

Measuring What Matters: Beyond Quality Performance Measures in Caring for Adults with Obesity

Elizabeth Ciemins, PhD, MPH, MA,¹ Vaishali Joshi, BSc,¹ Deborah Horn, DO, MPH,²
Joe Nadglowski, BSc,³ Abhilasha Ramasamy, MS,⁴ and John Cuddeback, MD, PhD¹

Abstract

Obesity is a chronic disease that poses serious health and societal burdens. Although guidelines exist for obesity management in primary care, evaluating the success of obesity treatment programs is hampered by lack of established, robust quality measures. This study aimed to develop, and test for feasibility, measures for operational tracking, quality performance, and patient-centered care in the context of a national collaborative to develop a model for obesity management in the US primary care setting. The authors developed and evaluated 7 measures used to track the care of patients with overweight or obesity (n = 226,727 at baseline) receiving care within 10 health care organizations (HCOs). Measure categories included: (1) operational tracking (obesity/overweight prevalence and prevalence of obesity-related complications); (2) quality performance (obesity diagnosis, change in weight over time, anti-obesity medication prescriptions, and assessment of obesity-related complications); and (3) patient-centered care (patient-reported outcomes). Measures were tested for feasibility, variability across HCOs, ability to detect differences over time, and value to the HCOs. All measures were feasible to collect, provided value to the participating HCOs, and demonstrated variation and ability to detect differences over time (eg, rates of documented diagnosis of obesity classes 1, 2, and 3 increased from 29%, 46%, and 66%, respectively, at baseline to 35%, 53%, and 71% at study end). This study confirmed the feasibility and perceived value of 7 operational, performance, and patient-centered measures collected in primary care practices in 10 HCOs over an 18-month period.

Keywords: obesity management, primary health care, health care outcome assessment, health care quality indicators

Introduction

ACCORDING TO THE Obesity Action Coalition, obesity is a “complex, multifactorial, and chronic disease” that requires a comprehensive medical approach to care¹; overweight and obesity are associated with serious complications (eg, cardiovascular disease, diabetes).^{2–5} More than 40% of adults in the United States had obesity in 2017–2018,⁶ with estimated costs of ~\$1.7 trillion in 2016.⁷ Obesity increases

the costs of medical care, reduces the probability of employment, and lowers earnings.⁸

Guidelines developed by the American Association of Clinical Endocrinologists (AACE)/American College of Endocrinology recommend thorough evaluation and proper diagnosis of patients with obesity, including a complete physical examination with determination and clinical interpretation of anthropometric measures such as body mass index (BMI), waist circumference, and body composition,

¹AMGA (American Medical Group Association), Alexandria, Virginia, USA.

²Center for Obesity Medicine and Metabolic Performance, Department of Surgery, University of Texas McGovern Medical School, Houston, Texas, USA.

³Obesity Action Coalition, Tampa, Florida, USA.

⁴Novo Nordisk, Inc., Health Economic and Outcomes Research, Plainsboro, New Jersey, USA.

and identification of obesity-associated comorbidities. Treatment may involve lifestyle changes and behavioral therapy, pharmacotherapy, or bariatric surgery.³

Despite the high prevalence of overweight and obesity, no conclusive evidence exists on the effectiveness of primary care-based obesity management programs⁹ nor consensus on the most appropriate way to measure outcomes. Robust quality performance measures help health care organizations (HCOs) track progress in treating chronic conditions and may incentivize clinicians and care teams to perform as well as or better than their peers. At the same time, organizations such as the National Quality Forum (NQF) and AMGA (American Medical Group Association) continue to advocate for a parsimonious set of meaningful measures for external accountability to avoid burdening clinicians with measure fatigue and to encourage measure developers to focus on outcomes that are meaningful to patients and health systems, ideally to replace process measures not clearly associated with clinical outcomes.^{10,11}

Weight and BMI are easily measurable and widely used to gauge the success of interventions addressing obesity.¹² Other potential measures include documentation of a diagnosis of obesity; prescription for, or referral to, an evidence-based treatment or program; and change in quality of life (QOL) as assessed by patient-reported outcome measures (PROMs).¹¹ The documentation of an obesity diagnosis has, in fact, been associated with self-reported,¹³ as well as electronic health record (EHR)-derived,¹⁴ weight loss success. Improvements in BMI and waist circumference¹⁵ and long-term weight loss¹⁶ in adults have been correlated with improved health-related QOL. However, data are lacking on the use of these measures in practice.¹⁷ Changes in clinical parameters such as blood pressure, glycemia, and cholesterol levels also have been suggested as markers of health improvements.¹⁸ Finally, in addition to performance measures, it is important to understand which measures are important for operational tracking of interventions designed to improve obesity care.

In response to this serious public health problem, AMGA conducted a 3-year Obesity Care Model Collaborative to define, pilot, and evaluate a framework and its components to address obesity in primary care within multispecialty medical groups or integrated health systems. During the collaborative, HCOs identified and shared innovations, successes, and failures, and tested models of care to address obesity. This study examined the selection, development, feasibility, and performance of 7 measures that reflect different aspects of care for people with overweight or obesity. Building on the feasibility testing conducted in this study, several measures were considered; one (ie, obesity diagnosis) went through rigorous reliability and validity testing in preparation for NQF endorsement, as reported elsewhere.

Methods

Study sample

This study involved patients aged 18–79 years with overweight or obesity, seen from October 2016 to June 2019 at 10 US-based HCOs that implemented programs to improve obesity management in primary care. Ten geographically diverse HCOs, serving demographically diverse patients, were

selected to participate in the collaborative. Primary care population volumes for each participating HCO are shown in Supplementary Figure S1 of Supplementary Material S1.

Eight of the 10 HCOs targeted a subset of primary care clinics in their systems, whereas 2 implemented their programs across their entire primary care population. Approval by an Institutional Review Board was not required for this quality improvement project. All data submitted to AMGA were de-identified, submitted in aggregate, and collected as part of routine patient care.

Interventions

A learning collaborative approach was applied to create and test obesity care models in primary care clinics across the participating HCOs over the 18-month study period. This collaborative was guided by an expert advisory committee and included in-person meetings, webinars, best practice sharing, education, site visits, goal setting, outreach, peer-to-peer learning, case studies, and measurement, as well as development and implementation of new care models within each HCO. HCOs were paid a stipend to participate.

