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Evaluation of Nutritional Guidance from Providers for Patients with Type 2 Diabetes in a Primary Care Setting

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By

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Abstract

Background: Adherence to diet is a challenging part of managing type 2 diabetes mellitus (T2DM). Guidelines recommend including a registered dietician and/or a diabetes educator. While this is the gold standard, there are barriers to implementation in primary care. The Starting the Conversation (STC) diet recall tool can aid primary care providers (PCPs) in providing brief nutrition counseling for patients with T2DM.

Purpose: To evaluate the perceptions and practices of PCPs regarding dietary education and documentation for patients with T2DM after provider education and initiation of the STC tool.

Methods: This was a non-randomized, quasi-experimental pretest post-test design, with a sample of three PCPs in one primary care clinic. Provider perceptions and subjective current practices were measured. Chart reviews provided patient A1C and provider utilization data. STC and smart phrase training was provided. The STC tool with printed dietary education was available for use in the clinic for four weeks.

Results: 100% participated (three providers). Survey results revealed an increase in use of the STC tool, smart phrase, and perceived time available to provide counseling. Barriers identified were time, inadequate teaching materials, and inadequate reimbursement. There was a significant increase in dietary counseling documentation (pre=17.3% vs. post=35.4%, p=0.004) and smart phrase usage (pre=2.7% vs post=18.5%, p=<0.001), and a non-significant increase in billing for preventive services (pre=0% vs. Post=3.1%, p=0.090).

Conclusion: When a registered dietician is not available, the STC tool and smart phrase could help PCPs provide and document quick nutritional counseling. This practice has potential

anywhere PCPs treat those with T2DM. More study is needed to determine if this practice helps decrease A1C levels and increase reimbursement rates for clinics.

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Background and Significance

Diabetes prevalence is increasing worldwide, and it has become an international health crisis. In the United States, type 2 diabetes mellitus (T2DM) affects more than 30 million people and was the 7th leading cause of death in 2017 (Bross et al., 2022). Poorly managed T2DM increases risk for stroke, renal dysfunction, cardiovascular disease, vision loss, and neuropathy (Ojo, 2021). In 2012, costs associated with T2DM were estimated to be 245 billion U.S. dollars (Bross et al., 2022).

Good nutrition is an important aspect of effective T2DM management. Diabetes diet plans help to regulate blood lipid levels, improve insulin resistance, and decrease weight in those with T2DM (Wang et al., 2018). In a study conducted to assess barriers for providing standard of care diabetes management in primary care, over half of patients reported a poor diet plan as the reason for their poor diabetes control (Kumar et al., 2022). Patients with T2DM often lack awareness of nutritional recommendations for glycemic control (Ruszkiewicz et al., 2020).

Since adhering to an appropriate diabetes diet is often the most challenging part of effectively managing the disease, patients with T2DM need tailored health education about diet control modifications to meet their nutritional and lifestyle goals (Bross et al., 2022). Diabetes self-management education (DSME) provides a basis for T2DM self-management, and it is important for providers and their practice settings to ensure referral to these programs consistently (Powers et al., 2016). It has been shown to reduce hospital admission, reduce A1C by up to 1%, and lower patients' risk for complications (Powers et al., 2016). Medical nutrition therapy (MNT) is an aspect of DSME which can only be delivered by a registered dietician (RD). MNT is reimbursed at a lower rate than the standard fee-for-service evaluations which causes low motivation for health systems to provide this service (Rosenfeld et al., 2022). Despite

the proven benefits, the number of patients who receive DSME is low and dietary conversations are not always happening between PCPs and their patients with T2DM, which unfortunately leaves a significant gap in care for patients with T2DM (Bross et al., 2022; Powers et al., 2016). Patients are often motivated and desire diet education; however, patients are unlikely to receive education in the primary care setting due to tight time constraints, lack of desire from PCPs to have these discussions, and many do not feel adequately trained to do so (Bross et al., 2022). Patients often identify PCPs as their primary source of nutrition education and since placing a referral for DSME or MNT is not always an option, discussions between PCPs and patients in the primary care setting can be an ideal place for dietary counseling (Bross et al., 2022). If PCPs can use a timely method that allows them to assess diet and deliver timely counseling, this could help to minimize the gap.

The Starting the Conversation (STC) tool is a simple, valid, and efficient eight-item simplified food frequency instrument intended for use by non-dieticians in primary care and health-promotion settings (Paxton et al., 2011). A diet screening tool such as the STC Diet Recall tool can aid PCPs (primary care providers) in providing a brief dietary intervention with nutrition counseling for their patients with T2DM.

Problem Statement

Patients with diabetes report a poor diet plan as a common reason for their uncontrolled diabetes (Kumar et al., 2022). The gold standard for nutritional management for all patients with T2DM includes customized care with a registered dietician to develop a nutrition plan. If this cannot be facilitated, they should be receiving dietary counseling from their PCP. Due to multiple barriers, often neither thing is happening (Arnett et al.; Bross et al., 2022; McBride 2022. To avoid barriers that exist with referrals, PCPs can address and bill for dietary counseling

during patient appointments. The STC tool is a quick and efficient way that PCPs can provide dietary counseling to patients with T2DM in the primary care setting (Paxton et al., 2011).

Context, Scope, and Consequences of Problem

Given the rapidly rising rate of T2DM, it is estimated that by the year 2035, there will be over 600 million people diagnosed with T2DM around the world. This is a momentous problem because poorly managed T2DM can have a significant impact on morbidity and mortality (Ojo, 2021). People who have T2DM are at an increased risk for heart disease, chronic kidney disease, nerve damage, poor foot health, hearing loss, vision loss, and poor mental health (CDC, 2022). In addition, the medical costs and costs associated with lost work and wages for those with T2DM cost $327 billion (about $1,000 per person in the US) yearly (CDC, 2022).

Positive diet and lifestyle changes are of the utmost importance to long-term T2DM management and prevention of other chronic illnesses. Low glycemic-index (GI) diets have been proven to improve glycemic control in people with T2DM. People with T2DM who follow a low-GI diet produce improvements in Hemoglobin A1C (HgbA1c) and their cardiometabolic risk factors. Low GI dietary patterns can also decrease patients' need for hyperglycemic medications (Chiavaroli et al., 2021). Individuals who eat a diet with a high GI have been shown to be at increased risk for an adverse cardiovascular event or death. The evidence supports that education about nutrition is one of the most effective ways that diabetes-related complications can be postponed (Ruszkiewicz et al., 2020).

Living with T2DM requires active daily self-management of the disease. Evidence shows that those with higher levels of health literacy yield better diabetes knowledge (Marciano et al., 2019). Health literacy involves obtaining, processing, and understanding education delivered by health-care providers (Marciano et al., 2019). Many people with T2DM often have high

motivation and perceptiveness for education about their diet and lifestyle, and they often identify PCPs as a valuable resource for nutrition education. However, providers often indicate that they have an inadequate amount of time, training, and/or desire to counsel their patients about nutrition (Bross et al., 2022).

A similar DNP project that was completed at a primary care clinic yielded findings that suggested that patients would prefer to discuss nutrition with their PCPs rather than being referred to another healthcare provider, but PCPs face barriers to doing this such as time and perceptions that patients are not responsive to the education (McBride, 2022). The results of this project revealed that some PCPs find the STC tool useful in practice and that it is helpful to have the resource available for assistance with dietary counseling (McBride, 2022).

The barriers that providers face such as time, lack of training, and lack of desire to provide education have not only been identified in the literature and previous projects but also at a local primary care clinic where this DNP project took place. A need for this project was identified at this clinic and so this project was created to facilitate provider-initiated diet assessment and intervention so that patients with T2DM were able to receive.

Current Evidence-Based Interventions/Strategies Targeting the Problem

According to the 2019 Report of the American College of Cardiology (ACC)/American Heart Association (AHA) Task Force on Clinical Practice Guidelines, a tailored nutrition plan that is developed with the help of a diabetes education program or RD is recommended for all adults with T2DM. The nutrition plan is a grade A recommendation for clinical practice that helps patients with T2DM improve glycemic control, lose weight if needed, and improve cardiovascular risk factors (Arnett et al., 2019). Specific recommendations include heart-healthy nutrition options such as the Mediterranean, DASH (Dietary Approaches to Stop Hypertension),

and vegetarian/vegan diets. Carbohydrate monitoring, increased fiber-rich whole grains, red meat in moderation, and limited refined carbohydrates are also recommended for patients with T2DM (Arnett et al., 2019).

Clinical practice guidelines recommend that to establish a healthy eating plan, customized interdisciplinary care including a registered dietician nutritionist and/or a diabetes educator can help patients meet their nutritional goals (Arnett et al., 2019). While this is the gold standard in nutritional management for patients with T2DM, this is not always feasible because of access, and it is not always what the patient prefers (McBride, 2022). Many patients prefer to receive dietary counseling from their PCPs because they are trusted individuals who are familiar with them and/or because of issues such as access, time, and cost that can be associated with going to an appointment with a specialist (McBride, 2022). PCPs have found it to be helpful to provide dietary counseling using the STC tool as a guide (McBride, 2022). This makes the STC tool a good alternative or addition to counseling from a registered dietician that can be provided in primary care settings.

