

Successful Implementation of an All-or-None Diabetes Measure in 10 US Health Systems

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Abstract

Type 2 diabetes mellitus (T2DM) affects 31.5 million adults in the United States and is commonly treated in primary care settings. One promising approach to comprehensive care is to focus on an all-or-none diabetes bundle measure, which ensures each patient meets a set of guideline-recommended measures. This requires a practice-level coordinated strategy. The purpose of this initiative was to help health care organizations (HCOs) improve the care and outcomes of patients with T2DM using an all-or-none bundle measure. This observational study was carried out in the context of a national best practices learning Collaborative that implemented targeted interventions in primary care settings and measured success using an all-or-none bundle measure. Ten AMGA member-HCOs, across 8 states, treating nearly 300,000 adult patients with T2DM in primary care participated. The primary measure, the Together 2 Goal[®] Core Bundle, included hemoglobin A1c (A1c) control (<8%), blood pressure (BP) control (<140/90 mmHg), lipid management (prescribed a statin), and medical attention for nephropathy. All 10 HCOs improved the Core Bundle measure during the 12-month Collaborative. The rate for the Core Bundle improved from 40.2% to 42.8%, an absolute increase of 2.6% ($P < 0.001$). In addition, 9 HCOs improved BP control, 8 improved lipid management, 6 improved attention to nephropathy, and 4 improved A1c control. Implementing interventions in primary care settings was successful in achieving comprehensive care for an estimated additional 7700 people living with T2DM who met all 4 components of the bundle measure during the 12-month intervention period.

Keywords: hypertension, nephropathy, quality measure, statin, hemoglobin A1c

Introduction

APPROXIMATELY 34 MILLION ADULTS in the United States have diabetes, of whom 90% to 95% have type 2 diabetes mellitus (T2DM).^{1,2} Diabetes is associated with a range of comorbidities, including cancer, obesity, hypertension, cardiovascular (CV) disease, and kidney disease.^{1,3–5} Managing diabetes creates a significant economic burden; diabetes cost Americans at least \$327 billion in 2017.⁶ This amount is projected to increase each year, potentially reaching \$622 billion by 2030.⁷

The current clinical standard of care guidelines published by the American Diabetes Association specify treatment

goals for patients with T2DM.⁸ Among these goals are a hemoglobin A1c (A1c) <7% (or a less stringent goal of <8% for some patients); blood pressure (BP) <140/90 mmHg, varying depending on the health history of individual patients; kidney disease screening; and statin treatment for patients with CV disease risk factors and for patients aged 40 to 75 years without CV disease.⁸

Unfortunately, many patients do not achieve all of these treatment goals.⁹ Challenges to delivering comprehensive diabetes care include limited time during patient visits, a heavy workload that prevents physicians from staying current with new information and the latest guidelines, and physicians' lack of awareness of their patients' current care

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gaps.^{10–12} In addition, gaps in patient education lead to reduced patient adherence to self-monitoring, medications, and lifestyle modifications.¹⁰

In an effort to address gaps in diabetes care, interventions have been developed and implemented that focus on various all-or-none bundle measures.^{11,13,14} A bundle measure consists of a group of individual component clinical measures. To achieve adherence with the bundle measure, a patient must meet all the individual measures. Improving an all-or-none bundle measure requires a comprehensive approach to chronic disease management, based on each patient's needs.¹⁵ Over the past few decades, bundle measures have been associated with improved outcomes for patients with T2DM.

For example, during the Steno-2 study and subsequent follow-up studies, the use of a 5-component bundle measure reduced the mortality rate by 20% among patients with T2DM in Denmark.¹⁴ The Geisinger Health System employed a 9-component diabetes bundle and improved the percentage of their patients compliant with the bundle measure from 2.4% to 13.1% across 5 years. A1c, BP, and cholesterol were among the component measures that improved during the program.¹³ In addition, Intermountain Healthcare combined a 5-component bundle measure with diabetes self-management education to improve care for patients with T2DM. Patients in this program also improved A1c, BP, and cholesterol among other measures.¹¹