Development of the framework for the collaborative is reported elsewhere. The framework contained 4 domains (ie, community, organization, care team, patient/family), each addressed from both care delivery and business perspectives. Interventions were designed and developed in the areas of health care services, roles and education, tools and workflow, measurement and evaluation, and reimbursement.

The interventions designed, implemented, and tested at the participating HCOs included dedicated obesity clinics, obesity support groups, shared medical appointments, community partnerships, EHR best practice alerts, provider/staff and patient education, transparent data sharing, pharmacist involvement, and designated provider/staff/patient champions. Each organization implemented various strategies and interventions.

Measure selection

Details on the process of measure selection can be found in Supplementary Material S1. The prioritized measure concepts were brought to the collaborative for feasibility testing (ie, Could HCOs program these measures for reporting from their EHRs? What could be learned about the measures from the results reported?) Measures fell into 3 categories: quality performance measures, operational process monitoring measures, and patient-centered measures (PROMs designed to enhance patient care).

A detailed measure specification document was created (Supplementary Material S2) and distributed to collaborative participants, along with instructions on how to submit data quarterly via a portal (denominators/numerators for prevalence and for each measure, by BMI class). Four quarters (2016 Q4–2017 Q3) of baseline and 6 quarters (2018 Q1–2019 Q2) of intervention data were collected and submitted by each HCO, per the measure specifications. Following submission, data were reviewed and validated with the submitting HCO; corrected or updated data were resubmitted to correct errors or inconsistencies.

The patients included in the analysis were aged 18–79 years, as of the first day of each reporting period, had a BMI measure and ≥ 1 primary care ambulatory encounters during

the reporting period, and were stratified by BMI class based on their last BMI in the reporting period. Data were collected for a baseline year and quarterly during the intervention period. All measures were reported for the targeted clinics only, except for *Prevalence of overweight/obesity*, which also was reported for patients with primary care visits across the entire organization for comparison purposes. Further details on the numerators/denominators used to calculate these measures are provided in Supplementary Material S2.

Prevalence of overweight/obesity

Prevalence of overweight and obesity was collected to monitor consistency over time, to provide a denominator for the other measures, and to define the population context for care of people with obesity in primary care (as compared to other conditions and their programs).

Prevalence was, therefore, not considered a quality performance measure. Defined as the proportion of patients who had overweight or obesity per the most recent BMI (calculated using weight and height measured at an office visit), prevalence was collected twice organization-wide (baseline and calendar year 2018) and quarterly for targeted clinics, and reported by BMI class. Diagnosis codes for obesity are provided in Supplementary Material S2.

Assessment for obesity-related complications (quarterly measure)

AACE guidelines recommend an annual assessment for obesity-related complications in all patients with BMI ≥ 25 kg/m².³ To measure whether this assessment was performed annually, the following results were collected from participating HCOs: blood pressure, glycated hemoglobin (HbA1c) or fasting plasma glucose (FPG), high-density lipoprotein cholesterol (HDL), triglycerides, thyroid stimulating hormone (TSH; past 5 years), serum creatinine, aspartate aminotransferase (AST) or alanine aminotransferase (ALT) or AST/ALT ratio, and all of these.

HCOs reported 8 numerators (ie, presence of a valid result for each of the 7 tests and 1 for all tests combined). These tests were chosen based on their assessment of specific obesity-related complications and their availability in EHRs. Results for serum creatinine and AST/ALT suggest that a comprehensive metabolic panel was performed, and HDL cholesterol and triglycerides suggest that a lipid panel was performed. These panel tests would ordinarily be part of an assessment for obesity-related complications, but for simplicity this measure requires only these “indicator” tests plus TSH. For the collaborative, it was recommended that HCOs follow all disease-specific guidelines for screening/testing for all obesity-related complications.

Organizations that did not record in their EHRs whether a plasma glucose reading was taken under fasting conditions were encouraged to consider the lowest plasma glucose result obtained on the same day as triglycerides or a lipid panel as a fasting value, because ideally, specimens for these tests are drawn after patients have been fasting for 8–12 hours. As a guideline-recommended measure, this was a candidate for a quality performance (process) measure.

Diagnosed obesity-related complications per patient (quarterly measure)

Based on the obesity-related complications listed in the AACE guidelines,³ HCOs reported the average number of type 2 diabetes, dyslipidemia, hypertension, obstructive sleep apnea, osteoarthritis, and nonalcoholic fatty liver disease diagnoses per patient. This measure also was not intended to be a quality performance measure, but instead to be used for operational tracking of whether complications were identified and diagnosed in patients with obesity, and was influenced by the underlying prevalence in the population. Combined with the *Assessment for obesity-related complications* measure, this measure provided HCOs with information regarding whether they were adequately assessing patients per the AACE guidelines.

HCOs reported the average number of complications per denominator patient, stratified by BMI class. Complications were identified as active problems on the patient problem list or by a diagnosis on a claim for a clinic encounter (excluding patients for whom a diagnosis code appears only on a claim for a screening test, used in a rule-out sense, instead of the Z code for screening, which is not technically correct but is a common error). This measure reflects both the diagnosed prevalence of complications and documentation of these diagnoses in the EHR. Although actual prevalence was unlikely to change rapidly, one of the goals of the collaborative was to improve diagnosis and documentation when any of these conditions was present. Participating organizations tracked this measure over time to monitor improvement in documentation of obesity-related complications.

Documentation of obesity diagnosis (quarterly measure)

Although documentation of an obesity diagnosis is a process measure, it was considered important to bring attention to this condition. A formal diagnosis was viewed as the first step toward changing provider and patient behaviors in terms of addressing obesity, and there is evidence to support this.¹⁴ Documentation of an obesity diagnosis was defined as an active obesity diagnosis code on the patient’s problem list in the EHR or on a claim for a visit during the reporting period, among all patients with a BMI ≥ 30 kg/m². This measure was evaluated preliminarily as a quality performance measure, as recommended by the NQF.

Percent weight change over 9–15 months (reported quarterly for rolling 12 months)

For patients whose initial BMI was ≥ 25 kg/m² in the 12-month reporting period, percent change in weight (or BMI) over time was calculated and classified under 1 of 7 categories (Supplementary Material S2). The proportions of patients with loss $\geq 10\%$ and $5\% \leq$ loss $< 10\%$ were required to be reported. Reporting the remaining categories was optional but encouraged because, for example, weight maintenance indicates successful weight management for some patients. This was a feasibility study and quality measures of longitudinal change are relatively new to the field, so a full range of weight loss percentages was captured to detect small and larger changes over time.

