Comparative Effectiveness of Childhood Obesity Interventions in Pediatric Primary Care: A Cluster-Randomized Clinical Trial

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**IMPORTANCE** Evidence of effective treatment of childhood obesity in primary care settings is limited.

**OBJECTIVE** To examine the extent to which computerized clinical decision support (CDS) delivered to pediatric clinicians at the point of care of obese children, with or without individualized family coaching, improved body mass index (BMI; calculated as weight in kilograms divided by height in meters squared) and quality of care.

**DESIGN, SETTING, AND PARTICIPANTS** We conducted a cluster-randomized, 3-arm clinical trial. We enrolled 549 children aged 6 to 12 years with a BMI at the 95% percentile or higher from 14 primary care practices in Massachusetts from October 1, 2011, through June 30, 2012. Patients were followed up for 1 year (last follow-up, August 30, 2013). In intent-to-treat analyses, we used linear mixed-effects models to account for clustering by practice and within each person.

**INTERVENTIONS** In 5 practices randomized to CDS, pediatric clinicians received decision support on obesity management, and patients and their families received an intervention for self-guided behavior change. In 5 practices randomized to CDS + coaching, decision support was augmented by individualized family coaching. The remaining 4 practices were randomized to usual care.

**MAIN OUTCOMES AND MEASURES** Smaller age-associated change in BMI and the Healthcare Effectiveness Data and Information Set (HEDIS) performance measures for obesity during the 1-year follow-up.

**RESULTS** At baseline, mean (SD) patient age and BMI were 9.8 (1.9) years and 25.8 (4.3), respectively. At 1 year, we obtained BMI from 518 children (94.4%) and HEDIS measures from 491 visits (89.4%). The 3 randomization arms had different effects on BMI over time (P = .04). Compared with the usual care arm, BMI increased less in children in the CDS arm during 1 year (−0.51 [95% CI, −0.91 to −0.11]). The CDS + coaching arm had a smaller magnitude of effect (−0.34 [95% CI, −0.75 to 0.07]). We found substantially greater achievement of childhood obesity HEDIS measures in the CDS arm (adjusted odds ratio, 2.28 [95% CI, 1.15–4.53]) and CDS + coaching arm (adjusted odds ratio, 2.60 [95% CI, 1.25–5.41]) and higher use of HEDIS codes for nutrition or physical activity counseling (CDS arm, 45%; CDS + coaching arm, 25%; P < .001 compared with usual care arm).

**CONCLUSIONS AND RELEVANCE** An intervention that included computerized CDS for pediatric clinicians and support for self-guided behavior change for families resulted in improved childhood BMI. Both interventions improved the quality of care for childhood obesity.

**TRIAL REGISTRATION** clinicaltrials.gov Identifier: NCT01537510

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The prevalence of childhood obesity in the United States remains at historically high levels. Community and environmental approaches can be effective in preventing obesity and bridging the relatively small childhood energy gap to meet the Healthy People 2020 childhood obesity goal.2 However, far greater energy deficits will be necessary to achieve improvements in body mass index (BMI) (calculated as weight in kilograms divided by height in meters squared) among children and adolescents who are already obese. Thus, seeking cost-effective, scalable clinical approaches for obesity reduction in children is a public health priority.

Expert committee guidelines3 and systematic reviews provide the basis for effective childhood obesity screening and management strategies in pediatric primary care and support comprehensive behavioral interventions to improve BMI.4,5 In addition, to improve quality of care for children with obesity, new nationally standardized performance measures (Healthcare Effectiveness Data and Information Set [HEDIS]) that focused on improving obesity screening and counseling practices within pediatric primary care were released in 2010.6

Despite the availability of obesity management guidelines, interventions to improve BMI in children have not proved effective in the context of primary care,7-9 and pediatric clinicians have been slow to adopt recommended screening and management practices.10 An important barrier to improving obesity management has been the lack of robust clinical information systems to improve the quality of care. The use of electronic health records offers the potential for improving the quality of care for obese children and for accelerating the use of evidence on obesity screening and management practices by primary care clinicians. Electronic health records also hold promise for establishing treatment benchmarks and for supporting patients and their clinical teams in care improvement.11,12