AMGA (American Medical Group Association) Foundation is a nonprofit trade association working with over 400 multispecialty medical groups and health care organizations (HCOs). In 2016, AMGA launched the Together 2 Goal® (T2G) Campaign (National Campaign). This was a national program that challenged participating medical groups and health systems to improve care for 1 million people with T2DM. More than 150 AMGA member organizations participated in the National Campaign, reaching nearly 2 million patients through 61,000 full-time equivalent physicians.¹⁶

In May 2019, AMGA launched the T2G Diabetes Bundle Best Practices Learning Collaborative (Collaborative). The Collaborative offered AMGA member organizations enrolled in the National Campaign the opportunity to participate in a supplemental intensive learning Collaborative that provided additional resources to improve the care of patients with T2DM. The Collaborative was an expansion of AMGA's successful 6-month pilot initiative (see Introduction 1.1 in Supplementary Content S1), which sought to improve clinical outcomes in people with T2DM by use of a bundle measure that included A1c and BP control, lipid management, and medical attention for nephropathy. None of the HCOs participating in the pilot program participated in the Collaborative.

The purpose of this study was to describe the quality improvement activities of the 10 HCOs participating in the Collaborative, assess the improvement in the Core Bundle measure over time, and compare with the improvement achieved in the National Campaign.

Materials and Methods

Study sample

The 1-year Collaborative (March 2019 to February 2020) included patients aged 18 to 75 years with T2DM, at 10 US-based HCOs that implemented interventions to improve an all-or-none diabetes bundle measure. To be considered ac-

tive, patients must have had at least 2 face-to-face encounters in an ambulatory setting with a primary care provider (PCP), an endocrinologist, a cardiologist, or a nephrologist and have at least 1 T2DM diagnosis on a claim or problem list in the previous 18 months.

Only active patients were included in the denominator. Patients were excluded if they were pregnant during the previous 24 months or died before the end of the reporting period. Patient volumes for each participating HCO at baseline and for the final reporting period are given in Supplementary Table S1 of Supplementary Content S2. Institutional review board approval was not required for this quality improvement project. All data were collected by each HCO as part of routine patient care and were de-identified and aggregated before submission to AMGA.

Recruitment

Fifty-six HCOs participating in the National Campaign and meeting certain selection criteria (see Methods 2.1 in Supplementary Content S1) were sent information about the Collaborative through email and were invited to apply for participation in the Collaborative. Thirteen interested HCOs submitted applications. Each HCO was assessed on the size of the T2DM patient population; feasibility, sustainability, and scalability of the interventions; size of the organization; engagement in the National Campaign activities; previous Core Bundle measure performance; and ability to meet the participation requirements of the Collaborative.

An external advisory council, consisting of experts in the fields of endocrinology, health care quality, obesity, clinical pharmacology, or population health, conducted a blind review of the applications and selected HCOs for participation.

Best practices learning collaborative

A learning Collaborative approach was employed to develop and test interventions designed to improve comprehensive care for patients with T2DM over a 12-month study period. Collaborative activities included an initial in-person meeting, webinars, sharing of best practices, education, goal setting, and peer-to-peer learning. Action plans were drafted by each HCO at the start of the Collaborative and updated bimonthly. These plans defined specific objectives and interventions, progress toward goals, and lessons learned. Qualitative information on successful interventions was collected through action plans and quarterly presentations.

Quantitative data were collated and provided to Collaborative participants in monthly progress and benchmarking reports. In addition, benchmark reports that compared the Collaborative participants with the participants in the National Campaign, including percentile rankings, were also provided (see example in Supplementary Fig. S1 of Supplementary Content S3). Each HCO employed at least 1 intervention to reach the goals defined in the Core Bundle measure. These interventions are described in Table 1. Participating HCOs were each paid a stipend of \$10,000. The stipends were used to help offset staff and analytic costs related to the Collaborative.