Purpose/Objectives

The purpose of this DNP project was to evaluate the perceptions and practices of PCPs regarding dietary education delivery to patients with T2DM and to evaluate dietary education documentation in the electronic medical record (EMR) after providing provider education and initiation of the STC tool in a primary care clinic.

The specific aims included:

- Implementation of a provider-based presentation on the STC tool which will educate providers on its potential for practice improvement

- Evaluation of the use of a smart phrase to document and bill for dietary counseling
- Evaluation of provider documentation practices at baseline and post-intervention
- Assessment of diabetes A1C quality measure data within clinic pre-intervention and post-intervention (clinic goal is <6.4; pre-intervention clinic data revealed that patient A1C levels were near the target but below baseline)

Review of Literature

A review of literature was completed to gather evidence for the study. The PICOT question that guided the review of literature and project is: "Within primary care settings, what dietary counseling practices are effective at increasing patient knowledge of recommended nutrition plans among patients with T2DM, and are they being done?" Supporting questions that helped to guide the review were: 1) "What does the evidence say is the best way to deliver dietary education to patients with T2DM?", 2) "What strategies are being used in outpatient settings to counsel patients with T2DM about diet?", 3) "What are the barriers that providers face with dietary counseling for their patients with T2DM?" A systematic search was completed to find literature that answered the above questions regarding dietary counseling for patients with T2DM in the outpatient setting. PubMed and CINAHL were the search databases used for literature review. In the search, the following keywords were used to find corresponding literature: diabetes, education, primary care, provider, type 2 diabetes, barriers, starting the conversation tool and diet. Articles were considered if they were published within the last 12 years, written in English, available in full-text, and were either a systematic review or randomized controlled trial. Exclusion criteria omitted articles not based in primary care, articles not focusing on dietary counseling, and research not on patients with T2DM.

Summary of Evidence

A literature search using PubMed and CINAHL yielded 8 research articles that could be used for the literature review. The overarching themes were: 1) Dietetic consultations for adults in primary care are effective at improving diet quality and diabetes outcomes (Galendi et al., 2022; Mitchell et al., 2017; Moller et al., 2017). 2) Individualized nutrition therapy provided by a dietician vs dietary advice provided by other health professionals yields a greater effect on HbA1c, weight, and LDL cholesterol (Garcia et al., 2022; Moller et al., 2017; Simoes Correa Galendi et al.,2022). 3) In order to obtain good metabolic control, it is necessary to address nutritional habits and individual education can have a profound impact on HbA1c levels (Cruz-Cobo et al., 2020; Eshete et al., 2023; Henderson et al, 2023). The review also revealed that there is a lack of training on nutritional advice delivery and excessive patient load makes it difficult for providers to help patients with lifestyle changes (Simoes Correa Calendi et al., 2022). The literature search also revealed that there is a need for a multidisciplinary team, including a dietician, for those with T2DM; however, most patients do not have access to a multidisciplinary team and therefore receive their diabetes care from an internist or family practice provider (Dankoly et al., 2021). The STC diet recall tool was found to be a simple, valid, and efficient tool to use for dietary assessment and intervention in a primary care setting (Paxton et al., 2011). The strength of evidence used in this review is strong. Only systematic reviews and randomized controlled trials were considered during the search for literature on PubMed.

Gaps in Practice

Diet and lifestyle are the foundation of successful diabetes management. Targeted dietary counseling helps patients to improve patient outcomes. Low GI diets are the recommended nutritional strategy to help patients with diabetes control their fasting glucose level, lower their

A1C, and decrease cardiometabolic risk factors (Chiavaroli et al., 2021). In current practice, it is recommended that PCPs deliver education and refer to nutrition professionals to help patients improve biomarkers of chronic disease. However, the research suggests that education regarding nutrition provided by any professional can support improvement in dietary patterns (Mitchell et al., 2016). Barriers to supportive nutrition assessment and care include long wait times for patients to get in to see a licensed dietician, lack of insurance coverage for dietary counseling, geographic accessibility, limited time for dietary education, and lack of confidence from providers to deliver quality education.

How Project Addresses Gaps

Ideally, patients with T2DM are referred to receive dietary counseling from DSME and/or MNT programs. The research suggests that this is the gold standard. However, given the above barriers, often this does not happen therefore dietary counseling often falls on PCPs. The gap is that patients are not receiving diabetes dietary counseling from their care team. Primary care providers could use a validated diet screening tool, like the STC tool, that is quick and efficient. The use of this tool can help address this gap in care for patients with T2DM.

This project helped to address the care gap by aiming to increase the diet education exposure patients receive at their office visits for T2DM. It is important that these appointments include comprehensive diabetes care since many patients are not getting diabetes-focused care from registered dieticians or other T2DM educators. If PCPs start using the STC diet assessment tool with attached diet education with patients, it could help patients to reflect on their lifestyle habits and learn how to obtain better glycemic control overall.

Conceptual Model

Kurt Lewin's three stage model of change was the conceptual model that was chosen to guide this project. This model is applicable to this project as it relates to changes in providers' behaviors. This theory consists of three stages of change: unfreeze, change, and refreeze (Malik, 2024). During the unfreeze stage, PCPs' perception management is taken into consideration, and they are prepared for a change (Malik, 2024). Effective communication about the change is important during this stage. In this project, straight-forward guidance was given to the providers with literature to back up the need for change. During the change stage, the implementation of the STC tool and new process was rolled out in the clinic. This stage in the model was supported by engaging the medical staff and reminding them about the STC tool and how to use it. During the refreeze stage, it is important to collect employee feedback, which was done through surveys (Malik, 2024). It was also beneficial to identify a change champion. In the case of this project, the change champion was the clinical mentor, a PCP in the clinic (Malik, 2024). She helped to remind staff about the new process and encouraged documentation with the new smart phrase.

Resistance to change was to be expected and was a barrier with this project. To address resistance going forward, it would be beneficial for continued similar projects at this site that would help to continue education and participation. Identifying a change champion was important to combat other PCPs' resistance to changing their practice. Given the limited time for the project, another barrier to change was inadequate training. There was only time for one in-person training session, however, the PCPs would have likely benefited from more.

Methods

Design

This study was conducted using a non-randomized, quasi-experimental pre and post-test design, with a single-group convenience sample of PCPs in one primary care setting.

Setting, Agency Description

This project's setting was at a primary care clinic affiliated with a private health care system in central Kentucky. This clinic offers community medicine, primary care, preventive services, and continuity of care for families. The clinic offers diagnosis and treatment of acute and chronic illnesses and injuries for children and adults. Family medicine providers at the clinic are trained to provide personalized, patient-centered, and evidence-based primary care to patients of all ages. They also provide comprehensive care for chronic illnesses, such as T2DM.

Congruence of Project to Selected Agency's Mission, Goals, and Strategic Plan

The agency's mission includes a commitment to patient care, education, and research to create a healthier Kentucky. The agency's direct values include reverence, integrity, compassion, and excellence. The project aligned well with the agency's mission, goals, and strategic plan. From the year 2000 to 2018, T2DM in Kentucky adults doubled from 6.5% to 13.7%. Through the clinic's mission, increased access to self-care resources for patients such as diet counseling could help patients with T2DM to improve their lifestyles and create a healthier community.

Description of Stakeholders

There were a handful of stakeholders that were identified during this project. One stakeholder for this project included the clinical mentor that helped to oversee the project in the clinic and helped to develop the smart phrase used for documentation. Other stakeholders included the practicing providers, nurses, and medical assistants in the clinic who helped to

facilitate this project and offered their time and commitment. The patients who were seen in the clinic who have T2DM were also stakeholders, since this project aimed to benefit their needs. The clinic manager and medical director were also stakeholders because this project sought to improve the quality measure data in the clinic and improve outcomes for patients.

Potential Site-Specific Facilitators and Barriers to Implementation

The site-specific facilitators included the STC tool, as it was already validated and available for use with clinic patients. Other facilitators included: the handout with educational information for patients, the Epic electronic medical record system, clinic computers, email, survey research, and supportive stakeholders. Barriers when implementing this project included: time constraint, resistance towards change from clinic staff, and patient refusal to participate in education.

Sample

The study's convenience sample consisted of 3 PCPs at a primary care clinic in central Kentucky. Inclusion criteria for the providers involved in the project was that they must be actively treating patients with T2DM in the clinic. Providers were excluded if they were not in the cohort of three PCPs that were identified to participate in this study. No exclusion was made for any sex, gender, or racial/ethnic group.

The study population also included indirect participants (N=150 pre-intervention, N=65 post-intervention) since this study included chart reviews of patients at the clinic. This second sample included the patients' whose charts were reviewed by the PI to collect dietary documentation data. The patients selected for chart reviews were randomly selected. Inclusion criteria included patients who were seen in the clinic for their T2DM and had a Hgb A1C of 6.4% or greater during the visit.

Procedure

The Institutional Review Board granted final approval on September 6, 2023. Surveying began after IRB (Institutional Review Board) approval and concluded after post-surveys and chart reviews were complete. The proposed dates of enrollment were from September of 2023 through March of 2024.

