-11 age groups and implementation begun this groups as well. Evidence of moderate improvement in process measures.

g. 3.5 - Improvement--Process measures continuing to improve, PDSA test cycles on well child and overweight/obese 2-11 age groups have been completed, changes implemented for these two groups.

h. 4.0 - Significant improvement -- Most components of the change package are implemented for well child and overweight/obese 2-11 age groups. There is evidence of breakthrough improvement in all measures to goal levels with the team close to accomplishing goal for all age groups. Plans for spread, to all providers re in place.
Appendix K: Family Feedback Form

We have a few questions about your office visit. When you are done, please turn this in to the nurse or the front desk.

Did you have to wait to see your doctor today? □ YES □ NO   If yes, how long? _____ minutes

Did you have to wait  □ Too short □ About Right □ Too Long  between appointments?

How would you rate the amount of time you spent with the doctor during your visit today?
□ Too short   □ About Right   □ Too Long

Please check all topics that the doctor talked to you about:
□ Your child’s BMI (body mass index)   □ Your child’s Physical Activity History
□ Your child’s Family History   □ Progress on Goals set at last office visit
□ Your child’s Diet History

Which habits did the doctor talk to you about? (Please check all that apply)
□ Have breakfast everyday
□ Eat more fruits and veggies
□ Eat more family meals
□ Eat less fast food
□ Be active for 60 minutes a day
□ Watch 2 or less hours of TV
□ Drink fewer sugary beverages
□ Establish a sleep routine
□ Serve child friendly portions
□ Serve 100% juice in child friendly portions
□ Eat calcium rich foods
□ Make healthy snacks
Did the doctor tell you information specific to your child’s needs? □ YES □ NO

Did you find this visit with the doctor helpful? □ YES □ NO

Did the doctor answer all your questions? □ YES □ NO

Did the doctor say anything that was hard to understand? □ YES □ NO

How many handouts did you receive? ______

Was this: □ too few handouts □ about the right number of handouts □ too many handouts?

Did the doctor explain each handout? □ NO □ SOME of it □ ALL of it

Did you set any goals for your child to work on for the next office visit? □ YES □ NO

If yes, how many goals? ______

Who set the goals? □ Just the doctor □ Just you □ Both you and the doctor □ N/A

Do you think that the handouts will help with your goals? □ YES □ NO □ N/A
Appendix L: Closing Interview Questions

1. Please describe your overall feelings, thoughts, etc. on the Pound of Cure package and learning collaborative?

2. What did you like about the POC learning collaborative? About the POC materials and counseling strategy?

3. What didn’t you like about the POC learning collaborative? About the POC materials and counseling strategy?

4. What types of resources should be added to the POC package and learning collaborative on counseling and promoting behavior change in families?

5. How was your time designated for each component of the POC learning collaborative? Counseling during initial and follow up visits, chart reviews, data entry, surveys? Other areas?

6. How did you approach identification and “recruitment” of POC children and families? Any advice for those who are beginning this process?

7. Please describe how the POC learning collaborative influenced your confidence to counsel on management of childhood obesity and promoting behavior change in families.

8. How would you like to improve upon your counseling skills around management of childhood obesity? What additional resources should we provide you?

9. What about the POC learning collaborative helped you make changes in your practice about childhood obesity?
Appendix M: Follow-up visit Run Charts

![Figure M. 1 - Run chart on weight status measures for follow-up visits.](image-url)
Figure M. 2 - Run chart on blood pressure and comorbid measures for follow-up visits.

Figure M. 3 - Run chart on counseling measures for follow-up visits.