Measures

The primary measure for the Collaborative consisted of an all-or-none bundle measure developed for the National

TABLE 1. DESCRIPTIONS OF INTERVENTIONS

<i>Intervention name</i>	<i>Description of the intervention</i>
Daily huddles	Conducted by clinical staff with a focus on identifying gaps in diabetes care among patients who were coming into the office and addressing the gaps during patient visits
Provider/staff education	Information on multispecialty clinical guidelines shared across specialties and disciplines; focused on topics related to clinical standards for diabetes care and recommendations for mitigating barriers to achieving those standards of care
Physician performance reports	Monthly performance feedback provided to participating clinicians that enabled them to compare their performance with that of their peers
POC A1c testing (A1c control)	A1c testing conducted in the office during primary care appointments; this testing yielded current A1c results that the PCP could discuss with the patient during the visit
Core Bundle quality measures	The incorporation of the Core Bundle measure into the organization-wide quality goals
Provider incentives	Provider compensation tied to established organizational quality goals that included the Core Bundle measure
Patient outreach	Chart review and outreach to patients who were missing 1 or more clinical measures or who missed scheduled appointments
Patient education	General diabetes education, referrals to CDCESs and clinical pharmacists, and statin education provided through phone calls by care coordinators
Standing orders	Included orders for insulin titration, RD and CDCES referrals, and A1c testing
Team-based care/ weekly huddles	Multispecialty teams that worked together through weekly meetings to coordinate care for individual patients; team members included clinical pharmacists, RDs, and CDCESs in addition to physicians, nurses, advanced practice clinicians, and care coordinators

A1c, hemoglobin A1c; CDCES, certified diabetes care education specialist; PCP, primary care provider; POC, point-of-care; RD, registered dietitian.

Campaign that included A1c control (<8%), BP control (<140/90 mmHg), lipid management (prescribed a statin), and medical attention for nephropathy (see Methods 2.2 in Supplementary Content S1). To achieve this bundle measure, a patient must have been compliant (or in control) for all 4 component metrics. An example of the Core Bundle measure computation is illustrated in Supplementary Figure S2 of Supplementary Content S4, showing the complexity associated with a bundle measure that does not allow for partial credit.

The components of the Core Bundle were selected by a national measurement committee established for the National Campaign. Measure specifications for each of the components were adapted from the Healthcare Effectiveness Data and Information Set (HEDIS)¹⁷ detailed in the HEDIS 2016 Technical Specifications for Physician Measurement guide. These were adapted to meet the specific requirements of the T2G bundle measure (eg, HEDIS includes patients with both type 1 and T2DM, whereas T2G includes only T2DM; adaptation of measure denominators to allow for single denominator across all component measures of the T2G bundle).

Data submission

Participating HCOs were provided with a detailed measure specification document as well as information on how to submit data through a portal (numerators and denominators for each measure, along with total active patients and patients with T2DM). Data were collected on patients who were seen between July 2017 and February 2020, which includes an 18-month look-back period. Each HCO submitted baseline data for the 12-month period ending December 2018 and a rolling 12 months of data each month until the final data period (March 2019–February 2020). Data were then reviewed and validated, and errors and inconsistencies were addressed.

Analyses

Descriptive statistics on Core Bundle measures were prepared monthly and shared, unblinded, with all participating HCOs. Absolute and relative changes over time were calculated for individual HCOs and overall.

Baseline rates were compared with the last reported month of data. Owing to the inconsistency between baseline and intervention time periods, some measures were adjusted to account for cyclic variability (seasonality) within a year. Seasonality in A1c and BP was identified in prior analyses conducted with data from electronic health records (EHRs) from 29 AMGA members, and as a result, an adjustment to correct for the effects of seasonality was applied to the A1c, BP, and Core Bundle measures (see Methods 2.3 in Supplementary Content S1). Lipid management and medical attention for nephropathy were not adjusted, as no seasonality was detected. For comparisons between the Collaborative and the National Campaign, similar periods were used; therefore, there was no need to adjust for seasonality.

Statistical comparisons of the proportions of patients meeting the Core Bundle measure and each component measure at baseline and the final evaluation period were conducted. To do this, the authors used a 2-sample *z* test.¹⁸ *P* values were calculated for 2-tailed comparisons, and results were considered significant at the *P*<0.05 level. These analyses were conducted for each of the HCOs in the Collaborative.

For the Collaborative, improvement rates were calculated for the Core Bundle measure and each component measure. These rates were compared with improvement rates for the National Campaign participants. *t*-Tests were conducted using R software (IBM). Collaborative participants were not included in the data for the National Campaign.