Evidence-Based Intervention

There was an evidence-based intervention during this project that was delivered by the PI. During the educational presentation, staff were educated about how to use the STC tool with printed education during clinic appointments with patients who have T2DM. They were instructed on how to document the counseling using a smart phrase and how to submit for billing for reimbursement purposes. The smart phrase is something that the PI and clinical mentor created in the fall of 2023 so that it would be available for use for the study. The educational presentation also included information about clinic quality measure data and project goals.

After the providers that wished to participate took the pre-survey, there was an opportunity for staff to listen to an in-person education session during their lunch break on November 1st, 2023 (see Figure 3 in Appendix B for educational flyer used for PCP intervention). The education was to be made available to the providers regardless of whether they participated in the pre-survey. The clinic's assistive staff were educated at different time points throughout the study to remind them about rooming patients with T2DM with printed STC tools and education handouts. After the educational intervention was complete, the STC tool with printed dietary education was available for use in the clinic for 4 weeks before post-surveys were sent.

Smart Phrase

The smart phrase is a tool available in some EMR systems that helps make writing patient notes faster and easier. It allows for commonly used portions of text to be simply positioned into patient notes by typing a period followed by a short user-generated phrase. The Smart-Phrase was created for this DNP project with the help of the clinical mentor and the clinic site EPIC specialist. The phrase included the following information when added to the note:

1. Most recent HbgA1C level
2. Yes/no drop-down box to chart whether the STC diet recall tool was used during the visit
3. The following phrase, "Dietary counseling provided. Non-pharmacological interventions such as low carb diet, high in vegetables and fruit discussed. The patient chose the following goal to work on until next follow-up visit: cut back on fast food, increase fruit and/or vegetable servings, find replacements for sweetened beverages, increase lean proteins, eat healthier snacks, eat healthier sweet treats, and choose healthier fats" (one goal is available to choose from a drop-down list)
4. Time spent: _____ (free text)
5. Billing codes: Add CPT CODE 99401 Preventive Counseling, if the time spent is 8 minutes or greater
6. Add visit (E&M) code Z71.3 Dietary Counseling and Surveillance to your visit diagnoses codes

Measures and Instruments

The STC tool is a validated eight-item food-frequency screener that was used by PCPs to assess dietary patterns of patients with T2DM and prompt dietary counseling if warranted. The tool grades the frequency of different dietary habits to produce a total summary score ranging

from 0-16. Higher scores indicate less healthy eating patterns. The STC tool was chosen for this project due to its conciseness, ease of use for non-dieticians, and documented validity. The STC diet recall tool is available to view in Appendix B.

Survey research data was collected in two web-based surveys created using Qualtrics software (pre- and post-intervention). The surveys were valid, used in a previous DNP study, and modified for use in this study based on the literature review and expert panel review. The survey questions were mostly written in a Likert scale format, yes/no response, and free text. The survey that was distributed pre-intervention consisted of 15 questions and the survey that was distributed post-intervention consisted of 21 questions. Both surveys can be viewed in Appendix A.

Data collection

Before sending out the invitation to participate, the clinic supervisor gave permission to email PCP email addresses. Potential participants at the primary care clinic were contacted via their email addresses to inform them about the opportunity to take surveys. A cover sheet explaining the goal of the study and study procedures was sent with the electronic survey links (refer to Appendix C for survey cover letter). The pre-survey was sent out on October 12, 2023, and remained open for 2 weeks. The post-survey was sent out on Nov. 25th, 2023, and remained open for 2 weeks. Two reminder emails were sent when the surveys were open. Survey responses were confidential. Survey participants were given unique identifiers so that data could be linked. The unique identifiers helped to assess overall changes from pre-intervention to post-intervention.

This study also included data collected from patient chart reviews. Dietary documentation, billing, and patient A1c data for the chart reviews were collected prior to the

study intervention and after the study intervention. The statistician helped in developing a data management and analysis plan for the data collected from chart reviews. The PI did not receive a code/link to re-identify any data. For the chart-review process, charts were selected based on patient A1C level during the visit and which provider they were seen by. If the patients' A1C level was 6.4 or greater, their chart was considered for review. This project was completed on one side of the practice clinic, among a cohort of 3 PCPs, and only patients seen by those three providers were selected during chart reviews. The goal was to review 150 charts pre-intervention and 150 charts post-intervention. Information that was reviewed in the patient charts included data found in the lab results (A1C), data pertaining to dietary education in the provider note section under the "plan" portion, and data found in the billing overview section of the visit. Charts were chosen if the patient's A1c was 6.4 or greater at the time of visit. Charts that qualified were pulled and were chosen randomly from the selection for review. After the pre-survey chart reviews, pre-intervention surveys, educational presentation, and the STC tool workflow were established in the clinic, a second chart review consisting of 150 charts of patients with T2DM was completed. The second chart review helped assess any changes to billing for dietary counseling services and any changes to provider documentation of dietary education for their patients with T2DM. Pre-intervention clinic A1c data were compared to post-intervention data 3-6 months apart.

Data Analysis

For the survey responses, data were summarized using frequency distributions at each survey timepoint. For the comparison of pre- and post-documentation, billing practices by PCPs, and smart-phrase usage— the chi-square test of association was used. Additionally, means and

standard deviations were used to summarize A1C levels for patients at each timepoint. All data analysis was conducted in SPSS, version 29. An alpha of .05 was used to inferential tests.

Results

Sample

This study had 100% participation among the three providers invited to participate. There was one provider for each of the age ranges of 35-44, 55-64, and 65+. All participants reported more than ten years of experience as PCPs. Age and years of experience were the only demographical questions asked in the surveys to keep responses confidential. Due to the small sample of three people, further demographic information could have led to the identification of individual PCP responses.

Comparison of Responses Between the Same Pre-Survey and Post-Survey Questions

A comparison of pre- and post-survey responses is displayed in Table 1. Statistical significance was not evaluated due to the small sample size. Instead, the direction of change in responses were evaluated. One PCP reported having used the STC tool before the intervention and two out of the three PCPs surveyed reported having used the STC tool after the intervention, so there was an increase in usage of the tool among PCPs. For the perception that patients benefit from individualized teaching at routine clinic visits, one PCP increased from *agree* to *strongly agree* while the other two PCPs maintained their *strongly agree* perception. The PCPs agreed that they do discuss dietary counseling with patients who have T2DM, but one provider changed their answer from *strongly agree* in the pre-survey to *somewhat agree* in the post-survey. All PCPs agreed that they do discuss specific dietary changes with patients who have T2DM, but one PCP changed their answer from *strongly agree* in the pre-survey to *somewhat agree* in the post-survey. During the pre-survey, all providers agreed that they document dietary counseling in the

plan portion of their notes. Post-survey responses revealed that one PCP changed their practice from documenting in the plan portion to documenting by using a smart phrase. Only one PCP reported having used the STC tool in the pre-survey and two PCPs reported having used it in the post-survey. There was a positive increase in PCP perception that patients find the STC tool helpful and that they have adequate time to review a diet recall tool from pre- to post-surveys.

There were no changes from pre- to post-surveys regarding PCP perception of time available to provide education, how often they document dietary counseling, whether having a diet tool is helpful, and if they have used other diet recall tools. Two out of the three PCPs (66.7%) agreed that they have time to provide dietary education *some of the time* and one PCP (33.3%) responded that they have time to provide dietary education *about half of the time*. The providers all responded that when they do provide dietary counseling, they only document it *some of the time*. There was unanimous agreement about it being helpful to have a diet recall tool available to assist with counseling and that they have not used any type of diet recall tool in practice besides the STC tool.

Barriers

Barriers to providers' ability to provide nutrition counseling were also assessed (see Table 1). In the pre-survey, one PCP reported that lack of training in diabetes-focused diets does not impact their practice, but in the post-survey all three agreed that it impacts them somewhat. To the question about inadequate teaching materials as a barrier, one PCP responded that it does not impact them in the pre-survey, while in the post-survey all PCPs agreed that it either somewhat or strongly impacts them. For all three respondents, responses about lack of knowledge as a barrier to providing nutrition counseling changed from does not impact to somewhat impacts from pre- to post-survey. At baseline, two PCPs felt that inadequate

reimbursement as a barrier strongly impacts them, and one felt that it does not; this changed in the post-survey, with one PCP selecting strongly impacts, one choosing somewhat impacts, and one choosing does not impact. Responses to low confidence as a barrier revealed an increase in level of impact in the post-surveys. Finally, there were no changes from pre- to post-surveys about the level to which the following barriers impact ability to provide nutrition counseling to patients with T2DM: time, lack of training in nutritional counseling, and patient refusal. Providers responded that time strongly impacts, lack of training in nutritional counseling somewhat impacts, and patient refusal somewhat impacts their ability to provide nutrition counseling in the primary care setting (see Table 1).

Responses Unique to Pre-Survey and Post-Survey Questions

Responses to pre- and post-survey questions that do not have pre- or post-responses for comparison are displayed in Table 2. There was one question unique to the pre-survey that did not appear on the post-survey. Responses revealed that all the PCPs somewhat agreed to wanting a dietary recall tool to guide dietary counseling with patients.