Weights had to be taken ≥ 9 months apart, and weight change was reported each quarter for rolling 12-month periods. This measure was stratified by BMI class, based on the patient's first BMI in the 15 months. Inclusion and exclusion criteria and detailed specifications for this measure are described in Supplementary Material S2. This measure was evaluated preliminarily as a quality performance measure, as recommended by the NQF.

Prescriptions for anti-obesity medications (reported quarterly)

Anti-obesity medications (AOMs) prescription rates were reported for all patients with a BMI ≥ 30 kg/m² as a potential quality performance measure. Although the BMI requirement is ≥ 27 kg/m² for patients with a medical complication, prescriptions were limited to this BMI for simplicity and ease of reporting. Specifically, for the combination drugs, HCOs were instructed to include all patients who had, during the reporting period, either the prescription for the single-pill combination or separate prescriptions for both components of bupropion/naltrexone or phentermine/topiramate. Reporters were permitted to include new prescriptions up to 10 days after the end of a reporting period (Supplementary Material S2).

Number of PROM surveys completed (2018 Q1 and 2019 Q2)

Based on recommendations from the NQF and the Patient-Centered Outcomes Research Institute on use of PROMs,^{11,19} the Obesity-Related Problem Scale (7 questions), and the Obesity and Weight Loss Quality of Life Instrument (17 questions) were chosen for feasibility testing. These surveys were combined into a 24-question survey but were scored separately (Supplementary Material S2). The intent was to test the feasibility of using these surveys as part of an obesity management program. HCOs administered the surveys in various ways, including paper and electronic formats in the clinic, or through a patient portal.

To obtain an unbiased sample, HCOs were encouraged to survey all patients who presented for a visit and met the criteria for consecutive clinic days until 50 surveys were completed. It was suggested that HCOs limit survey administration to patients visiting 1–3 providers who were willing to discuss the survey responses with the patient. A second survey was administered to the same patients, 9–15 months following the first survey. (Follow-up surveys completed between 2018 Q4 and 2019 Q2 were accepted, to provide HCOs an opportunity to reach out to patients or for patients to present at a follow-up visit.) For testing, HCOs were encouraged to select patients likely to return and willing to complete the survey.

Change in score in PROM surveys (2019 Q2)

At each HCO and for each patient, the summary score of their first survey was subtracted from the summary score of their second survey, separately for each survey instrument. HCOs reported the average change in score for each of the surveys (Supplementary Material S1).

Analysis

Descriptive statistics were prepared quarterly on all 7 process and performance measures and shared, unblinded, with all participating HCOs. Absolute and relative changes over time were calculated at the aggregate and individual HCO level. For measure viability, variability across HCOs was assessed, as well as ability to detect change in the measure over time (ie, Do health systems have the ability to improve the measure and is it approaching a ceiling?) Feasibility was measured by the HCO's ability to collect and submit data on a quarterly basis. Value to the HCO was assessed through discussion during in-person and online meetings, as well as stated intentions to continue to collect specific measures after the collaborative concluded.

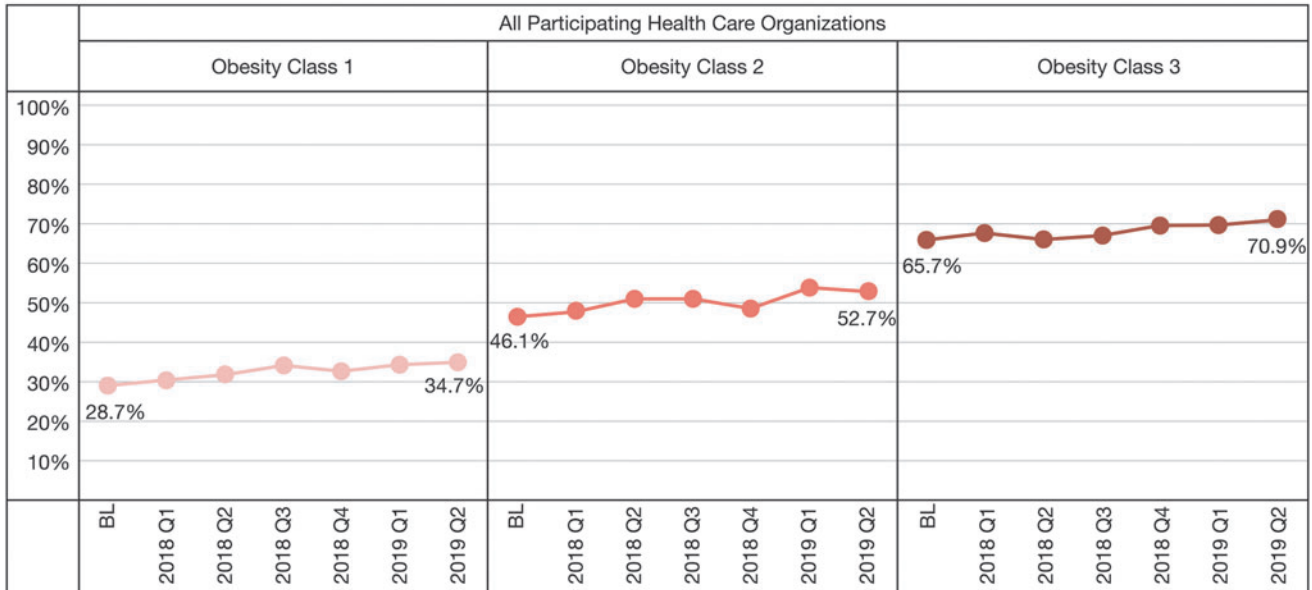
Baseline rates were compared with the last reported quarter of data (2019 Q2). However, for measures *Prescriptions for AOMs* and *Diagnosed obesity-related complications*, the first quarterly report (2018 Q1) was used as a baseline to ensure fair comparison between time periods. Allowing 1 year to find a prescription or a diagnosed complication in a baseline period could inadvertently skew results toward higher rates with patients potentially having more clinician visits and therefore more opportunities to receive a prescription or diagnosis. Comparing patients with a prescription or diagnosis in a quarter to patients in the same quarter the following year removed this potential bias. Additionally, many participating organizations did not implement interventions or initiate their obesity programs until after the first quarter of measure reporting. Although *Documentation of an obesity diagnosis* also looked for a diagnosis, the authors compared baseline with 2019 Q2 because rates were so low that having 1 year of data as a baseline did not make a difference and, thus, did not bias rates.

