A Quality Improvement Initiative Addressing Provider Prescription of Weight Management Follow-up in Primary Care
Roohi Y. Kharofa, MD, MPH*†; Robert M. Siegel, MD*†; John F. Morehous, MD†‡

Abstract
Introduction: Few providers routinely comply with the American Academy of Pediatrics recommendations to prescribe weight management follow-up in-between well-child checks for children with obesity/overweight. This quality improvement (QI) project aimed to increase the percentage of patients prescribed weight management follow-up within three months of their well-child check.

Methods: The project took place in 1 outpatient primary care clinic at a large, free-standing children’s hospital from May 2018 to April 2019. We grouped interventions in 4 Plan-Do-Study-Act ramps with the following themes: (1) provider education; (2) electronic health record note changes; (3) discharge order modifications; and (4) provider feedback. The primary outcome was the percent of patients ages 2–18 years with body mass index \( \geq 85\% \) that had an order placed to schedule a follow-up weight management appointment in primary care. We monitored attendance rates for scheduled follow-up visits as a balancing measure.

Results: Mean prescription rates increased from 32% at baseline to 58%, with special cause analysis demonstrating improvement. Of patients prescribed follow-up, 40% returned for a weight management visit, compared to 13% before the QI initiative. The no-show rate was 35%.

Conclusions: The utilization of QI methodology led to an increase in the percentage of patients appropriately prescribed weight management follow-up and a resultant increase in the number of patients seen for follow-up. The next steps include a re-examination of process failures to improve patient buy-in in follow-up prescriptions. (Pediatr Qual Saf 2021;00:e454; doi: 10.1097/pq9.0000000000000454; Published online 26 August, 2021.)

INTRODUCTION
Problem Description
Heightened efforts at prevention and intervention are crucial to reversing the childhood obesity epidemic.1 The American Academy of Pediatrics (AAP) recommends that primary care providers review body mass index (BMI) at every well-child check (WCC) and engage families in lifestyle modification counseling.2 Based on these national recommendations, our pediatric division created an algorithm to guide the assessment and management of overweight and obesity in 2012 (Fig. 1). The prescription of follow-up is an essential component of the treatment plan. It alerts families to the ongoing need to monitor the child’s health status, establishes a timepoint for goal setting, allows for a reassessment of anthropometric data, and provides additional time for counseling. Without prescribing follow-up, a provider may not see a child again for another year. Over that time, growth trajectories can accelerate significantly, especially in children six years of age and older, given the physiologic phenomenon of adiposity rebound.3 Thus, the lack of prescription of weight management follow-up at a WCC can be a missed opportunity to intervene.

Available Knowledge
Despite the availability of the Obesity Prevention/Intervention Algorithm (Fig. 1), few primary care providers within our health system comply with recommendations to prescribe weight management follow-up in-between WCCs. A past review of site-specific data revealed that providers appropriately prescribe...
follow-up to one-third of patients with an elevated BMI after a routine WCC. Provider-elicited barriers to pediatric weight management have been studied extensively. Common themes are established throughout the literature. Reported barriers include inadequate training and resources, low self-efficacy in guiding change, and lack of time. There are many topics that the AAP recommends covering at WCCs within the typical 15–20 minute appointment, which is challenging at baseline and more difficult if a child has underlying medical or socioeconomic issues. Providers are also deterred by perceived patient reactions to the sensitive topic of weight and the perception that patients/families lack the desire or motivation to make changes. When questioned, parents report that their reluctance centers around concern for their child’s mental health and fear of being blamed for their parenting choices. Parents also indicate that they lack confidence that their provider can effectively manage childhood obesity (ie, lack the necessary knowledge, time, and/or resources).

**Specific Aim**
The specific aim was to increase the percentage of patients, ages 2–18 years, with BMI ≥ 85% who have prescribed weight management follow-up within 3 months of their WCC from 32% to 75% over 6 months.