There were multiple questions that were unique to the post-survey to obtain information on how the PCPs felt about the STC tool, whether they preferred other tools, whether they documented using a smart phrase, the process of distribution of the STC tool, and the educational session. In the post-surveys, providers agreed that they document dietary education by using a smart-phrase, that they do not prefer a different diet screening tool over the STC tool, that the smart phrase created for the project was easy to use and adapt to their needs, that they attended the in-person training session, and that they will change their practice because of the education they received. The PCPs either felt neutral or somewhat disagreed that they would continue to use the STC tool. There were differing responses about how the process of the CMA/RN

initiating the STC tool during patient rooming worked for the respondents. One PCP somewhat disagreed that it worked well, one felt neutral, and one strongly agreed that it worked well. Two PCPs felt that it was easy to submit billing for dietary counseling and one felt neutral. The PCPs either somewhat agreed or strongly agreed that patients could fill out the STC tools quickly and that the STC tool was easy to use and understand. Responses revealed that PCPs either felt neutral (33.3%) or agreed (somewhat agree 33.3%, strongly agree 33.3%) that the STC tool was helpful in guiding counseling with patients, that they learned a better process of documenting dietary counseling, that they feel more prepared to provide dietary counseling, that the education was helpful, and that the smart phrase will improve the documentation process. One PCP responded that there needs to be an addendum to the smart phrase template to include a response stating, "diet is stable, no change needed."

Chart Review Data

Chart review data are displayed in Table 3. A total of 150 charts were reviewed pre-intervention with 65 reviewed post-intervention. Charts were only considered for review if the patient had seen one of the three PCPs who participated in the study and if the patient's A1C was 6.4 or greater at the time of the visit. Results from the chart reviews showed a significant increase in provider documentation of dietary counseling in their notes after the education and smart phrase training (pre=17.3% vs. post=35.4%, p=0.004). There was a non-significant increase in billing for dietary counseling services (pre=0% vs. post=3.1%, p=0.090). Also, results showed a significant increase in the usage of a smart phrase for documentation of dietary counseling in provider notes (pre=2.7% vs post=18.5%, p=<0.001). There was a small downward trend in patient A1C levels pre- and post-intervention. (pre, *mean*=7.48, SD=1.29 vs. post, *mean*=7.40, SD=1.21).

Discussion

Comparison of Responses Between the Same Pre-Survey and Post-Survey Questions

The overall increase in PCPs' positive perceptions of the STC tool, the smart phrase, and the benefit of individualized teaching at routine visits all suggest that the educational training was beneficial. The PCPs' more positive opinions on time available to review a diet recall could mean that after using the STC tool in practice, it proved to be more time-efficient than originally thought. This is helpful to know considering time is one of the greatest barriers PCPs face. Documentation of diet counseling was inconsistent throughout the study, which could mean there were missed opportunities for patients and reimbursement. Missed dietary counseling documentation could be reflective of the different barriers that PCPs identified.

Barriers

The PCP responses to how different barriers affect their practice yielded interesting results. Time as a barrier is consistent with what was identified in the literature review since time was often mentioned as one of the biggest barriers for PCPs in providing preventive dietary education to patients with T2DM. Although providers identified time as one of the most significant contributing barriers to providing dietary counseling in the primary care setting, they did report that they felt there was more time to review a diet recall tool after the educational intervention. This finding supports the idea that although time is a top barrier to the provision of nutritional counseling, the STC tool could be an effective way to optimize the time PCPs have available to discuss nutrition. Other diet assessment tools can be time-consuming; the STC tool is one of the only valid tools available for quick dietary assessment in primary care (Paxton et al., 2011). This makes the STC tool the best option to maximize the limited time available for

preventive counseling in primary care settings, as it allows PCPs to focus counseling on a specific problem area.

Survey responses also revealed increased awareness of how lack of training in diabetes-focused diets and inadequate teaching materials affect nutrition counseling practices. This change in perception could have stemmed from the educational intervention, increased realization of these barriers after providing nutrition counseling more often in practice, or coincidence. Lack of training was a common barrier mentioned in the literature (Bross et al., 2022; Simoes Correa Calendi et al., 2022). Inadequate teaching materials were a significant barrier identified in the survey results, but not a common barrier in literature. The STC tool used for this study had an attached education component on the opposite side of the handout (see Figure 2). Continuation of the STC tool with attached education in the clinic could help to address inadequate teaching materials, which is more unique to this clinic setting. The printed education used for this study is a teaching material that patients could review while they wait to be seen by PCPs, or they could take it home with them for later review.

Survey responses revealed a change in perception from PCPs about general lack of knowledge as a barrier. The responders did not initially see this as a barrier in their practice; however, they did identify it as a barrier that somewhat impacts them in the post-surveys. Providing PCPs in this clinic with more training on the recommendations for diet measures for patients with T2DM could help address lack of training in diabetes-focused diets, lack of knowledge, and confidence levels. More training could be easily completed by PCPs with continuing education units (CEUs). The Center for Disease Control (CDC) provides many webcast and web-based self-training activities that PCPs could complete for CEUs (CDC, 2023).

Inadequate reimbursement is another barrier that PCPs identified as affecting nutrition counseling. One goal of this study was to address this barrier by increasing billing for preventive services by using the smart phrase created for this study. The smart phrase allowed PCPs to document the time they spent on counseling and reminded them that if they spent eight minutes or greater, they could bill for preventive services using the CPT CODE 99401. Reimbursement from The Centers for Medicare and Medicaid Services (CMS) could increase if PCPs continue to bill for preventive services more often and/or if the clinic could obtain a staff member who is trained in DSME or MNT.

Responses Unique to Pre-Survey and Post-Survey Questions

The fact that all PCPs surveyed would like to use a dietary recall tool to guide dietary counseling and that there is no other screening tool they prefer, is a promising finding. However, they did not feel strongly about continuing to use the STC tool. It is unclear why they felt this way. It is unclear what aspects of their practice they would consider changing based on the education they received since they do not feel positive about using the STC tool. Future studies should explore this in further detail. The process of using the smart phrase for documentation and submitting billing for preventive services was overall favorable, so perhaps PCPs felt encouraged to change documentation and billing practices, but without use of the STC tool going forward. Possibly, providers felt positively about changing documentation and billing practices because they were reminded of how to use a smart phrase to simplify their charting process. The billing code reminder that is written on the smart phrase tool could have been helpful and could help to sustain changes related to billing for preventive services. The STC tool is the most time-efficient diet recall tool for primary care settings (Paxton et al., 2011) and the literature supports that when patients are not able to receive dietary counseling from someone with specialized diet

training, they should receive this counseling from their PCPs (Arnett et al., 2019; Bross et al., 2022; McBride, 2022). Further studies with more survey questions to probe PCPs about these topics could provide additional clarity as to why PCPs are open to using a diet recall tool but do not feel encouraged to use the STC tool.

Chart Review Data

Documentation of dietary counseling and smart phrase usage increased after PCPs received education. This could be because using a smart phrase is a quick and efficient way to document in the patient chart (Pereira, 2021). There was also an increase in billing for preventive services which could be due to the smart phrase created for this project. Perotte et al., (2022) have found that notes with higher smart phrase usage are billed at higher billing levels due to the ease in which providers can bring in essential elements into their note; this helps them to meet higher levels of billing for services. This study aimed to incorporate smart phrase usage for these purposes as it allowed reminders to PCPs to bill for services they provided and which specific billing code to use. If provision of dietary counseling continues at this clinic, hopefully there would be a positive overall effect on patient A1C levels as well. Moving forward, documentation and billing for dietary counseling need to continue for reimbursement purposes, which could help sustain the dietary counseling provision and help insurance companies track metrics for reimbursement.

Impact on Project Site

This study had an impact on the clinic used as the project site. Implementation of this project helped increase documentation of dietary counseling in provider notes and increase the number of times providers documented billing for preventive services. Increased documentation is important for the clinic due to financial implications and quality assurance. Reimbursement

payers rely on precise clinical terminology accurately documented using administrative codes to determine appropriate reimbursement levels. Without accurate coding being reflected in the clinic visit summary notes, the clinic loses out on reimbursement funds. CMS has designated up to $25.64 to reimbursed to the clinic for every time that the billing code 99401 is used, however, CMS in general does not routinely consider this a reimbursement code for Medicare only patients.

The clinic site for the study focuses on A1C quality measure data to measure how well the clinic is doing at managing T2DM care for patients. There was a downward trend with A1C levels over the period that charts were reviewed during the pre-intervention timeframe (May 2023 through September 2023) when compared to the charts reviewed during the post-intervention timeframe (November 2023 through January 2024). However, there was not enough time to determine if this finding was specific to the project intervention. Tracking A1C levels in patients who have participated in using the STC tool in the clinic over a long period of time could yield valuable data on whether STC tool use in the clinic is effective in improving A1C levels (McBride, 2022). This study could affect quality assurance at the clinic if A1C trends go down over time with continued use of the STC tool, education, documentation, and billing for preventive services.