Results

All 7 measures were considered feasible to collect, except for PROMs, the administration and associated logistics of which were challenging for most HCOs. Therefore, 6 of 7 measures passed the feasibility test, and those being considered as quality performance measures (ie, obesity diagnosis, weight change, AOM prescriptions, assessment for obesity-related complications) were ready for additional formal reliability and validity testing, which has been conducted and reported. Variability of these measures was assessed across HCOs as well as ability to detect change within systems over time, which will be described, measure by measure, as is the value to the HCO of the other measures not considered as candidates for quality performance.

Documentation of an obesity diagnosis increased across all obesity classes over the course of the collaborative, demonstrating the health systems' ability to improve the measure. In the 12-month baseline period, diagnosis rates among patients with obesity classes 1, 2, and 3 were 28.7%, 46.1%, and 65.7%, respectively. By the end of the collaborative, they were 34.7%, 52.7%, and 70.9% (Figure 1A). Wide variation was observed between the participating HCOs: 1 group started with overall rates of 95% and reached 100% by the end of the collaborative, whereas 2 other groups approached a 90% diagnosis rate among patients with obesity class 3 by the end of the collaborative (Figure 1B).

A



B

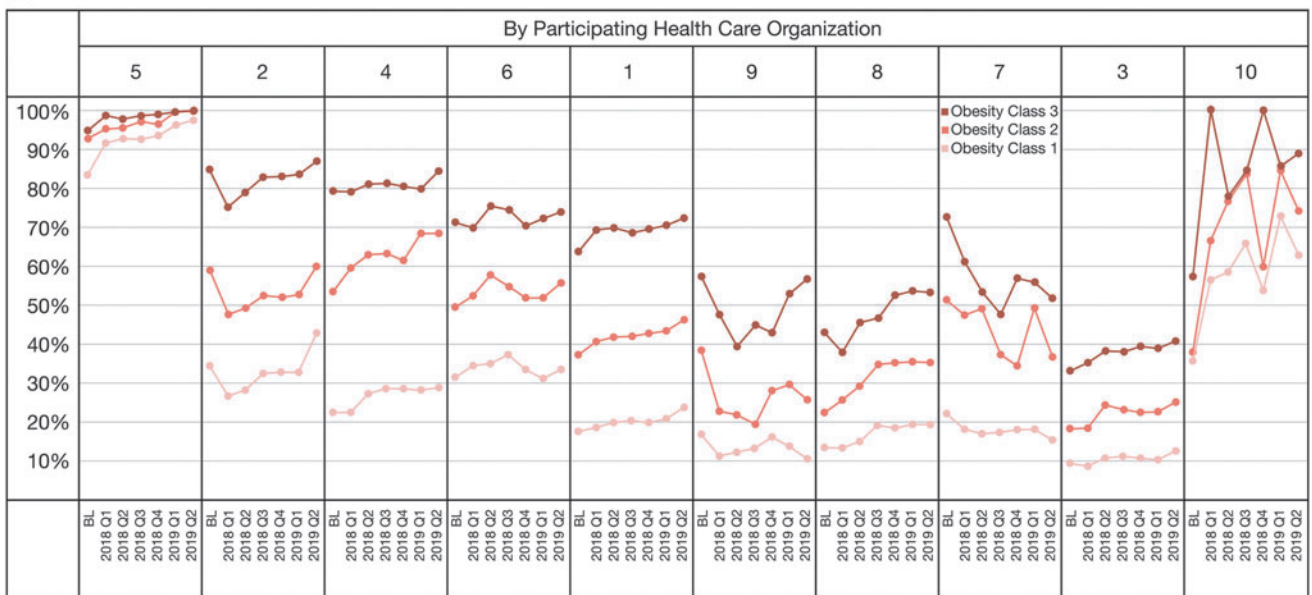


FIG. 1. Documentation of an obesity diagnosis over time (A) for the 10 HCOs combined and (B) by HCO. BL=October 1, 2016 to September 30, 2017; HCOs are ordered by performance, from best to worst. HCO 10 followed a very small cohort of patients (n=300 across all weight classes) and is susceptible to small numbers bias. BL, baseline; HCO, health care organization.

The second candidate for a quality performance measure was weight change over time. Quarterly data were collected on percent weight change over a 9- to 15-month period at 9 HCOs; 1 HCO with 300 annual patients was excluded from these analyses to avoid bias related to small numbers. Across the remaining HCOs demonstrating improvements in weight loss and with ≥ 3000 annual patients, more patients lost weight and fewer patients gained weight during the collaborative. A 3% increase was observed in the proportion of patients who lost $\geq 5\%$ total body weight at 6 HCOs. Variation was observed across clinics with an increase of 1%–6% in the proportion of patients who lost $\geq 5\%$ total

body weight (data not shown). A 5% increase (range: 4%–7%) was observed in the proportion of patients who lost $\geq 1\%$ total body weight at 5 HCOs and weight loss was observed across all BMI classes. Figure 2 shows the variation observed across 3 of the highest performing HCOs. All HCOs were successful in programming and reporting this measure using EHR data, supporting its feasibility as a quality performance measure.

The third candidate for a quality performance measure was treatment, specifically with an AOM. The rate of prescribing AOMs was low overall, with 3.4% of eligible patients (obesity classes 1–3) receiving medications in 2019 Q2. Absolute