Incorporating point-of-care health information technology may be especially effective if augmented by outreach to parents and children.13-14 Telephone support has been used to deliver motivational interviewing and brief focused negotiation to effect behavior change.15,16 Mobile technology strategies, such as text messaging, have been used to provide outreach and support for behavior change to parents and adolescents.17,18 Systematic reviews of interactive telephone or text message interventions for obesity found few studies with only modest intervention effects but concluded that electronic approaches appeared to be promising.18,19

This article reports the main outcomes of a trial examining the extent to which an intervention using clinical decision support (CDS) delivered to pediatric clinicians at the point of care of obese children, with or without individualized family coaching, improved children’s BMI and the quality of care for childhood obesity. We hypothesized that children assigned to both active intervention groups would have a smaller age-associated increase in BMI and improved quality of care during a 1-year period than those in a usual care group. We further hypothesized that children in the CDS group who received individualized family coaching would achieve greater BMI improvements than those in the group who received CDS alone.

At a Glance
- In this cluster-randomized clinical trial on obesity management, pediatricians received clinical decision support and families received individualized coaching or a self-guided behavior change intervention.
- Both interventions improved the child’s BMI compared with usual care.
- The greatest improvements in BMI were among those patients who received both interventions and had the highest fidelity to the intervention protocol.
- Both interventions substantially improved the quality of care for childhood obesity.
- These interventions may represent sustainable, high-reach approaches for accelerating adoption of comparative effectiveness evidence for childhood obesity.

Methods

Study Overview
The Study of Technology to Accelerate Research (STAR) investigation was a cluster-randomized clinical trial conducted within 14 pediatric offices of Harvard Vanguard Medical Associates, a multispecialty group practice in Massachusetts. The STAR study design, eligibility, and recruitment have been described in detail; the trial protocol is found in Supplement 1.20 We randomly assigned each practice to 1 of 3 study arms (Figure). In 5 practices, clinicians received computerized CDS on obesity management, and patients and their families received an intervention supporting self-guided behavior change. In 5 additional practices, we augmented CDS with individualized family coaching (CDS + coaching). Four control practices received usual care. The primary outcomes included improvements in BMI and quality of care during the 1-year intervention period.

Randomization
We created 5 strata from the 14 practices based on patient volume. A blinded biostatistician (K.P.K.) used a pseudorandom number generator to assign practices within each stratum to 1 of the 2 intervention arms or to the control arm.

Eligibility and Recruitment
Children’s eligibility criteria for the STAR trial included 6.0 to 12.9 years of age, BMI at the 95th percentile or greater for age and sex, and receipt of well-child care at Harvard Vanguard Medical Associates within the 15 months before enrollment. Recruitment occurred from October 1, 2011, through June 30, 2012. After receiving permission from the pediatric clinicians to contact eligible patients, blinded research assistants called the families and established eligibility, obtained verbal consent, and completed a questionnaire by telephone. We obtained written informed consent from the parents via mail. All study activities were approved by the institutional review board at Harvard Pilgrim Health Care, Boston, Massachusetts.
## Intervention

### Computerized CDS System

In the 10 practices randomized to the 2 intervention arms (CDS and CDS + coaching), we modified the existing electronic health record to deploy a computerized, point-of-care CDS alert to pediatric clinicians at the time of a well-child visit for a child with a BMI at the 95th percentile or greater. The alert contained links to growth charts, evidence-based childhood obesity screening and management guidelines, and a prepopulated standardized note template specific for obesity that included options for (1) documenting and coding for the BMI percentile, (2) documenting and coding for nutrition and physical activity counseling, (3) placing referrals for weight management programs, (4) placing orders for laboratory studies if appropriate, and (5) printing educational materials. In these 10 practices, we also trained the clinicians to use brief motivational interviewing to negotiate a follow-up weight management plan with the patient and their family. These training sessions were conducted in person at each of the 10 sites during regularly scheduled clinical meetings and were led by expert faculty (E.M.T. and R.M.) and information technology specialists.