Next Steps

The process of the CMA/RN initiation of the STC tool during patient rooming yielded mixed feedback from the PCPs. One PCP somewhat disagreed that the process worked well, one felt neutral, and one strongly agreed that the process worked well. To potentially improve the results that this project yielded, it would be important to address some aspects that did not seem to work well for the staff. It is unclear what specific aspects of the process of CMA rooming and

initiation of the STC tool the PCPs did not like, so it would be important to consider what alterations to the process may work better for the staff. There was some feedback from clinic staff that the clinic prefers all documentation to be electronic, so perhaps there was some resistance due to this project using paper forms, when staff members were no longer used to this way of doing things. This study used paper forms as an initial trial to test the process and feasibility before making EMR changes. The next step would be to discuss with staff if and how paper forms affected their perceptions during the study and if feedback warrants, to consider utilizing the STC tool electronically.

Since the clinic uses Epic, many patients have access to an online portal that could allow them to complete intake forms, such as the STC tool, ahead of their visits. Pre-visit planning such as this has been shown to improve satisfaction among staff and patients (Gholamzadeh et al., 2021). Streamlining this process could allow the PCP to review STC tool answers ahead of the patient visit while they are doing chart reviews and would decrease the burden on medical staff to complete it during patient rooming. Using pre-visit electronic planning would also allow for immediate copying of the STC tool answers into the patient's electronic record, which may be helpful for both providers and patients to reference later if needed. With increased education and potential to move the STC tool from paper to electronic formatting, this process could be more seamless and predictable over time.

Next steps for this project would be to consider adjusting the process of dispersing the STC tool to patients at this clinic as necessary. Conducting rapid-cycle testing using Plan-Do-Study-Acts (PDSA) cycles is something else to consider. This approach is popular in supporting quality improvement in healthcare and can help clinicians bring enhancements to patient care by using a systematized experimental method to guide learning and tests of change (Reed et al.,

2016). I would recommend that this project be altered based on results and to have the process consistently used among the three PCPs at the clinic for a period. Once enough data are gathered on how the process is working and revised accordingly, this project could be expanded to include the other three PCPs in the practice as well.

Limitations

Limitations in this study were the design flaws. The chart review template for data should have had an option to assess documentation for referral orders to an endocrinology specialist because there were a few patients that were referred based on their A1C and likely received more tailored T2DM nutrition care as a result. Since this element was not tracked during chart reviews, PCPs could have been seeking expert consultation for their patients with uncontrolled A1Cs, but they were not given credit for appropriate action and documentation. Often, referral to an endocrinologist ensures extra diet counseling in the form of MNT and/or DSME, which is the gold standard of care for patients with T2DM (Arnett et al., 2019). If this project is implemented again, referrals to endocrinologist specialists should be noted during the chart review process because this is an alternative way that patients receive specialized care for T2DM when they do not receive it in primary care offices.

A PCP-observed issue and design flaw was that there was no key on the STC tool (refer to tool in Appendix B). Without a key for reference, this could cause some confusion for both PCPs and patients as to what the total number means after the STC tool score is calculated. After the number is calculated on the STC tool, patients are left with a number without attached meaning unless someone were to verbally explain it. A higher number on the tool yields a less healthy diet, but what is considered high should be written on the tool. A revised tool with an

added key that describes what different scores mean could help with tool comprehension, especially if patients are filling it out electronically.

The smart phrase used for the study was good but could be improved due to the PCP-identified issue of not having the option to document when patients did not need any dietary changes. It is possible that PCPs attempted to use this tool with patients, but the patient didn't need to make any dietary changes, thus the smart phrase would not have been useful. If this smart phrase is used for another study, it could include language that identifies the patient as having a healthy diet already, thus not needing to set a dietary goal or receive counseling.

Practice Recommendations

The results of this project gave some interesting findings that can guide future initiatives to improve dietary counseling using the STC tool in a primary care setting. The clinic used for this study did not have access to a dietician or diabetes educator for patient referrals. In settings where there is an access to care issue for dietary counseling such as this one, using the STC tool can help patients with T2DM receive more tailored dietary counseling. PCPs identify time as a significant barrier but see the STC tool as an option to efficiently use their limited time to provide dietary counseling. If the EMR being used has smart phrase capabilities, then use of a smart phrase can help PCPs document usage of the tool, patient goals, and time spent for billing purposes. A smart phrase that uses dialogue to remind PCPs about the time required and associated ICD codes for billing for preventive services could help to increase reimbursement for primary care settings. Specific practice change recommendations based on the findings from this study include electronic delivery of STC tools, the addition of a scoring key on the STC tool, adding option to smart phrase that states something like 'no diet changes needed,' and inclusion

of patient referrals to endocrinology if completing another chart review. This project should be conducted using the PCPs in the clinic as the sample with these recommendations in mind.

Implications for Practice, Policy, and Research

If related studies are continued that can help identify how to increase utilization of the STC tool and improve impact on patient care and systems outcomes, this could help gain the support of PCPs, leaders in the clinic, policy makers, and patients. Increased support from these stakeholders could help to create sustainable practice changes for the clinic. The increased support could provide the opportunity for more resources, which could be allocated to providing education to providers and potentially fund a diabetes educator or registered dietician for the clinic that PCPs can refer patients to. Project initiatives that are like this study could aim to improve billing for dietary counseling services to help address this issue and potentially gain attention from policy makers. An increase in support from policy makers may help make national diabetes prevention programs more affordable to Kentuckians because although some insurances cover services through this entity, that is not always the case.

The cost-effectiveness of this project is a positive element in its potential for sustainability. It is estimated that the cost to print grayscale on one piece of paper is around one cent per page. The cost of printing is the only cost this project incurred, so it is estimated that the net cost-benefit was positive. The cost for future projects like this one is likely to be low, especially if future projects utilize the EMR for electronic delivery of the STC tool because this would eliminate the costs associated with printing.

Conclusion

Diabetes prevalence is increasing worldwide, and it has become an international health crisis. Poorly managed T2DM increases risk for stroke, renal dysfunction, cardiovascular disease, vision loss, and neuropathy (Ojo, 2021). In 2012, costs associated with T2DM were estimated to be $245 billion. (Bross et al., 2022). According to the 2019 Report of the American College of Cardiology (ACC)/American Heart Association (AHA) Task Force on Clinical Practice Guidelines, a tailored nutrition plan is recommended for all adults with T2DM. The nutrition plan is a grade A recommendation for clinical practice that helps patients with T2DM improve glycemic control, lose weight if needed, and improve cardiovascular risk factors (Arnett et al., 2019). The gold standard of care is for PCPs to utilize customized interdisciplinary care including a registered dietician nutritionist and/or a diabetes educator who can help patients meet their nutritional goals (Arnett et al., 2019). Given that many patients are not seeing registered dieticians, dietary counseling often falls on PCPs. The care gap is that patients are not receiving diabetes dietary counseling from their care team due to multiple barriers such as time and access to services. The STC tool can help PCPs to assess diet quickly and efficiently and counsel patients accordingly.

This project aimed to address the care gap by increasing the diet education exposure patients receive at their office visits with their PCPs when they are being seen for T2DM. The STC diet assessment tool with attached diet education could help patients to reflect on their lifestyle habits and learn how to obtain better glycemic control overall. This project was determined to be successful if there was: 1) increased nutrition counseling with the STC tool, 2) increased documentation of nutrition counseling, 3) lower average A1C levels within the clinic, and 4) a positive response from PCPs about the process of using the STC tool in practice.

Through this project there was an increase in nutrition counseling and increased documentation. The A1C levels among patient chart reviews post-intervention were slightly lower when compared with pre-intervention levels. However, we cannot deduce that this is due to the project intervention as A1C levels reflect glucose levels over three months and this project did not run long enough. Overall, survey research indicated that PCPs felt positively about using a diet assessment tool in practice and generally, responses to the project intervention were mostly positive. However, perceptions about the STC tool were mixed and some PCPs do not plan to use the STC tool in the future, so this should be explored further.

Using a validated diet recall tool like the STC tool can help PCPs provide quick nutritional counseling. When patients are not able to see a trained dietician or diabetes educator, this is a possible alternative process. An associated smart phrase for documentation within EMR charting systems does seem helpful so that PCPs can quickly document and bill for the counseling provided. Moving forward, these results can hold value in settings where PCPs are treating those with T2DM; however, more exploration is needed.