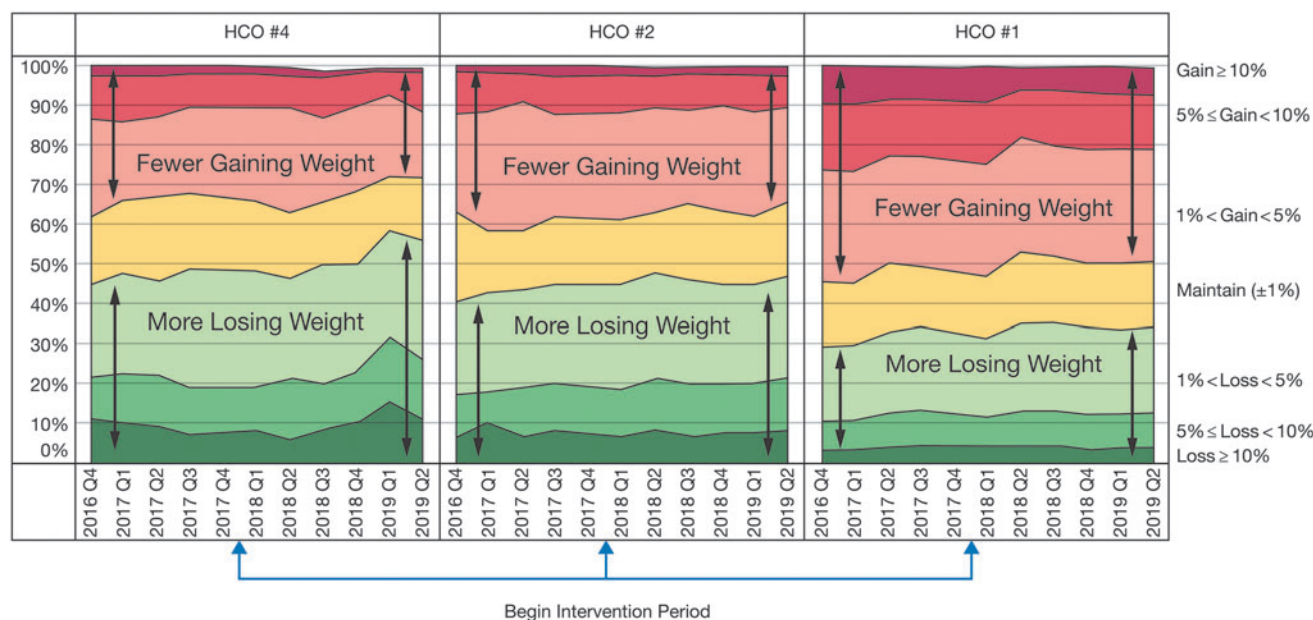


FIG. 2. Weight change over time in 3 select participating HCOs. HCO, health care organization.

prescribing rates increased over time among patients with obesity classes 1, 2, and 3 by 0.5%, 0.7%, and 0.7%, respectively, from 2018 Q1 to 2019 Q2 (Figure 3A). Among patients with obesity class 3, change in the proportion of patients prescribed an AOM ranged from an absolute decrease of 2.6% to an increase of 6.6% (Figure 3B). One HCO reported additional data on a subset of 3 targeted clinics that demonstrated increases in AOM prescribing rates of 10.2%, 15.0%, and 24.0% among patients with obesity class 1, 2, and 3, respectively.

The final candidate for a quality performance measure was assessment for obesity-related complications; 7 assessments were reported. Over the 15 months of the collaborative, improvements were observed in all assessments, with the largest improvements seen in HbA1c (7.2% absolute improvement) and serum creatinine (8.8%) (Figure 4). Increases in the proportion of patients with a BMI ≥ 25 kg/m² who received a serum creatinine test in the past year varied across HCOs. Seventy percent of participating HCOs reached a serum creatinine assessment rate of more than 80% by the end of the collaborative. Assessments for all 7 tests (HbA1c or FPG, blood pressure, TSH, HDL, triglycerides, AST/ALT, serum creatinine) increased from 25.5% to 35% over the course of the collaborative ($P < 0.001$).

In addition to reporting measures for benchmarking and comparative tracking across organizations, participants also used measures to monitor progress internally, focus on sub-populations, and encourage friendly competition between providers. The results for the remaining measures, none of which were considered for quality performance measures, but instead were used for operational tracking or to improve patient care, are described in Supplementary Material S1.

Discussion

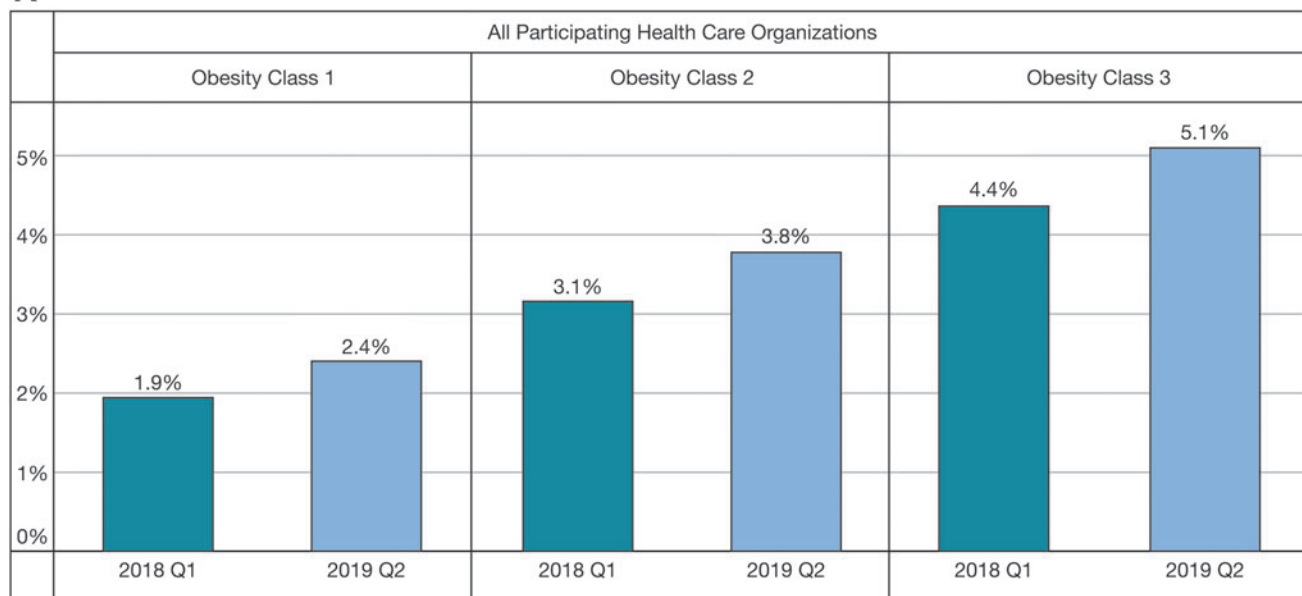
The 10 participating HCOs were successful at collecting and submitting data on patients with overweight or obesity

for 4 quality performance measures and 2 operational monitoring measures, and demonstrated limited success on 1 patient-reported measure. The 3 quality performance measures were further assessed in a formal measure-testing process. All measures, except PROMs, were feasible for HCOs to collect and were considered valuable for tracking of operational processes, as well as for quality of care, for patients with overweight or obesity. After 1 year of observation, the process measure of identification and diagnosis of obesity-related complications increased. As an operational tracking measure, organization-wide prevalence of overweight or obesity remained high, at 75%, throughout the collaborative.