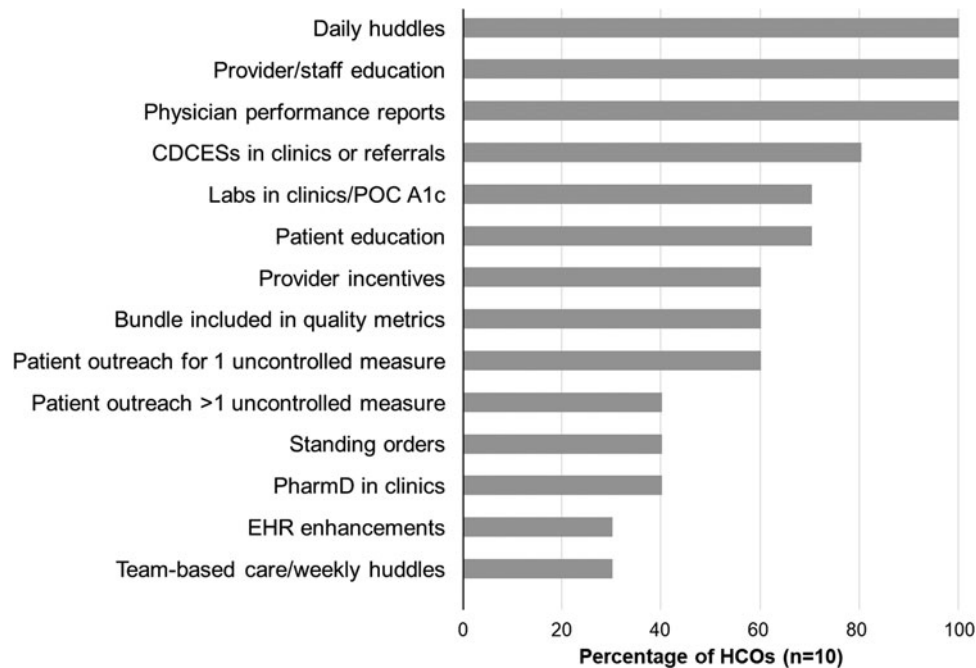


FIG. 1. HCOs implementing each intervention. A1c, hemoglobin A1c; CDCEs, certified diabetes care education specialists; EHR, electronic health record; HCOs, health care organizations; POC, point-of-care.

The additional patients achieving bundle control was assessed by calculating the change in the rate of patients who met the bundle criteria in the baseline period compared with the final intervention period. This change in rate was then multiplied by the Collaborative T2DM population from the final period.

Timeline

A timeline that describes evaluation and intervention periods of the Collaborative can be found in Supplementary Figure S3 of Supplementary Content S5.

Results

Qualitative results

The HCOs were from 8 states (PA, KY, NJ, MO, MI, LA, CA, and VA), representing multispecialty medical groups, integrated delivery systems, and academic medical centers across the country. The HCO size ranged from mid-size groups (170–280 providers), a large group (549 providers), to very large groups (1100–1870 providers). This included the specialty providers within their organization.

Each participating HCO chose best practice interventions for implementation at their health system based on the unique characteristics of their organization. Definitions of selected interventions are noted in Table 1. The interventions that were implemented by all participating HCOs included physician performance reports, provider and staff education, and daily huddles (Fig. 1).

Quantitative results

During the Collaborative, the active patient population increased by nearly 6% (1.8M–1.9M) and patients with T2DM increased by 10% (270K–297K) (see Supplementary Table S1

in Supplementary Content S2). T2DM prevalence ranged from 9% to 19% among HCOs. The average prevalence in the baseline period was 14.8% and last reporting period was 15.4%, an increase of 0.6%. The percentage increase in prevalence for each HCO ranged from –0.6% to 1.4%.

All 10 HCOs improved the Core Bundle measure in absolute percentages. The rate for the Core Bundle improved from 40.2% to 42.8%, an absolute increase of 2.6% ($P < 0.001$). The range of improvement for individual HCOs was 1.1% ($P = 0.003$) to 4.6% ($P < 0.001$) (Fig. 2). The rate for BP control increased from 76.5% to 78.6%, an increase of 2.1% ($P < 0.05$). Nine HCOs improved BP control, with greatest improvement of 4.1% ($P < 0.001$).