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Tables

Table 1. Summary of PCP perceptions and practices regarding dietary counseling and charting before and after an educational intervention (N =3)

	Pre-education *n* (%)	Post-education *n* (%)
Patients with diabetes benefit from individualized teaching at routine clinic visits		
Agree	1 (33.3%)	0 (0.0%)
Strongly agree	2 (66.7%)	3 (100.0%)
I discuss specific dietary changes with my patients who have diabetes when they have poor glycemic control		
Somewhat agree	1 (33.3%)	2 (66.7%)
Strongly agree	2 (66.7%)	1 (33.3%)
I have adequate time to provide education to my patients with diabetes when they struggle to control their blood sugar		
Sometimes	2 (66.7%)	2 (66.7%)
About half the time	1 (33.3%)	1 (33.3%)
I document when I provide dietary counseling to patients with diabetes		
Sometimes	3 (100%)	3 (100%)
Where do you document that you have provided dietary counseling		
I document in the plan portion of my note	3 (100%)	2 (66.7%)
I document somewhere else, please describe where: using a smart phrase	0 (0.0%)	1 (33.3%)
I think it is helpful to have a diet recall tool available for nutrition counseling		
Somewhat agree	2 (66.7%)	2 (66.7%)
Strongly agree	1 (33.3%)	1 (33.3%)
I have used the STC tool with my patients who have diabetes		
I have never heard of the STC tool	1 (33.3%)	0 (0.0%)
No	1 (33.3%)	1 (33.3%)
Yes	1 (33.3%)	2 (66.7%)
My patients find the STC tool helpful for improving diet		
Yes	0 (0.0%)	1 (33.3%)
Maybe	1 (33.3%)	1 (33.3%)
N/A	2 (66.7%)	1 (33.3%)

I have adequate time to review a dietary recall tool with patients during their appointments Somewhat disagree Neither agree nor disagree Somewhat agree	 2 (66.7%) 1 (33.3%) 0 (0.0%)	 1 (33.3%) 0 (0.0%) 2 (66.7%)
I have used other diet screening tools besides the STC tool No	 3 (100%)	 3 (100%)
How much do the following barriers impact your ability to provide nutrition counseling for patients with diabetes? Please write barrier if it is not listed in the other text box. 1. **Time** Strongly impacts	 3 (100%)	 3 (100%)
2. **Lack of training in nutritional Counseling** Somewhat impacts	 3 (100%)	 3 (100%)
3. **Patient refusal** Somewhat impacts	 3 (100%)	 3 (100%)
4. **Lack of training in diabetes-focused diets** Somewhat impacts Does not impact	 2 (66.7%) 1 (33.3%)	 3 (100%) 0 (0.0%)
5. **Inadequate teaching materials** Strongly impacts Somewhat impacts	 2 (66.7%) 0 (0.0%)	 2 (66.7%) 1 (33.3%)

Does not impact	1 (33.3%)	0 (0.0%)
6. **Lack of knowledge**		
Somewhat impacts	0 (0.0%)	3 (100%)
Does not impact	3 (100%)	0 (0.0%)
7. **Inadequate reimbursement**		
Strongly impacts	2 (66.7%)	1 (33.3%)
Somewhat impacts	0 (0.0%)	1 (33.3%)
Does not impact	1 (33.3%)	1 (33.3%)
8. **Low confidence**		
Somewhat impacts	1 (33.3%)	2 (66.7%)
Does not impact	2 (66.7%)	1 (33.3%)

Table 2. Other survey results from pre and post surveys

	Pre-survey *n* (%)	Post-survey *n* (%)
I would like to use a dietary recall tool to guide counseling for my patients. Somewhat agree	3 (100%)	N/A
Do you document dietary education by using a smart-phrase? Yes	N/A	3 (100%)

I will use the STC tool to guide dietary discussions with my patients. Neither agree nor disagree Somewhat disagree	N/A	 2 (66.7%) 1 (33.3%
Is there a dietary screening tool that you prefer over the STC tool? No	N/A	 3 (100%)
Please answer how these different aspects of the process of providing, discussing, and documenting the STC tool with patients worked for you: 1.) **The CMA/RN initiating the STC tool during patient rooming worked well** Somewhat disagree Neither agree nor disagree Strongly agree	N/A	 1 (33.3%) 1 (33.3%) 1 (33.3%)
2.) **It was easy to submit billing for dietary counseling.** Neither agree nor disagree Somewhat agree	N/A	 1 (33.3%) 2 (66.7%)
3.) **The smart phrase was easy to use and adapt to my needs** Somewhat agree	N/A	 3 (100%)

4.) **Patient was able to fill out the STC tool in a timely manner**	N/A	
Somewhat agree		2 (66.7%)
Strongly agree		1 (33.3%)
5.) **The STC tool was easy to use/understand**	N/A	
Somewhat agree		2 (66.7%)
Strongly agree		1 (33.3%)
6.) **The STC tool was helpful in guiding counseling with the patient**	N/A	
Neither agree nor disagree		1 (33.3%)
Somewhat agree		1 (33.3%)
Strongly agree		1 (33.3%)
Please select which education session regarding the STC tool and dietary counseling documentation that you participated in.	N/A	
In-person		3 (100%)
If you participated in the educational presentation, please answer the following:	N/A	
1.) I learned a better process of documenting dietary counseling		

Neither agree nor disagree		1 (33.3%)
Somewhat agree		1 (33.3%)
Strongly agree		1 (33.3%)
2.) I feel more prepared to provide dietary counseling	N/A	
Neither agree nor disagree		1 (33.3%)
Somewhat agree		1 (33.3%)
Strongly agree		1 (33.3%)
3.) The education was helpful	N/A	
Neither agree nor disagree		1 (33.3%)
Somewhat agree		1 (33.3%)
Strongly agree		1 (33.3%)
4.) The smart phrase will improve my documentation process	N/A	
Neither agree nor disagree		1 (33.3%)
Somewhat agree		1 (33.3%)
Strongly agree		1 (33.3%)
5.) I will change my practice as a result of this education	N/A	
Somewhat agree		3 (100%)
Please describe any way that you think the process that was used in this study could improve. (free text)	N/A	

N/A There needs to be a selection of "Diet is stable, no change needed."		2 (66.7%) 1 (33.3%)

Table 3. Review of dietary counseling and billing documentation pre- and post-intervention

	Pre-education (n=150) n (%)	Post-education (n=65) n (%)	*p*
Diet counseling charted Yes No	 26 (17.3%) 124 (82.7%)	 23 (35.4%) 42 (64.6%)	*0.004*
Billing for diet counseling Yes No	 0 (0.0%) 150 (100%)	 2 (3.1%) 63 (96.9%)	*0.090*
Smart-phrase usage Yes No	 4 (2.7%) 146 (97.3%)	 12 (18.5%) 53 (81.5%)	*<0.001*

Appendices

Appendix A: Survey Questions

Pre-survey

1.) Patients with diabetes benefit from individualized diet teaching at routine clinic visits.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
2.) I discuss specific dietary changes with my patients who have diabetes when they have poor glycemic control.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
3.) I have adequate time to provide education to my patients with diabetes when they struggle to control their blood sugar.	Never Sometimes About half the time Most of the time Always
4.) I document when I provide dietary counseling to patients with diabetes	Never Sometimes About half the time Most of the time Always
5.) Where do you document that you have provided dietary counseling?	I do not document it I document in the plan portion of my note I document somewhere else: _____
6.) I think it is helpful to have a diet recall tool available for nutrition counseling	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree

7.) I have used the Starting the Conversation (STC) tool with my patients who have diabetes.	Yes No Maybe I have never heard of the STC tool
8.) My patients find the STC tool helpful for improving diet.	Yes Maybe No N/A
9.) I have adequate time to review a dietary recall tool with patients during their appointments.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
10.) I would like to use a dietary recall tool to guide counseling for my patients.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
11.) I have used other diet screening tools besides the STC tool. Please list which ones if answer is yes	Yes_____ Maybe No
12.) How much do the following barriers impact your ability to provide nutrition counseling for patients with diabetes? Please write barrier if it is not listed in the other text box. Time Lack of training in nutritional counseling Patient refusal Lack of training in diabetes-focused diets Inadequate teaching materials Lack of knowledge Inadequate reimbursement Low confidence Other:	Likert scale: Strongly impacts Somewhat impacts Does not impact

13.) What is your age? Select which applies	18-24 25-34 35-44 45-54 55-64 65+
14.) How many years have you been practicing as a provider?	0-2 years 2-5 years 5-10 years >10 years
15.) In order to assign a unique ID to your surveys for comparison of pre and post data please type the first letter of your mother's name followed by the last 3 digits of your phone number.	_____ (free text)

Post-survey

1.) Patients with diabetes benefit from individualized diet teaching at routine clinic visits.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
2.) I discuss specific dietary changes with my patients who have diabetes when they have poor glycemic control.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
3.) I have adequate time to provide education to my patients with diabetes when they struggle to control their blood sugar.	Never Sometimes About half the time Most of the time Always

4.) I document when I provide dietary counseling to patients with diabetes	Never Sometimes About half the time Most of the time Always
5.) Where do you document that you have provided dietary counseling?	I do not document it I document in the plan portion of my note I document somewhere else: _____
6.) Do you document dietary counseling by using a smart-phrase?	Yes No I don't document dietary counseling
7.) I think it is helpful to have a diet recall tool available for nutrition counseling	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
8.) I have used the Starting the Conversation (STC) tool with my patients who have diabetes.	Yes No Maybe I have never heard of the STC tool
9.) My patients find the STC tool helpful for improving diet.	Yes Maybe No N/A
10.) I have adequate time to review a dietary recall tool with patients during their appointments.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree

11.) I will use the STC tool to guide dietary discussions with my patients.	Strongly disagree Somewhat disagree Neutral Somewhat agree Strongly agree
12.) I have used other diet screening tools besides the STC tool. Please list which ones if answer is yes	Yes_____ Maybe No
13.) How much do the following barriers impact your ability to provide nutrition counseling for patients with diabetes? Please write barrier if it is not listed in the other text box. Time Lack of training in nutritional counseling Patient refusal Lack of training in diabetes-focused diets Inadequate teaching materials Lack of knowledge Inadequate reimbursement Low confidence Other:	Likert scale: Strongly impacts Somewhat impacts Does not impact
14.) Is there a dietary screening tool that you prefer over the STC tool? Please list the tool and explain why if the answer is yes.	Yes_____ No
15.) Please answer how these different aspects of the process of providing, discussing, and documenting the STC tool with patients worked for you: -The CMA/RN initiating STC tool during patient rooming worked well -It was easy to submit billing for dietary counseling -The smart-phrase was easy to use and adapt to my needs -Patient was able to fill out STC tool in a timely manner	Likert scale: Strongly disagree Somewhat disagree Neither agree nor disagree Somewhat agree Strongly agree

-The STC tool was easy to use/understand -The STC tool was helpful in guiding counseling with the patient	
16.) Please select which education session regarding the STC tool and dietary counseling documentation that you participated in.	In-person Electronic I did not participate in an education session
17.) If you participated in the educational presentation, please answer the following: -I learned a better process of documenting dietary counseling -I feel more prepared to provide dietary counseling -The education provided was helpful -The smart-phrase will improve my documentation process -I will change my practice as a result of this education	Likert scale: Strongly disagree Somewhat disagree Neither agree nor disagree Somewhat agree Strongly agree
18.) Please describe any way that you think the process that was used in this study could improve. (CMA/RN delivering STC tool for patient to fill out while rooming, so that tool is complete and ready for provider intervention, documenting using smart-phrase, etc.). Write N/A if no feedback.	_____ (free text)
19.) Please describe how the educational presentation regarding the STC tool and dietary counseling documentation could be improved. Write N/A if no feedback or if you did not view the presentation.	_____ (free text)
20.) In order to assign a unique ID to your surveys for comparison of pre and post data please type the first letter of your mother's name followed by the last 3 digits of your phone number.	_____ (free text)

21.) Any comments?	_____ (free text)

Appendix B: Survey Cover Letter

University of Kentucky Consent to Participate in Research

Research Title: *Evaluation of Nutritional Guidance from Providers for Patients with Type 2 Diabetes Mellitus in a Primary Care Setting* **Protocol #:** 89744

Researcher: Whitney Rice RN, BSN, DNP student, University of Kentucky Contact Information: 859-229-3349, wmshar21@uky.edu

Faculty Advisor: Elizabeth Tovar

Purpose, Procedure, and Duration:
We are researchers from the University of Kentucky inviting you to participate in a survey. We want to learn more about your opinions regarding dietary assessment and education for patients with Diabetes Mellitus. This survey will ask you some general questions about your opinions and perceived barriers to delivering dietary education to patients with Diabetes Mellitus.

If you agree to participate in our study, you will be asked to answer questions to help us evaluate current provider practices, opinions, and dietary education documentation in the electronic medical record (EMR). The survey will take about 5 minutes to complete. We expect 3 people to respond. If you do not participate in the survey, or if you skip certain questions/end the survey early, your job will not be at risk.

Eligibility:
You must meet the following requirements to participate in this research study:

- You must currently be treating patients with Type 2 Diabetes Mellitus at St. Joseph Palomar Primary Care Clinic **Benefits:**

You may not benefit personally from being in this study, but your answers could help us understand more about dietary counseling for patients with Type 2 Diabetes Mellitus in a primary care setting.

Risks:
Some of our questions may make you feel uncomfortable or upset, but you can skip any question you don't want to answer. You can also stop the survey at any time.

We will use Qualtrics to collect your responses. They may have Terms of Service and Privacy policies outside of the control of the University of Kentucky that allows them to use your data for other purposes.

We will make every effort to safeguard your data. However, we cannot guarantee the security of data obtained via the internet.

Privacy and Future Use:
Your responses to the research survey are anonymous. That means we won't know which responses are yours. We won't collect names, internet addresses, email addresses, or any other identifiable information.

We may use your responses in future research or share them with other researchers.

Complaints or Concerns:
If you have questions about the study, please contact the researcher using the contact information provided above.

If you have complaints or concerns about your rights as a research volunteer, you can contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

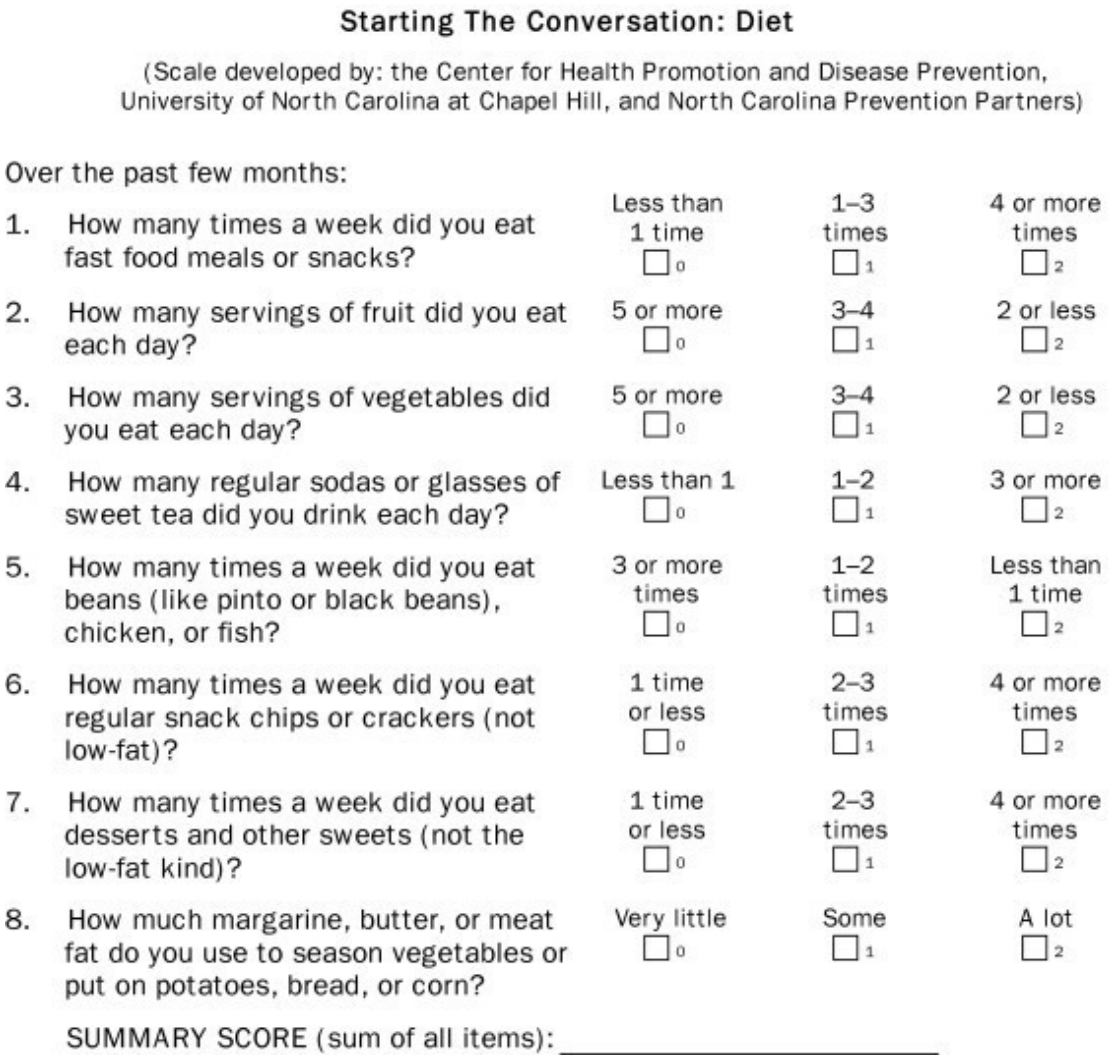
Thank you for taking the time to consider our study. You do not have to participate in our study, but we hope you will. To ensure your responses will be included in our study, please complete the survey within 1 week of receiving the invite.