Four candidate measures for quality performance demonstrated feasibility to collect, variability across HCOs, and ability to change over time, allowing for performance differentiation between HCOs. Across all HCOs, a shift in weight change was observed over the course of the collaborative, with equal increases in the proportion of patients who lost weight and decreases in the proportion who gained weight. Also, a 3% absolute increase was observed in the proportion of patients who lost $\geq 5\%$ of total body weight at 6 HCOs. Documentation of an obesity diagnosis increased by 5% from baseline among patients with obesity class 3. Assessment for all 7 obesity-related complications increased by 9 percentage points over the course of the collaborative. AOM prescribing rates were the most difficult measure to change, and the majority of improvement was observed in patients with obesity class 3. HCOs that reported data on pilot clinics also observed significant shifts in this measure.

There are few published reports of primary care, population-based obesity management programs, with most describing small, observational cohort studies targeting narrow populations, making it difficult to compare measures and outcomes with this population-based study.²⁰⁻²⁵ In addition, measures in published studies were rarely specified in the

A



B

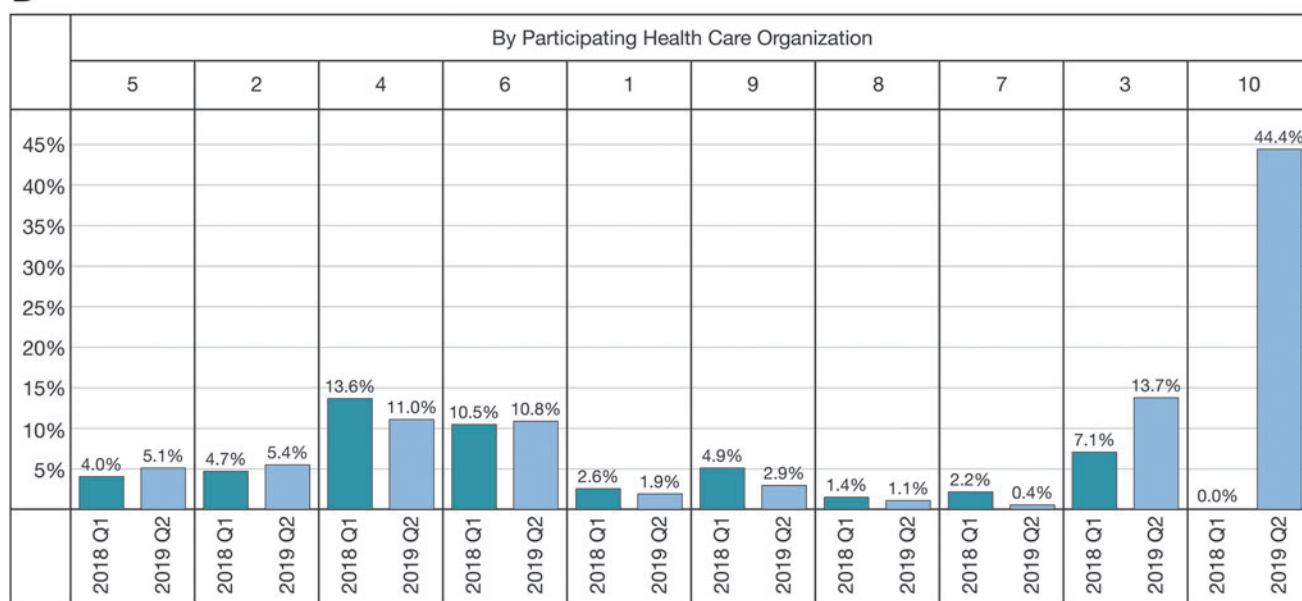


FIG. 3. Prescribing rates for anti-obesity medications across the 10 HCOs (A) by obesity class and (B) among patients with obesity class 3. HCO 10 followed a very small cohort of patients (n = 300 across all weight classes) and is susceptible to small numbers bias. HCO, health care organization.

same way (eg, many studies measured absolute weight loss vs. percent body weight loss).

One of the challenges in measurement of a primary care-based program is that a single cohort of patients is not followed over time. Instead, new patients are added regularly to the denominator, diluting potential effects for the initial population. Also, as demonstrated in this study, a pilot clinic focusing on treating patients with obesity may attract new patients with obesity or referrals from other primary or specialty care clinics, further diluting the denominator with new patients, and potentially obscuring successful weight loss among established patients. An influx of new patients referred to a provider who specializes in obesity can di-

minish overall calculated weight loss for that provider's patient population. This may contribute to a reluctance by institutions and physicians alike to embrace weight loss as a quality performance measure.

In this collaborative, 1 participating HCO followed a small cohort (~300 patients) over the course of the 15-month measurement period. This cohort demonstrated greater improvement than those in the other participating organizations; proportions of patients with obesity class 3 who lost >1% and ≥5% total body weight were 64.3% and 25.3%, respectively, in 2019 Q2. The proportion prescribed an AOM increased from 0% in the first intervention quarter to 44% by the end of the collaborative for obesity class 3