**METHODS**

**Context**
We completed this quality improvement (QI) work at an outpatient, community-based primary care clinic that is part of a large, free-standing children’s hospital. The hospital system uses Epic (Epic Systems Corporation, Verona, Wis.) as the electronic health record (EHR) for scheduling, clinical documentation, and order entry. The clinic has 10 primary care providers (7 physicians; 3 nurse practitioners). The clinic has over 6,000 patients and 14,000 visits annually. The population is approximately 47% white, 37% black, and 15% Hispanic, with 82% of patients insured by Medicaid. Our improvement team consisted of 3 general pediatricians, a nurse, a dietitian, the clinic manager, and one formal QI consultant with tertiary weight management expertise. As the team participated in a QI program through the associated children’s hospital, we also had access to expert consultants.

To prepare for the improvement work, 2 team members observed clinical visits from admission to discharge and created a process map. Process mapping revealed that when a provider prescribed follow-up, they communicated this follow-up to the discharging team member (ie, a nurse or medical assistant) through the EHR. The discharging team member would then either schedule the follow-up immediately (if family amenable and calendar open) or place a recall (per family request or

![Fig. 1. Obesity Prevention & Intervention Algorithm created to guide screening for elevated BMI, laboratory testing, and follow-up.](image-url)
We also reviewed some basic tenets of motivational interviewing to help guide plan creation, focusing on gauging confidence for specific changes and re-working plans when confidence was less than 7 (scale 0–10). The presentation concluded with a discussion of the Obesity Prevention & Intervention Algorithm (Fig. 1), the division-specific algorithm for prescribing follow-up, and what laboratories to order for a child based on BMI category and risk factors. The algorithm was subsequently printed in color and hung-up at each desk in the provider work area to serve as a reminder and provide immediate access.

During the initial education session, we sought feedback on the clarity and usefulness of the algorithm. Providers voiced that further instructions on how to interpret and manage screening laboratories would be helpful. After consultation with specialists in Endocrinology, Cardiology, and Gastroenterology, we created a second page to the algorithm, guiding interpretation and management for each of the recommended obesity-screening laboratories (not shown).

2. EHR note changes: Before the QI initiative, the WCC note templates included discharge instructions so that providers could document follow-up recommendations within the clinical chart. We modified the plan section of note templates to include a dropdown choice specifically for weight management follow-up in primary care. We embedded a second dropdown menu within the weight management follow-up choice to allow providers to easily indicate the time interval for follow-up (1, 2, 3 months or an asterisk to enter free text).

We also created a new note template for the follow-up weight management visit. Although what occurred at the follow-up visit was outside the scope of this initiative, we identified provider concern about lack of competency/comfort with providing follow-up care as a barrier to prescribing follow-up. Thus, to increase provider comfort and increase prescription rates for follow-up, the improvement team designed a new note template prompting the appropriate history, ROS, physical examination, and readiness to change, were deemed extremely important, they were outside the initiative's scope. The team only focused on altering provider prescribing behavior. As such, we did not include patient key drivers in the final key driver diagram.

Interventions

We executed interventions using Plan-Do-Study-Act (PDSA) cycles.15

1. Provider education: At baseline, providers could access the obesity prevention and intervention algorithm (Fig. 1) electronically on the hospital’s employee website, where it was located with a wide array of other resources for general pediatricians. Few providers reported actively using it to guide management. To inform providers of national and division-specific guidelines, we delivered a presentation to the site-specific medical providers at a monthly meeting. Eight of the 10 clinic providers were present. The 2 absent providers received the presentation on an alternate day during the same week. The presentation included the prevalence of childhood overweight and obesity, associated comorbidities, AAP evidence-based recommendations on prevention and intervention during WCCs, tactfully approaching BMI conversation with families, and data on the low baseline prescription rates.

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3. Modification of discharge order: A discharge order already existed within the order set for a WCC. The provider could indicate their recommendation for follow-up by selecting a dropdown menu choice (eg, “follow-up in 1 year for next WCC”) or by using free text. We added an option for the
patient to return for a weight management visit as
the menu choice directly below returning for the
next WCC. This phrase served both as a reminder
to the provider and a way to enter orders more effi-
ciently. Similar to the note changes, the instructions
included recommended time intervals or a free-text
choice.