### Educational Materials and Intervention for Self-Guided Behavior Change for Families

To augment the clinical intervention and to support families in behavior change, we developed a comprehensive set of educational materials for pediatric clinicians to provide to their patients at well-child and follow-up visits that focused on individual- and family-level behaviors (eFigure in Supplement 2). These behaviors included (1) decreases in screen time, (2) decreases in consumption of sugar-sweetened beverages, (3) increases in moderate and vigorous physical activity, and (4) improvement of sleep duration and quality. Families in the CDS arm also received 4 newsletters throughout the intervention period encouraging self-guided behavior change.

### Individualized Family Coaching

In the CDS + coaching intervention arm, families were assigned a health coach who used motivational interviewing to support families by telephone at 1, 3, 6, and 9 months. Parents were also invited to participate in an interactive text message program. Any parent who chose not to receive texts had the option to receive the same messages by email. Texts received twice weekly during the 1-year follow-up provided support for behavior change for the patient and their family. A previous STAR investigation described the procedures and content of the text message program.

### Usual Care

Participants at practices randomized to the control arm received the current standard of care offered by their pediatric office. No new decision support tools for obesity were made available in the electronic health records of the 4 usual care practices.
Outcome Measures and Timing of Data Collection
We ascertained the main outcome measures for this study—BMI and quality of care—using the child’s electronic health record from well-child visits. We obtained BMI at the initial and 1-year follow-up visits. We obtained HEDIS measures at the preintervention (≤1 year before the initial study visit) and the 1-year follow-up visits for study participants.

In routine practice standardized across all 14 study sites, medical assistants measured the children’s weight without shoes using electronic calibrated scales and measured the children’s height using a stadiometer. We calculated BMI and age- and sex-specific BMI z scores.22 To define quality of care for obesity, we used HEDIS measures of International Classification of Diseases, Ninth Revision diagnostic coding for BMI percentile and counseling for nutrition or physical activity.6 Visit records that contained specific use of each diagnostic code were considered to have met the HEDIS requirements.

Other Measures
We used questionnaires before the initial visit and at 1 year to obtain the parent’s height and weight, from which we calculated their BMI. Parents also reported their educational attainment level, marital status, annual household income, country of birth, and the child’s race/ethnicity. To assess parents’ acceptance of and satisfaction with the intervention components, we asked parents in the intervention group to rate how satisfied they were with the program and whether they would recommend the program to their family or friends.

Statistical Analysis
Analysis was performed from October 2013 through January 2014. We used a cluster-randomized design in which we randomized clinics and measured outcomes of individual children. In intent-to-treat analyses, we assessed BMI and BMI z scores using linear mixed-effects models to account for clus-
tering by practice and within each person. To assess quality of care, we used logistic, generalized, linear mixed-effects models predicting documentation of HEDIS codes for BMI percentile. Our models for each outcome included a term for time (pre-intervention or initial study visit vs 1-year follow-up visit), intervention arm (CDS, CDS + coaching, or usual care), and the interaction (time × arm). The interaction term reflects the overall effect of the intervention, that is, whether the intervention arms were affected differently than the usual care arm. We present unadjusted and adjusted multivariate regression estimates. Adjusted models accounted for child age and sex and for covariates that were unbalanced across intervention arms at baseline. At the preintervention visit and the 1-year follow-up visit for the usual care arm, no participants in the study had documentation of HEDIS counseling codes for nutrition or physical activity, so the model above could not be fit. Instead, we calculated the crude percentage of HEDIS documentation for nutrition or physical activity counseling and the Fisher exact test P value for arm by time. All analyses were performed using commercially available software (SAS, version 9.3; SAS Institute).

Table 2. Changes in BMI and BMI z Score From Initial Study Visit to 1-Year Follow-up by Study Arm*