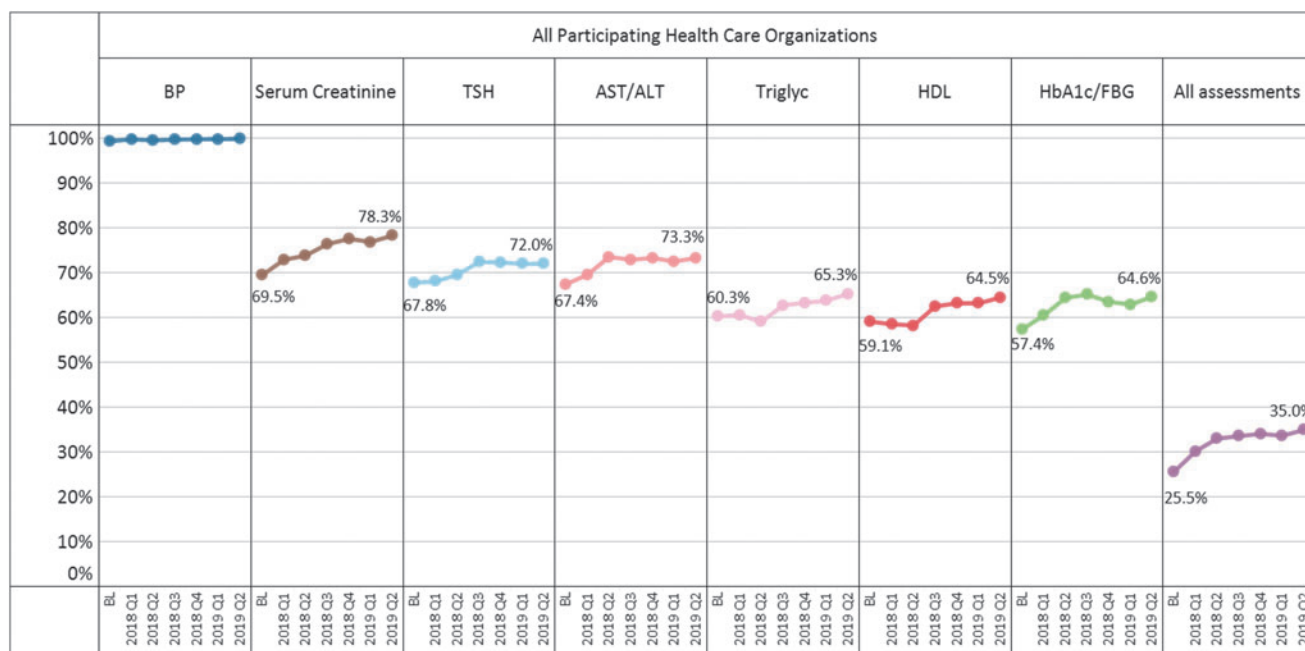


FIG. 4. Assessment for obesity-related complications over time for the 10 HCOs. ALT, alanine aminotransferase; AST, aspartate aminotransferase; BP, blood pressure; FBG, fasting blood glucose; HbA1c, glycated hemoglobin; HCO, health care organization; HDL, high density lipoprotein; Triglyc, triglycerides; TSH, thyroid stimulating hormone.

patients. This method of reporting on a single cohort of patients over time could be considered for a quality performance measure, potentially increasing its acceptance.

PROMs were not easily integrated into clinic workflow, as they required collecting data that are not already stored in the EHR. PROMs are starting to be regularly and consistently used to monitor patient progress, and those that have been integrated tend to reflect overall patient health (eg, Patient-Reported Outcomes Measurement Information System).²⁶ It was challenging for the HCOs to integrate these obesity-specific PROMs into regular practice. Therefore, the organizations were asked to test collecting the measure on a subset of 50 patients who were likely to return to complete a postintervention survey. For those sites able to collect data, the measure was considered extremely valuable and, by the end of the collaborative, several HCOs were working to integrate the measure into their EHRs. The information collected at baseline provided important additional information, directly from the patient, to help the provider and patient co-design an appropriate care plan. Data on change scores were not sufficient to draw any conclusions from a performance measure perspective.

Limitations

This study had several limitations. The organizations were diverse in terms of size, structure, and patient population and had different levels of overall resources available for this program. Although all participating organizations adhered to the requirement to implement strategies in each of the prescribed domains, each chose a different set of interventions and, in some cases, followed different time lines (eg, 1 organization initiated a structurally independent, dedicated obesity clinic only for patients with obesity; an-

other designated 2 afternoons per week exclusively for people with obesity, whereas another conducted shared medical appointments). HCOs were permitted to implement appropriate interventions that fit within their local contexts, but all reported on the same set of measures, and consistent results were seen in terms of feasibility, variability, ability to detect change, and value to the HCO. In addition, HCOs reported the intention to continue to collect these measures, further demonstrating the measures’ perceived value.

Despite these limitations, this study demonstrated the feasibility of developing coherent, sustainable programs for care of patients with obesity at geographically and structurally diverse HCOs and collecting/reporting data to track progress on 7 measures with various purposes. Several of the measures are ready for further reliability and validity testing and could potentially be endorsed as accountability measures. Based on study findings, 1 measure (obesity diagnosis) has undergone additional rigorous testing. The accountability agenda is important with a disease as prevalent as obesity, but internal use within HCOs is equally important. The participating HCOs consistently found value in these measures for operational monitoring of their nascent obesity care programs, and the measures played a key role in this collaborative to stimulate continuous improvement as well as to gauge success.

Conclusions

This national Obesity Care Model Collaborative was successful in its goal of feasibility testing 7 measures in primary care practices at 10 HCOs in 10 states across the US for the purposes of operational tracking of processes, quality performance, and patient-centeredness. The organizations demonstrated the ability to apply the data specifications for

all measures to extract the necessary data from their EHRs and other records. In addition to demonstrating ability to report all measures, including PROMs in a subset of organizations, the participating practices showed improvements over a 15-month period on the quality performance measures, including obesity diagnosis documentation, weight change over time, and prescribing of AOMs.

Acknowledgments

The authors would like to thank Doris Boutain (University of Washington School of Nursing), Paula Burich (Sharp Rees-Stealy Center for Health Management), Bartolome Burguera (Cleveland Clinic), Timothy Garvey (Birmingham VAMC, University of Alabama at Birmingham), Robert Kushner (The Obesity Society, Northwestern University), Kathleen Morton (Costal Medical), Gina Gordon (Novant Health), Timothy Harlan (Tulane University Medical Group), Barbara Hodne (The Iowa Clinic), Jenelle Howe (HealthCare Partners), Natasha Malesevic (Aurora Health Care), Kara Mayes (Mercy Clinic), Kathy Mostafaie (HealthCare Partners), Michelle O'Meara (Utica Park Clinic), Marianne Sumego (Cleveland Clinic), Gabe Smolarz (Novo Nordisk, Inc.), Andrew Toth (Confluence Health), and Verlyn Warrington (The Guthrie Clinic) for assistance with measure selection, program design, and interpretation of findings. Advisors provided insights from varying perspectives that helped the collaborative participants and others better understand implementation barriers and facilitators, as well as clinical outcomes.

Author Disclosure Statement

Dr. Ciemins, Ms. Joshi, and Dr. Cuddeback are employees of AMGA and have no potential conflicts of interest to disclose. Dr. Horn is a consultant with Bausch Health, Novo Nordisk, and Medtronic, and received research funding from Novo Nordisk. Mr. Nadglowski is an employee of Obesity Action Coalition and has no potential conflicts of interest to disclose. Ms. Ramasamy is an employee of Novo Nordisk, Inc. and owns common stock and stock options.