4. Giving providers feedback: We started sending out
monthly provider updates about the group’s success
during month one. In the third month, providers
also started receiving individual updates regarding
their performance compared to the larger group.

Study of the Interventions
To establish a baseline for weight management prescrip-
tions, we looked at data for 6 weeks from the end of
May 2018 to the beginning of July 2018. The 6-month
intervention period began in July 2018 and ended in
December 2018. We monitored data for an additional 3
months after PDSA cycles ended (through March 2019)
to monitor sustainability. The institutional review board
associated with the clinic reviewed the study and decided
it was not human subjects research.

Measures
The primary outcome measure was the percentage of
patients, ages 2–18 years old, with BMI ≥ 85%, seen for a
WCC that received a prescription for follow-up for weight
management. The primary author (R.Y.K.) reviewed a
weekly, automated report from the EHR for all children
meeting inclusion criteria. The report included patient
name, date of birth, contact date, provider name, BMI
percentile, and the text within the discharge order. The
number of patients with BMI ≥ 85% that had an order to
schedule a follow-up appointment within 3 months of the
WCC was the numerator. The denominator was the total
patients meeting inclusion criteria for the week.

We monitored attendance rates for scheduled fol-
low-up visits as a balancing measure given the concern
that increased prescriptions for weight management fol-
low-up could lead to high no-show rates. We collected
data by performing a secondary EHR extraction to look
at scheduled visits and completed visits for patients pre-
scribed follow-up for weight management from July 2018
to December 2018. We monitored follow-up appoint-
ments through April 2019 to capture all patients seen for
follow-up up to 4 months from their index WCC visit.

Analysis
We plotted the outcome measure weekly on an annotated
control chart (p-chart). We counted no prescription or a
prescription with a follow-up time point longer than 3
months as failures, consistent with the clinic’s Obesity
Prevention & Intervention Algorithm. We analyzed data
using standard statistical process control methods. We
used special cause analysis to identify a change in per-
formance within the system, with 8 or more consecutive
points above or below the centerline used to cue a midline
shift in the control chart.15

Fig. 2. Key driver diagram. James M. Anderson Center for Health Systems Excellence. LOR#, level of reliability number.
We dichotomized attendance rates for scheduled follow-up visits as yes or no, based on the patient returning in less than 4 months of the index visit. We analyzed data using descriptive statistics.

**RESULTS**

**Outcome Measure**

There were 923 patients with a BMI $\geq 85\%$ seen for WCCs between July 15, 2018, and March 14, 2019. Through this QI initiative, the improvement team increased the percentage of discharge orders that included a prescription for weight management from 32% at baseline to 58% in the first month of PDSA cycle implementation (Fig. 3). Provider education on the clinic algorithm had a significant initial impact. The improvement was sustained for 8 months using additional PDSA cycles. Analysis of individual data during the QI initiative showed that provider compliance ranged from 0% to 100%, with 20% of providers falling below 50% for appropriately prescribing weight management follow-up (compared to 80% of providers at baseline).

Verbal qualitative comments from providers during monthly provider meetings regarding the most impactful PDSAs corroborated that the education and EHR changes provided sustainability to the initiative. Providers reported that the education motivated them to increase their counseling frequency, leading to increased confidence, positive patient experiences, and repeated application. Additionally, all 10 providers reported the discharge order changes as extremely helpful. One provider reported: “There are just so many issues being addressed during the WCC. Having weight management follow-up as a drop-down option reminds me to communicate this with nursing. Before, I may have recommended it to the family but forgot to communicate it to the rest of the team.” Similarly, providers reported liking the new template for the follow-up visit note.

Although this QI initiative did not have a specific aim associated with the ordering of obesity-screening laboratories, the QI team quickly deciphered that provider buy-in, a key driver, was tied to an interest in learning how to manage laboratories with specific questions on which laboratories required referral. We created a laboratory ordering and referral algorithm in consultation with specialists, and providers unanimously (10/10) reported the algorithm was helpful during monthly meetings, improving buy-in based on positive anecdotal comments.