<table>
<thead>
<tr>
<th>Study Arm</th>
<th>BMI Outcome</th>
<th>Mean (SD)</th>
<th>Mean Change</th>
<th>β Value (95% CI)</th>
<th>P Value</th>
<th>Adjusted Difference</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial Study Visit</td>
<td>1-y Follow-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDS</td>
<td>25.6 (4.5)</td>
<td>26.3 (4.6)</td>
<td>0.7</td>
<td>−0.48 (−0.88 to −0.08)</td>
<td>&lt;.001</td>
<td>−0.51 (−0.91 to −0.11)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CDS + coaching</td>
<td>26.0 (4.2)</td>
<td>26.8 (4.6)</td>
<td>0.9</td>
<td>−0.32 (−0.73 to 0.09)</td>
<td>.04*</td>
<td>−0.34 (−0.75 to 0.07)</td>
<td>.04*</td>
</tr>
<tr>
<td>Usual care</td>
<td>25.7 (4.2)</td>
<td>26.9 (4.6)</td>
<td>1.2</td>
<td>0.0 [Reference]</td>
<td></td>
<td>0.0 [Reference]</td>
<td></td>
</tr>
<tr>
<td>CDS vs CDS + coaching</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>−0.17 (−0.57 to 0.24)</td>
<td>.42*</td>
<td>−0.17 (−0.58 to 0.23)</td>
<td>.40*</td>
</tr>
</tbody>
</table>

BMI z score, U

<table>
<thead>
<tr>
<th>Study Arm</th>
<th>Unadjusted Prevalence, % (95%CI)</th>
<th>Change, %</th>
<th>OR (95%CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDS</td>
<td>45 (28-62)</td>
<td>24</td>
<td>2.28 (1.16-4.52)</td>
<td>.02b</td>
</tr>
<tr>
<td>CDS + coaching</td>
<td>64 (46-78)</td>
<td>21</td>
<td>2.56 (1.24-5.28)</td>
<td>.03a</td>
</tr>
<tr>
<td>Usual care</td>
<td>65 (46-80)</td>
<td>4</td>
<td>1 [Reference]</td>
<td></td>
</tr>
<tr>
<td>CDS vs CDS + coaching</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>−0.02 (−0.06 to 0.03)</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); CDS, clinical decision support; NA, not applicable.
*a Includes 549 patients randomized to 1 of 3 study arms. Study arms are described in the Intervention and the Usual Care subsections of the Methods section. 
*b Indicates generalized linear mixed-effects model analysis with all models corrected for clustering by practice and correlation within individual patients.
*c Adjusted for parent age and country of birth and child race/ethnicity, sex, and age at visit.
*d Indicates intervention arm vs usual care.
*e Type 3 overall P value evaluates equality of effects across interventions as obtained from the time × arm interaction term.
*f Indicates CDS vs CDS + coaching arms.

ting by practice and within each person. To assess quality of care, we used logistic, generalized, linear mixed-effects models predicting documentation of HEDIS codes for BMI percentile. Our models for each outcome included a term for time (pre-intervention or initial study visit vs 1-year follow-up visit), intervention arm (CDS, CDS + coaching, or usual care), and the interaction (time × arm). The interaction term reflects the overall effect of the intervention, that is, whether the intervention arms were affected differently than the usual care arm. We present unadjusted and adjusted multivariate regression estimates. Adjusted models accounted for child age and sex and for covariates that were unbalanced across intervention arms at baseline. At the preintervention visit and the 1-year follow-up visit for the usual care arm, no participants in the study had documentation of HEDIS counseling codes for nutrition or physical activity, so the model above could not be fit. Instead, we calculated the crude percentage of HEDIS documentation for nutrition or physical activity counseling and the Fisher exact test P value for arm by time. All analyses were performed using commercially available software (SAS, version 9.3; SAS Institute).

Results

Baseline Characteristics

We assessed eligibility among 2242 patients from 14 pediatric practices and contacted 1338 who had a scheduled visit within the study time frame (Figure). We did not attempt to contact the 908 children who had a visit outside our recruitment period. We enrolled 194 children in the CDS arm, 171 in the CDS + coaching arm, and 184 in the usual care arm. Overall,
Table 4. Parents’ Perceptions of the Feasibility and Acceptability of the STAR Interventions*