Funding Information

This collaborative initiative was funded by Novo Nordisk, Inc. The authors received writing/editorial support from Patricia Fonseca, PhD, of Excerpta Medica, funded by Novo Nordisk, Inc.

Supplementary Material

Supplementary Material S1
Supplementary Material S2

References

1. Obesity Action Coalition. OAC position statements. <https://www.obesityaction.org/our-purpose/about-us/position-statements/> Accessed January 21, 2020.
2. World Health Organization (WHO). Fact sheets. Obesity and overweight. 2018. <https://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight> Accessed January 22, 2020.
3. Garvey WT, Mechanick JI, Brett EM, et al. American Association of Clinical Endocrinologists and American

- College of Endocrinology comprehensive clinical practice guidelines for medical care of patients with obesity. *Endocr Pract* 2016;22 (suppl 3):1–203.
4. Danaei G, Ding EL, Mozaffarian D, et al. The preventable causes of death in the United States: comparative risk assessment of dietary, lifestyle, and metabolic risk factors. *PLoS Med* 2009;6:e1000058.
5. Allison DB, Fontaine KR, Manson JE, Stevens J, Vanltallie TB. Annual deaths attributable to obesity in the United States. *JAMA* 1999;282:1530–1538.
6. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity among adults: United States, 2017–2018. *NCHS Data Brief* 2020;360. <https://www.cdc.gov/nchs/data/databriefs/db360-h.pdf> Accessed April 6, 2020.
7. Waters H, Graf M. America's obesity crisis. The health and economic costs of excess weight. Milken Institute. 2018. <https://milkeninstitute.org/sites/default/files/reports-pdf/Mi-Americas-Obesity-Crisis-WEB.pdf> Accessed March 6, 2020.
8. Biener A, Cawley J, Meyerhoefer C. The impact of obesity on medical care costs and labor market outcomes in the US. *Clin Chem* 2018;64:108–117.
9. Cochrane AJ, Dick B, King NA, Hills AP, Kavanagh DJ. Developing dimensions for a multicomponent multidisciplinary approach to obesity management: a qualitative study. *BMC Public Health* 2017;17:814.
10. Cuddeback J. Guest commentary: start using quality measures that matter and not process measures. *Modern Healthcare*. 2017. <https://www.modernhealthcare.com/article/20170717/NEWS/170719938/guest-commentary-start-using-quality-measures-that-matter-and-not-process-measures> Accessed February 11, 2020.
11. National Quality Forum. Obesity quality measures overview. www.qualityforum.org/ProjectMaterials.aspx?projectID=90313 Accessed January 22, 2020.
12. Millstein RA. Measuring outcomes in adult weight loss studies that include diet and physical activity: a systematic review. *J Nutr Metab* 2014;2014:421–423.
13. Dhurandhar NV, Kyle T, Stevenin B, Tomaszewski K; ACTION Steering Group. Predictors of weight loss outcomes in obesity care: results of the national ACTION study. *BMC Public Health* 2019;19:1422.
14. Ciemins EL, Joshi V, Cuddeback JK, Kushner RF, Horn DB, Garvey WT. Diagnosing Obesity as a First Step to Weight Loss: An Observational Study. *Obesity*. 7 Oct 2020. doi: 10.1002/oby.22954. PMID: 33029901.
15. Wang L, Crawford JD, Reppermund S, et al. Body mass index and waist circumference predict health-related quality of life, but not satisfaction with life, in the elderly. *Qual Life Res* 2018;27:2653–2665.
16. Buscemi S, Castellini G, Batsis JA, et al. Psychological and behavioural factors associated with long-term weight maintenance after a multidisciplinary treatment of uncomplicated obesity. *Eat Weight Disord* 2013;18:351–358.
17. Hegland PA, Aasprang A, Hjelle Øygaard S, et al. A review of systematic reviews on the effects of patient-reported outcome monitoring with clinical feedback systems on health-related quality of life-implications for a novel technology in obesity treatment. *Clin Obes* 2018;8: 452–464.
18. Ingels JS, Hansell A, Zizzi S. Beyond weight loss: a qualitative exploration of participant expectations and strategies for measuring progress during a weight man-

- agement program. *SAGE Open Med* 2018;6:2050312118807618.
19. Patient-Centered Outcomes Research Institute. Guidance on reporting research on patient-reported outcome measures (PROMs). <https://www.pcori.org/research-results/2016/guidance-reporting-research-patient-reported-outcome-measures-proms> Accessed February 4, 2020.
 20. Wadden TA, Tsai AG, Tronieri JS. A protocol to deliver intensive behavioral therapy (IBT) for obesity in primary care settings: the MODEL-IBT program. *Obesity (Silver Spring)* 2019;27:1562–1566.
 21. Granara B, Laurent J. Provider attitudes and practice patterns of obesity management with pharmacotherapy. *J Am Assoc Nurse Pract* 2017;29:543–550.
 22. Viglione C, Bouwman D, Rahman N, et al. A technology-assisted health coaching intervention vs. enhanced usual care for primary care-based obesity treatment: a randomized controlled trial. *BMC Obes* 2019;6:4.
 23. Peirson L, Fitzpatrick-Lewis D, Ciliska D, Usman Ali M, Raina P, Sherifali D. Strategies for weight maintenance in adult populations treated for overweight and obesity: a systematic review and meta-analysis. *CMAJ Open* 2015;3:E47–E54.
 24. McVay MA, Yancy WS, Bennett GG, et al. A web-based intervention to increase weight loss treatment initiation: results of a cluster randomized feasibility and acceptability trial. *Transl Behav Med* 2019;pii:ibz143.
 25. LeBlanc ES, Patnode CD, Webber EM, Redmond N, Rushkin M, O'Connor EA. Behavioral and pharmacotherapy weight loss interventions to prevent obesity-related morbidity and mortality in adults: updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA* 2018;320:1172–1191.
 26. Patient-Reported Outcomes Measurement Information System. www.healthmeasures.net/explore-measurement-systems/promis Accessed February 4, 2020.

Address correspondence to:
Elizabeth Ciemins, PhD, MPH, MA
AMGA (American Medical Group Association)
One Prince Street
Alexandria, VA 22314
USA

E-mail: eciemins@amga.org