**Balancing Measure**

Forty percent of patients returned for a weight management visit within 3 months, compared to the historical

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Fig. 3. Percent of patients prescribed follow-up for weight management in primary care after a routine well-child check.
DISCUSSION

To our knowledge, this is the first QI initiative to address provider prescription of follow-up for weight management in the primary care setting. Our implementation efforts support that providers can change their practice and improve pediatric weight management during WCCs. Using QI methodology, the improvement team increased provider prescriptions of follow-up for weight management in primary care by 26%, a sustainable change 8 months later. Provider education on national and local treatment guidelines was an impactful intervention. Providers reported increased confidence in their skills following the education and repeated application. This finding is consistent with prior literature looking at referral to tertiary care for weight management (as opposed to follow-up in primary care), showing that provider education can improve referral rates. Efforts at not only educating practicing providers but also improving the education of trainees are pertinent. Creating a provider workforce that understands the effectiveness of current management protocols and feels comfortable providing pediatric weight management care are necessary steps to curtail the epidemic. Education in itself is only a level of reliability of 2 (5% failure rate), leading to a more consistent process and improved outcomes.

Provider comfort with obesity-screening laboratories increased, which was an interesting and unforeseen consequence of this initiative. Despite being a recommended part of care for children with overweight and obesity, providers infrequently order laboratories and have identified laboratory testing as an area where additional guidance would be helpful. As laboratory ordering was not part of this initiative’s specific aim, we did not track laboratory orders during this project. A future retrospective analysis to look at changes in ordering patterns before and after this initiative will be necessary to determine if provider education and algorithm support lead to improved metabolic screening. Similarly, it would be beneficial to look at whether providers more comfortable with comorbidity management are more likely to prescribe weight management follow-up as well due to a sense of increased overall competence with the content area.

Although education was an essential aspect of this QI initiative based on the control chart (Fig. 3), additional interventions also played a role in sustaining the improvement for 8 months. Two of the PDSA ramps involved enhancements to the EHR. Qualitative data from providers supported that the amendment of discharge orders to include follow-up options within the dropdown menu allowed the change to be sustainable. The reminder for follow-up is a constant within the discharge. The provider must select a choice or delete the smart phrase before signing the order. As choosing a discharge order was already a well-established part of the care delivery system, the team built on this pre-existing process step. Additionally, the prewritten text is favorable to providers because it decreases the time spent on EHR-related work. Implementation efforts that can help decrease the charting burden while enhancing clinical care are crucial to building a more efficient system.

Limitations

Some limitations hindered our initiative. Our outcome measure was reliant on patient acceptance and not a pure measure of provider prescription. If a patient declined follow-up, the provider would not enter a prescription in the discharge order. The provider could document refusal in the patient note instead; however, we only reviewed discharge orders for this initiative because we could abstract data from the discharge orders electronically. We were unable to abstract free text from the patient note, and thus monitoring provider notes was not sustainable long-term. We also counted follow-up recommendations as failures if prescribed at an interval longer than 3 months. We based this decision on past data showing that patients do not return to the clinic if asked to return at 4 months or longer. To account for these scenarios, the improvement team set the goal of prescription at 75%. Although prescription rates increased significantly to 58%, we did not meet the goal. Additional analysis in the future will need to focus on the remaining 42% to identify what portion of these failures are due to lack of appropriate prescription by the provider versus a family’s lack of interest and/or buy-in in following up. Qualitative analysis would allow for further investigation into barriers for both providers and patients. Long-term anthropometric data would also help show whether using the algorithm and associated management protocols leads to effective weight management (ie, improved anthropometric and metabolic outcomes). Last, as the improvement initiative took place at a single clinic, the results may not be generalizable. The improvement team spread the implementation efforts to 2 other clinics within the hospital system in March 2019. Further analysis is needed to determine the success of implementation at these alternate sites.

CONCLUSIONS

The improvement team successfully used QI methodology to increase provider prescription rates for follow-up weight management rapidly. We demonstrated sustained improvement even after active improvement efforts ended. The next steps will focus on patient acceptance of and adherence to follow-up recommendations for weight management in primary care.
DISCLOSURE
The authors have no financial interest to declare in relation to the content of this article.

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