<table>
<thead>
<tr>
<th>Parent Perception</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feasibility and Acceptability Measures in Both Interventions (n = 355)</strong></td>
<td></td>
</tr>
<tr>
<td>Parent very satisfied with experience in STAR Intervention</td>
<td></td>
</tr>
<tr>
<td>CDS arm</td>
<td>46.9</td>
</tr>
<tr>
<td>CDS + coaching arm</td>
<td>81.3</td>
</tr>
<tr>
<td>Increased satisfaction with health care system</td>
<td></td>
</tr>
<tr>
<td>CDS arm</td>
<td>47.9</td>
</tr>
<tr>
<td>CDS + coaching arm</td>
<td>62.7</td>
</tr>
<tr>
<td>Would recommend STAR to friends and family</td>
<td></td>
</tr>
<tr>
<td>CDS arm</td>
<td>85.1</td>
</tr>
<tr>
<td>CDS + coaching arm</td>
<td>94.0</td>
</tr>
<tr>
<td><strong>Feasibility and Acceptability Measures in CDS + Coaching Arm (n = 171)</strong></td>
<td></td>
</tr>
<tr>
<td>Telephone calls with health coach</td>
<td></td>
</tr>
<tr>
<td>Participated, %</td>
<td>94.4</td>
</tr>
<tr>
<td>Very satisfied with the counseling received, %</td>
<td>87.1</td>
</tr>
<tr>
<td>Very good/excellent quality of advice provided, %</td>
<td>73.7</td>
</tr>
<tr>
<td>Text message or email from health coach</td>
<td></td>
</tr>
<tr>
<td>Received, %</td>
<td>92.6</td>
</tr>
<tr>
<td>Very satisfied with the content received, %</td>
<td>68.8</td>
</tr>
<tr>
<td>Very good/excellent quality of advice received, %</td>
<td>55.1</td>
</tr>
</tbody>
</table>

Abbreviations: CDS, clinical decision support; STAR, Study of Technology to Accelerate Research.
* Includes 194 parents in the CDS arm and 171 parents in the CDS + coaching arm. Intervention arms are described in the Intervention subsection of the Methods section.

Discussion

In this primary care–based, cluster-randomized clinical trial, we found that an intervention that included computerized point-of-care CDS for pediatric clinicians and an intervention for self-guided behavior change for patients and their families resulted in improvements in children’s BMI. The magnitude of change was a reduction of about 0.5 BMI U or 0.06 SDs (z score) compared with usual care. Children in the intervention arm whose parents received individualized health coaching showed slightly less improvement in BMI (about 0.3 BMI U), but the effect was not statistically significant by conventional standards. In subset analyses, the greatest improvements in BMI, relative to the usual care arm, were among participants in the CDS + coaching arm with the highest fidelity to the intervention protocol. Both interventions substantially improved quality of care for childhood obesity. The educational materials and coaching components of the intervention were highly rated by parents, although overall satisfaction was higher among the group that received individualized coaching.

Our findings lend support to a growing body of evidence that computerized CDS tools can improve clinician performance and

2 patients could not be contacted at the 1-year follow-up. At 1 year, patients could contribute outcome data on BMI, HEDIS measures, and/or questionnaire data, and we obtained BMI from 518 children (94.4%) and HEDIS measures from 491 visits (89.4%). Table 1 shows characteristics of the study sample. At the initial study visit, a higher proportion of children in practices randomized to the CDS + coaching and usual care arms were racial/ethnic minorities and had a parent who was born outside the United States. We found no other substantial group differences in sample characteristics.

Main Outcomes

Table 2 shows participants’ BMI at the initial study visit and 1-year follow-up by study arm (last follow-up, August 30, 2013). In adjusted models, the arms were shown to have different effects on BMI ($P = .04$) and BMI z score ($P = .02$) over time. Compared with the usual care arm, children in the CDS arm had a smaller mean change in BMI (−0.51 [95% CI, −0.91 to −0.11]) and BMI z score (−0.06 [95% CI, −0.11 to −0.02]) compared with the usual care arm. Children in the CDS + coaching arm also had a smaller mean change in BMI (−0.34) and BMI z score (−0.05) compared with the usual care arm, although the 95% CIs for these effects included 0 by a small margin. Although we observed slightly better BMI and BMI z score outcomes in the CDS arm compared with the CDS + coaching arm, the 95% CIs overlapped 0 by wide margins, and we found no significant differences in the effect sizes between the 2 intervention arms. At 1 year, we found no differences among the study arms in follow-up visits for weight management.