The rate for lipid management increased from 77.3% to 79.3%, an increase of 2.0% ($P < 0.05$). Eight HCOs improved lipid management (greatest improvement, 4.7% [$P < 0.001$]). The rate for attention to nephropathy increased from 90.7% to 91.3%, an increase of 0.6% ($P < 0.05$). Six improved attention to nephropathy (greatest improvement, 1.6% [$P < 0.001$]). The rate for A1c increased from 67.3% to 68.4%, an increase of 1.1% ($P < 0.05$). Four improved A1c (greatest improvement, 4.2% [$P < 0.001$]). One HCO had a decline in A1c control (Table 2).

Comparison with the National Campaign

Improvement in the Core Bundle measure among participants in the Collaborative was greater than improvement among participants in the National Campaign over the same period (difference in absolute improvement rate, 1.1% [$P = 0.02$]) (Table 3). Furthermore, the improvement rate for the Collaborative (2.5%) was 1.8 times greater than the improvement rate among the participants in the National Campaign (1.4%) (see Supplementary Table S2 in Supplementary Content S6).

As a result of the Collaborative improvements, the authors estimate the equivalent of an additional 7730 (26 per

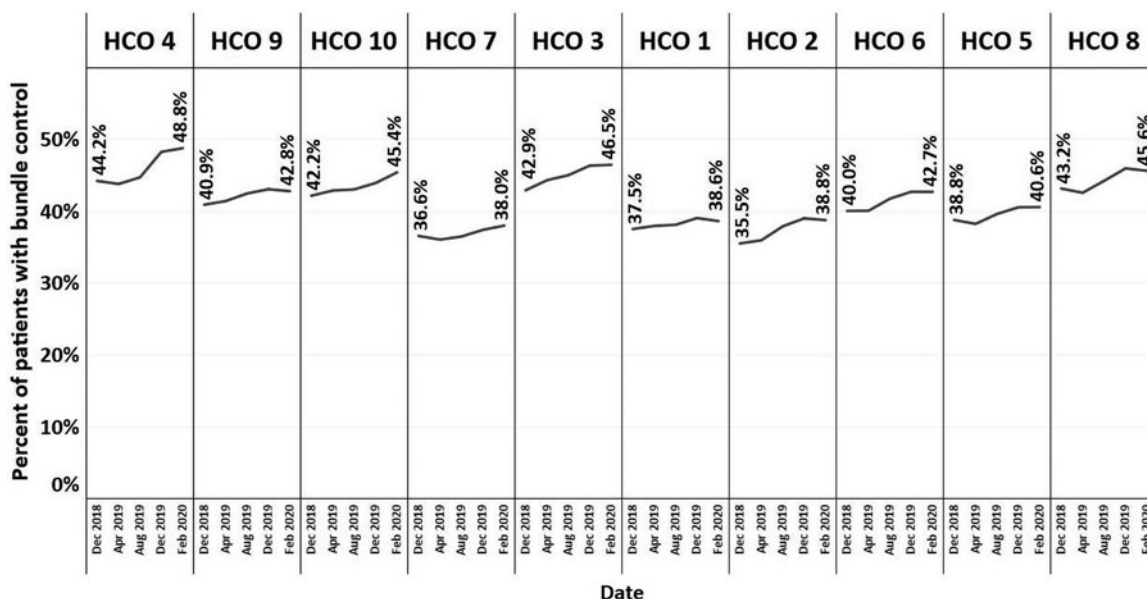


FIG. 2. Trendline for the core bundle measure by HCO. Data are adjusted for seasonality. BL, baseline; HCO, health care organization.

1000) patients achieved Core Bundle control, 3270 (11 per 1000) patients achieved A1c control, 6243 (21 per 1000) patients achieved BP control, 1784 (6 per 1000) patients achieved attention for nephropathy, and 5946 (20 per 1000) patients received lipid management.

Discussion

Providing comprehensive care to patients with T2DM in the primary care setting requires the achievement of multiple performance measures. There are several options for calculating performance on multiple discrete measures for the same condition, including item-by-item and composite measurement. The all-or-none bundle, described by Nolan et al,¹⁵ is the most challenging, as it requires achievement on all the measures in the bundle to reach adherence.

However, it also offers several important advantages when measuring performance. First, it more closely reflects the interests of patients, which can result in more comprehensive patient-centered care. Second, it promotes a system perspective that requires teamwork across departments to identify and address gaps in care. Finally, it is a more sensitive scale for assessing improvements, as the component measures differ in level of achievement, leaving the most room to improve on low-performing measures.