Please select an option below to indicate you read this information and you wish to take the survey:

1. I agree to be in this study
2. I don't want to be in this study

Figures

Figure 1: Starting the Conversation (STC) Diet Recall Tool



Starting The Conversation: Diet

(Scale developed by: the Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill, and North Carolina Prevention Partners)

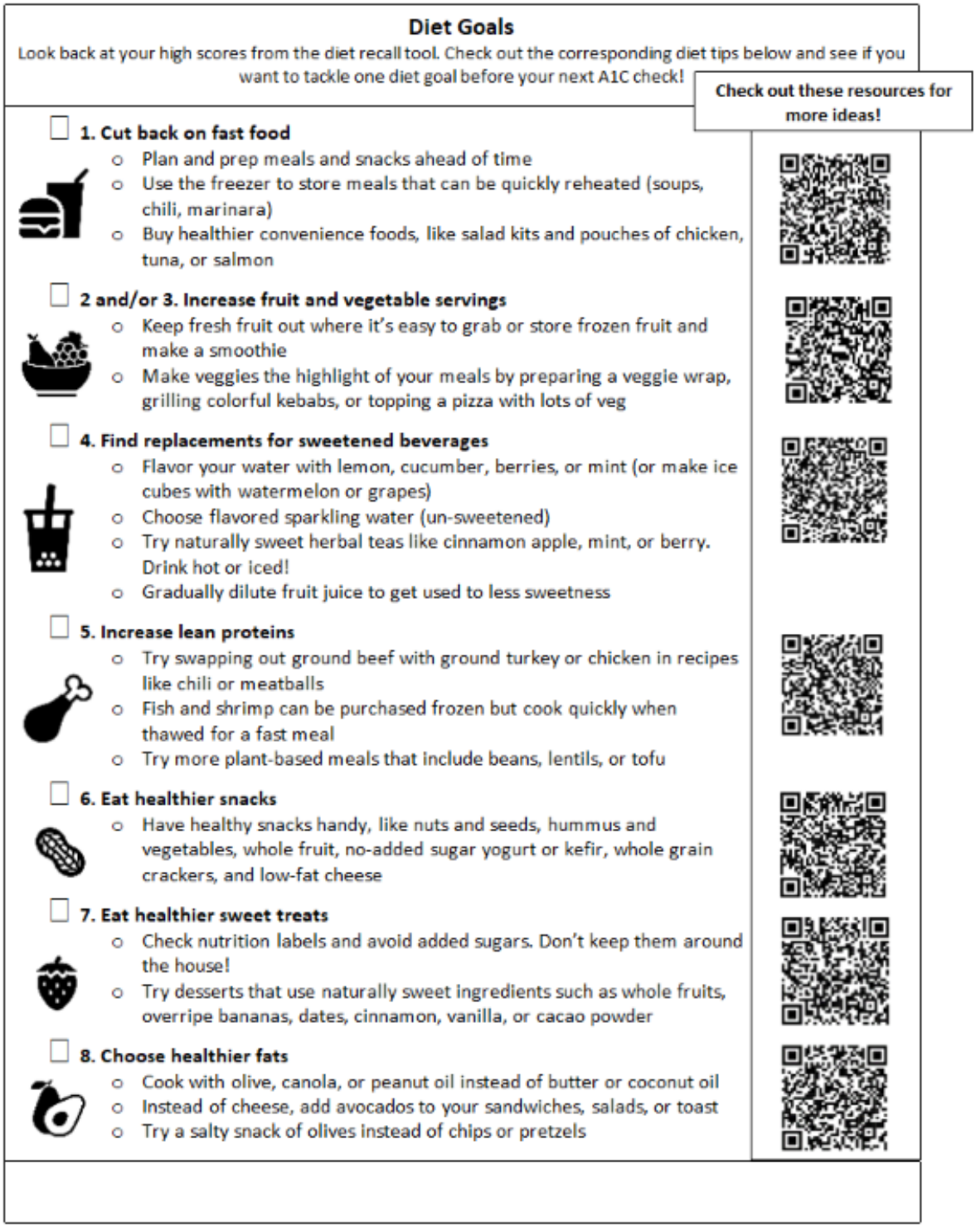
Over the past few months:

1.	How many times a week did you eat fast food meals or snacks?	Less than 1 time ☐ 0	1–3 times ☐ 1	4 or more times ☐ 2
2.	How many servings of fruit did you eat each day?	5 or more ☐ 0	3–4 ☐ 1	2 or less ☐ 2
3.	How many servings of vegetables did you eat each day?	5 or more ☐ 0	3–4 ☐ 1	2 or less ☐ 2
4.	How many regular sodas or glasses of sweet tea did you drink each day?	Less than 1 ☐ 0	1–2 ☐ 1	3 or more ☐ 2
5.	How many times a week did you eat beans (like pinto or black beans), chicken, or fish?	3 or more times ☐ 0	1–2 times ☐ 1	Less than 1 time ☐ 2
6.	How many times a week did you eat regular snack chips or crackers (not low-fat)?	1 time or less ☐ 0	2–3 times ☐ 1	4 or more times ☐ 2
7.	How many times a week did you eat desserts and other sweets (not the low-fat kind)?	1 time or less ☐ 0	2–3 times ☐ 1	4 or more times ☐ 2
8.	How much margarine, butter, or meat fat do you use to season vegetables or put on potatoes, bread, or corn?	Very little ☐ 0	Some ☐ 1	A lot ☐ 2

SUMMARY SCORE (sum of all items): _____

Figure 1 (Paxton et al., 2011)

Figure 2: Education handout for patients



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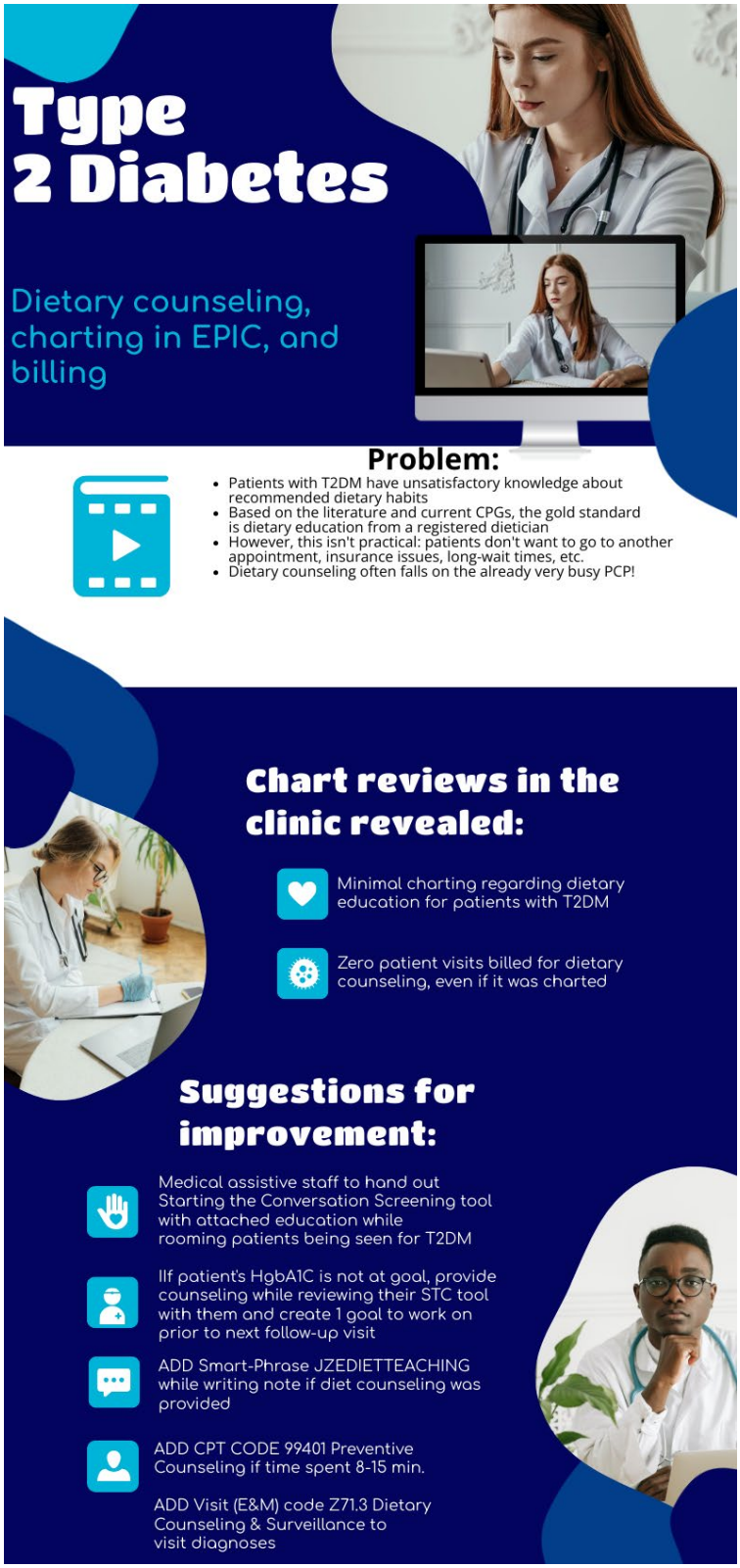
(McBride, 2022)

Figure 3: Provider Handout for Educational Session



JZE DIET TEACHING SMART PHRASE, WHAT DOES IT SAY?

Most recent A1C

The smart-phrase ties in the patient's most recent Hbg A1c level to the documentation

Diet counseling charted

"Dietary counseling provided. Non-pharmacological interventions such as low carb diet, high in vegetables and fruit discussed."

Patient goal

- Cut back on fast food
- Increase fruit and/or vegetable servings
- Find replacements for sweetened beverages
- Increase lean proteins
- Eat healthier snacks
- Eat healthier sweet treats
- Choose healthier fats

TIME

Allows you to add in time spent and reminds you what billing code to use for reimbursement

The potential:

- Improved Quality measure data related to Hgb A1C
- Gives patients an opportunity to be proactive in their own health
- Quick and efficient way to expose patients to dietary counseling
- Increased rates of reimbursement for the clinic