Table 3 shows intervention results for HEDIS performance measures for childhood obesity. Compared with the usual care arm, we observed substantially greater use of HEDIS codes for documenting BMI percentile among participants in the CDS (adjusted odds ratio [OR], 2.28 [95% CI, 1.15–4.53]) and CDS + coaching (adjusted OR, 2.60 [95% CI, 1.25–5.41]) arms. In addition, compared with the usual care arm, we observed greater use of HEDIS codes for nutrition or physical activity counseling in the CDS (45%) and CDS + coaching (25%) arms (vs 0% in usual care; $P < .001$).

Intervention Fidelity

We aimed for participants in the CDS + coaching arm to complete all 4 telephone calls with the health coach and participate in the text message or email program. Among the 171 participants in the CDS + coaching arm, 116 (67.8%) completed all of these activities and were categorized as having high fidelity to the intervention protocol; 55 (32.2%) did not complete all of these activities and were categorized as having low fidelity. Compared with participants in the usual care arm, high-fidelity participants in the CDS + coaching arm had the greatest improvements in BMI (−0.53 [95% CI, −1.01 to −0.04]). Compared with the participants in the usual care arm, low-fidelity participants in the CDS + coaching arm did not achieve improvements in their BMI (0.02 [95% CI, −0.61 to 0.65]).

Based on follow-up questions of the 365 intervention participants, 46.9% of participants in the CDS arm and 81.3% of participants in the CDS + coaching arm reported being very satisfied with the program (Table 4). Among participants in the CDS + coaching arm, telephone calls with the health coaches and the text message program were highly rated (87.1%).
Our study also extends the published literature by showing improvements in obesity-related quality of care and concurrent improvements in individual-level BMI. Our findings also support existing comparative effectiveness research evidence that behavioral interventions can improve BMI in children but are in contrast to several primary care–based interventions that have been found to be ineffective. The magnitudes of effect in our study also exceed the adjusted mean difference in BMI in other primary care–based interventions, including the LEAP (Live, Eat, and Play) (~0.20 at 9 months), LEAP-2 (~0.11 at 12 months), and HopSCOTCH (Shared-Care Obesity Trial in Children) (~0.10 at 12 months) trials.

The STAR interventions had several features that distinguished them from previous primary care–based interventions for obesity. First, we used a CDS system to guide pediatric clinicians on how to manage childhood obesity at the point of care. The use of a robust clinical information system and point-of-care support led to improved quality of care in our study and could have reduced pediatric clinician variation in obesity care. Second, our CDS intervention encouraged family self-management of their behavior changes, and our CDS + coaching intervention used individualized health coaching to support family behavior change. Previous interventions have relied heavily on primary care clinicians to deliver the bulk of interventions. Approaches that instead encourage self-guided behavior change by families or that utilize health coaches and other behaviorally trained members of the primary care team may be better suited to sustain the intensity required for effective behavior change. Third, we maximized the use of remote behavior change support using mailings, telephone contact, text messaging, or email. Previous interventions and treatment programs have required in-person consultations or visits to affect BMI and behavior change, and several programs have reported high attrition rates. Providing alternatives to in-person visits and flexibility of the methods used to deliver weight management care as we did in the STAR trial might have led to higher fidelity to the protocol and to improved outcomes. Such parent-centered principles have been proposed as important in the development of programs to treat obesity.

In a paradoxical outcome, we did not observe greater intervention effects among patients who received individual coaching. The number of coaching sessions or their frequency or content might have been insufficient to produce greater effects than the CDS and self-guided intervention. Future studies should determine what minimal amount of coaching is necessary to achieve improvement in childhood obesity interventions. Of note, while effects on BMI were not markedly greater among the group that received individualized counseling, parent satisfaction was. Thus, health care systems should consider these differences in parent-reported satisfaction as they consider which interventions to adopt.

Conclusions

We found that an intervention that leveraged efficient health information technology to provide CDS for pediatric clinicians and that provided an intervention for self-guided behavior change by families resulted in improvements in the children’s BMI. Clinical decision support in both STAR interventions led to improved quality of care for childhood obesity. Parents in the intervention arms also felt that participating in the STAR study increased their satisfaction with their health care services. The STAR interventions may represent sustainable high-reach approaches for accelerating adoption of comparative effectiveness evidence for childhood obesity, for improving quality of care for childhood obesity in pediatric primary care, and for effectively supporting patients and families in improving obesity-related behaviors.