Each of the organizations participating in the Collaborative successfully improved the Core Bundle measure. This took time, focus, and collaboration across multidisciplinary teams. Teamwork was successfully endorsed through goals that were aligned across specialties and focused on the quality measures that composed the Core Bundle.

Other studies employing all-or-none diabetes bundles have been previously reported,^{11,13,14} however, 1 major difference between this initiative and previous studies is that it involved implementing a bundle measure across multiple HCOs in a Collaborative environment. The results presented here are comparable with those previously published, as participating HCOs successfully increased bundle measure performance and improved the care of patients with T2DM.

The percentage of patients meeting the Core Bundle measure increased by up to 4.6% in only 1 year, which is similar to the improvement observed after the bundle intervention in the Geisinger Health System.¹³

Across the 10 participating HCOs, findings regarding the success of interventions were consistent. For example, provider education that enabled a better understanding of current guidelines was a key component for successfully improving the Core Bundle measure. Providers required education on how to address the complexity of treating multiple conditions (glycemic control, hypertension, and dyslipidemia) in a single patient, including the management of multiple medications. Successful organizations simplified the guidelines into a single concise message and provided updates as guidelines changed. Provider education was shared in a variety of venues, including department meetings and one-on-one reviews with providers.

Formal processes and tools developed to facilitate clinical decision making were also integral in the improvement of the Core Bundle measure. The tools were incorporated into the EHR to assist providers with making treatment decisions and to promote standardization of care across the organization. Several HCOs implemented these types of tools as part of the Collaborative.

Multispecialty teams conducted weekly huddles to develop care plans for individual patients, which were then shared with the PCP. Staff in the primary care setting used the care plans to conduct outreach to patients with care gaps and bring them into the office for care.

All HCOs provided feedback reports to physicians that allowed them to benchmark their performance against that of their peers. Benchmark reports were valuable because physicians had high expectations about their performance. Regular face-to-face peer-to-peer mentoring meetings were used as a strategy to present these reports to providers. This was beneficial because it afforded the physicians an opportunity to express their concerns and to receive mentoring, support, and one-on-one education when needed.

TABLE 2. CHANGE IN COLLABORATIVE MEASURES OVER TIME FOR EACH HEALTH CARE ORGANIZATION

Measure	HCO	Rate (December 2018 adjusted) ^a , %	Rate (February 2020 adjusted) ^a , %	Absolute change, %	Z	P
Core Bundle	1	37.5	38.6	1.1	3.0	0.003*
	2	35.5	38.8	3.3	7.8	<0.001*
	3	42.9	46.5	3.6	7.9	<0.001*
	4	44.2	48.8	4.6	6.4	<0.001*
	5	38.8	40.6	1.8	3.6	<0.001*
	6	40.0	42.7	2.7	11.2	<0.001*
	7	36.6	38.0	1.4	2.4	0.015*
	8	43.2	45.6	2.4	3.1	0.002*
	9	40.9	42.8	1.9	5.6	<0.001*
	10	42.2	45.4	3.2	7.0	<0.001*
A1c control	1	71.0	70.2	-0.8	2.3	0.022*
	2	69.1	71.0	1.9	4.7	<0.001*
	3	68.1	68.3	0.2	0.5	0.637
	4	67.7	71.9	4.2	6.4	<0.001*
	5	67.4	68.3	0.9	1.9	0.062
	6	68.1	68.1	0.0	0	1.00
	7	65.4	66.4	1.0	1.8	0.077
	8	65.0	65.1	0.1	0.1	0.893
	9	61.9	64.1	2.2	6.6	<0.001*
	10	42.2	45.4	3.2	7.0	<0.001*
BP control	1	74.3	76.3	2.0	6.1	<0.001*
	2	75.5	77.8	2.3	6.2	<0.001*
	3	76.7	78.6	1.9	5.0	<0.001*
	4	74.0	75.1	1.1	1.8	0.079
	5	79.1	81.5	2.4	5.8	<0.001*
	6	74.4	76.9	2.5	11.9	<0.001*
	7	73.8	75.4	1.6	3.1	0.002*
	8	79.9	84.0	4.1	6.8	<0.001*
	9	77.7	78.5	0.8	2.8	0.005*
	10	80.0	82.3	2.3	6.4	<0.001*
Nephropathy	1	91.2	91.0	-0.2	0.9	0.359
	2	87.2	87.9	0.7	2.4	0.016*
	3	91.2	92.7	1.5	6.1	<0.001*
	4	93.6	94.3	0.7	2.0	0.041*
	5	90.9	90.9	0.0	0	1.00
	6	88.8	89.0	0.2	1.3	0.194
	7	91.2	91.0	-0.2	0.6	0.556
	8	91.1	92.0	0.9	2.1	0.038*
	9	93.9	94.6	0.7	4.4	<0.001*
	10	88.4	90.0	1.6	5.6	<0.001*
Lipid management	1	67.9	70.2	2.3	6.5	<0.001*
	2	66.0	70.7	4.7	11.5	<0.001*
	3	82.8	85.8	3.0	9.1	<0.001*
	4	87.5	89.9	2.4	5.3	<0.001*
	5	71.4	72.3	0.9	1.9	0.053
	6	79.1	82.0	2.9	15	<0.001*
	7	76.7	76.7	0.0	0	1.00
	8	81.5	83.2	1.7	2.9	0.004*
	9	83.6	84.1	0.5	2.0	0.049*
	10	76.4	78.4	2.0	5.2	<0.001*

^aData are adjusted for seasonality.

* $P < 0.05$.

A1c, hemoglobin A1c; BP, blood pressure; HCO, health care organization.

One HCO that used quality coordinators to identify patients with missing laboratory values, patients who had not attended an appointment within the past 12 months, and patients with BP or A1c values that were not in control had a 4% increase in A1c control. Another that included the BP measure across multiple value-based contracts for related

specialties and incorporated an incentive component that was contingent upon the achievement of the Core Bundle measure realized a 4% increase in the BP measure.

Improvements in the lipid management measure required additional education for both providers and patients on the benefit of statins in reducing risk of CV disease. One HCO

TABLE 3. COMPARISON OF CHANGE OVER TIME BETWEEN PARTICIPANTS IN THE COLLABORATIVE AND THE NATIONAL CAMPAIGN, 2018 VERSUS 2019

Measure	Collaborative (n=10)	National Campaign (n=51) ^a	Percent difference	P
	Absolute percent change, mean (\pm SD) ^b	Absolute percent change, mean (\pm SD) ^b		
Core Bundle	2.5 (1.0)	1.4 (10.9)	1.1	0.02*
A1c <8%	1.1 (1.1)	0.5 (2.4)	0.6	0.24
BP <140/90 mmHg	1.8 (0.9)	1.1 (1.9)	0.7	0.09*
Attention to nephropathy	0.7 (0.7)	0.4 (2.9)	0.3	0.49
Lipid management	1.8 (1.3)	1.5 (2.5)	0.3	0.54

^aNational Campaign includes 51 HCOs that reported in both 2018 and 2019.

^bData represent same period for both groups (January–December 2018 vs. January–December 2019); therefore, seasonality adjustment was not performed.

* $P < 0.05$.

A1c, hemoglobin A1c; BP, blood pressure; HCOs, health care organizations; SD, standard deviation.

that increased lipid management by nearly 5% focused on clinical education. To educate patients and reduce hesitancy to take statins, the HCO trained staff members in motivational interviewing techniques and provided them with scripts to use during outreach phone calls with patients, which increased the acceptance of statin use. Best practice alerts were programmed into the EHR to notify providers when a patient required a statin medication.

Finally, 4 HCOs that conducted point-of-care (POC) A1c testing found that it was valuable: it improved the efficiency of testing for patients and supplied providers with current information during visits, which led to more meaningful conversations with patients. One HCO that added POC A1c testing during the Collaborative reported that a strong partnership, including networking and communication, between the laboratory and primary care practices was necessary for implementation. Within this HCO, a pilot study at 4 clinic sites was required to ensure that the results from POC tests were consistent (valid and reliable) with the results generated in the laboratory. When this concern was addressed, POC A1c testing was expanded into 10 primary care areas within the organization.

There were several notable strengths of the Collaborative structure. For example, HCOs were permitted to implement appropriate interventions that fit within their local contexts, but all reported on the same set of measures. This allowed for consistency of the data across organizations and between the National Campaign and the Collaborative, enabling valid benchmarking and comparative analyses.

In addition, HCOs reported the intention to continue to collect these measures, further demonstrating the measures' perceived value. Advantages of the Collaborative versus the National Campaign included increased accountability and focus, sharing of best practices among participants, required quality improvement documentation, quality improvement guidance from AMGA, regular virtual meetings, site visits, monthly reporting, and honoraria, which motivated sites to focus more on the Core Bundle measure.

One positive unintended outcome of this study was the HCO's enhanced ability to prioritize diabetes care during the disruptions resulting from the coronavirus disease 2019 pandemic. Although the intervention period ended in February 2020, participating HCOs reported in a wrap-up meeting that took place in July 2020 that they now had

interventions in place to identify at-risk patients, enabling them to more readily and successfully adopt innovative strategies such as drive-through A1c testing.

Limitations

This study had several limitations. The organizations were diverse in size, structure, and patient population, and they had different levels of overall resources available for this program. Although all participating organizations adhered to the requirement to implement strategies to improve the Core Bundle, each chose different interventions and, in some cases, followed different implementation strategies that were difficult to assess with aggregate data (eg, staggered the implementation of different interventions, implemented interventions in a portion of primary care locations vs. all locations).

Every location for each HCO was not required to participate; however, for all HCOs, the data submitted represented the entire organization and were not limited to the specific locations conducting interventions. This potentially diluted the results because most of the interventions were only implemented within a subset of areas within the organization. Nonetheless, this limitation was somewhat mitigated by the implementation of certain interventions, such as physician performance reports, across the entire organization.

The structure of the Collaborative did not allow for a single cohort of patients to be followed over time. Instead, patients moved in and out regularly. The inability to follow one population over time may have diluted the effects of the intervention. New patients were consistently presenting at the clinics, making it difficult to improve their individual measures. In addition, the lack of individual patient data prevented stratification of the results by patient characteristics.

Despite these limitations, this study demonstrated the feasibility of achieving success with a bundle measure for patients with diabetes at geographically and structurally diverse HCOs. In addition, HCOs demonstrated the ability to collect and report data from an EHR to track progress on the components of the Core Bundle measure. The participating HCOs consistently found value in each of the measures for comprehensive monitoring of their diabetes programs, and the measures played a key role in this Collaborative to stimulate continuous improvement as well as to gauge success.

Conclusions

The HCOs that participated in the intensive 12-month Best Practices Learning Collaborative achieved greater improvement in the Core Bundle measure when compared with those in the National Campaign. The Collaborative touched the lives of nearly 300,000 patients with T2DM, achieving improvements in comprehensive diabetes care for the equivalent of more than 7730 additional patients.

Acknowledgments

The authors thank advisors Frank Colangelo (Premier Medical Associates), Megan Dorrell (Community Health Network), Jamie L. Reedy (Summit Health Management), Tony Hampton (Advocate Aurora Healthcare), Gretchen Schull (Mercy), and Alisa Schiffman (Novo Nordisk, Inc.) for assistance with 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.

The authors also thank John Cuddeback and Jill Powelson for designing the pilot study and conducting the seasonality analysis in collaboration with Optum[®]. Writing assistance was provided by Amy Ross, PhD, of PRECISIONscientia, Yardley, Pennsylvania, and was supported financially by Novo Nordisk, Inc., Plainsboro, New Jersey, in compliance with international Good Publication Practice guidelines.

Authors' Contributions

Ms. Rattelman, Dr. Kennedy, Ms. Chambers, and Dr. Ciemins participated in study design and data collection, analysis, and interpretation. Dr. Hamersky participated in the study design and data analysis and interpretation. Dr. Leng participated in data analysis and interpretation. Dr. Grant participated in data analysis and interpretation and drafted the article. All authors contributed to the revision of the article and approved the final version for submission.

Author Disclosure Statement

Dr. Hamersky and Dr. Leng are employees of Novo Nordisk, Inc. For the remaining authors, no competing interests were declared.

Funding Information

This Collaborative initiative was funded by Novo Nordisk, Inc.

Supplementary Material

Supplementary Content S1
 Supplementary Content S2
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