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# newsFLASH
Diabetes Care and Education

## Message from the Chair

Alyce Thomas, RD
Paterson, NJ

As DCE prepares to celebrate its 40th anniversary in less than a year, it is my honor to serve you as your current Chair — what an honor it is! Reflecting on the accomplishments of past DCE Chairs, those who also are or have been presidents of other national organizations and leaders in diabetes care, education, prevention and advocacy, I sometimes want to pinch myself to see if this is real or an extended dream! If it's a dream, please don't wake me up yet, I'm enjoying it immensely.

I have been a DCE member for a long time, which is a far longer tenure than that of my leadership role in this DPG. DCE was and remains to this day my "go to" place for up-to-date information on diabetes and nutrition, which is one of the reasons that I joined over 30 years ago. And if I were to look in some of my old files, I might still find an old issue of *On the Cutting Edge* and *news*FLASH. To throw them out would be similar to saying goodbye to an old friend.

Besides the newsletters, DCE continues to offer other wonderful benefits to its members, including patient handouts, recipes, information on reimbursement, advocacy and research, and the latest in diabetes technology (see Sidebar). However, one particular question has puzzled me for a long time: why isn't every RDN who works with persons with diabetes a member of DCE? Statistics show that approximately 12-14% or 39-45 million of the U.S. adult population have diabetes and another 8-16 million have undiagnosed diabetes. In other words, someone you know has diabetes — either a patient or loved one. I have used information from the DCE website to share with patients and even family and friends.

Could part of the problem be that some RDNs and DTRs continue to think that you must be a CDE to belong to DCE? Of course, the answer is no, you don't have to be a CDE in order to be a member of DCE and you don't have to be a CDE in order to be a DCE volunteer or leader. Recently, a colleague mentioned to me that someone she knew was going to join DCE because she had just passed the CDE exam. I applaud the person for passing the CDE exam; however, she could have been a DCE member from the time she joined the Academy. This, by the way, isn't an isolated case; the same misperception showed up on last year's member survey.

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## MISSION

Empowering DCE Members to be leaders in food, nutrition, and diabetes care and prevention.

## VISION

Optimizing the health of people impacted by diabetes using food, nutrition, and self-management education.

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## STRATEGIC PRIORITY AREAS

**Goal 1: The public trusts and recognizes DCE members as food, nutrition and diabetes experts.**

- Work collaboratively with industry, media, medical and other health care disciplines and their organizations.
- Use evidence-based science on issues related to nutrition, food and diabetes.
- Advocate for leadership positions within the Academy.
- Engage with policy makers and decision makers.

**Goal 2: DCE members optimize the health of individuals and populations impacted by diabetes.**

- Engage DCE members to impact food and nutrition policies through participation in the legislative and regulatory processes at local, state and federal levels.
- Prepare and support DCE members to lead, contribute, conduct, interpret and use research in practice.
- Review and update the Diabetes Scope of Practice for the continuum of care for diabetes as needed based on research, practice guidelines, etc.
- Utilize and expand reimbursement for MNT throughout the continuum of diabetes care.

**Goal 3: DCE members and prospective members view DCE as vital to their professional success.**

- Reach out to Registered Dietitian/Nutritionists, Nutritionist/Dietetic Technician Registered, students and former DCE members.
- Provide relevant and valued resources and services for a diverse audience through the enhancement of social media presence.
- Create state-of-the-art professional development opportunities.

# Message from the *news*FLASH Editor

Britt Rotberg, MS, RDN, LD, CDE, BC-ADM
Atlanta, GA

Happy Fall, DCE members!

We recently returned from AADE18 in Baltimore, MD and the energy at the meeting could not have been more infectious. With a tag line stating, "turn passion into action," no one would expect anything less. At AADE18 we heard from many of our wonderful colleagues and DCE members on a variety of topics. The DCE leadership team was very busy throughout the meeting, talking to current members and past chairs to hear from everyone on how we can continue offering value to YOU!

It was no surprise that the focus of the meeting was the rapidly-evolving healthcare landscape. There were numerous presentations about population health management and discussions targeting how we as RDs can serve as change agents if we wish to contribute to the Institute of Health Improvements' goal of having 100 million healthier lives by 2020.

During the general session, we also heard about how we need to shift our mentality of healthcare from a singular focus of one person to that of population management, and furthermore, explored strategies on how to effectively enable this care-driven transfer. One such strategy includes creating registries within our health system/office and stratifying the people with diabetes by certain characteristic (A1C, CVD, etc.). Another strategy considers focusing more on DSMS versus DSME by using evidence-based methods to change behavior and increase medication engagement. There are various functions we can explore as RDNs evolve and move into uncommon roles, such as practice coaching, care management, and digital care augmentation. More to come in the next special issue focusing on population health management, so stay tuned!

Other topics of interest included the gut microbiome and how it not only affects our weight, but our glucose intolerance, immune system, mental health, risk of cancer, risk of depression, asthma, and hypertension. We also heard from William Cefalu, MD, Chief Scientific, Medical, and Mission officer of ADA, who spoke of future change in diabetes guidelines, the shift from using A1C as a starting point to using patients characteristics (such as CVD, CKD), and developing patient-centered care practices while focusing on 1) optimizing quality of life and 2) preventing complications.

During his presentation, we were able to get a glimpse of the next ADA guidelines and the initiative to shift to precision medicine, making sure the appropriate therapy is in the hands of the patient at the appropriate time. As James Gavin, MD, PhD said during one of his presentations, "A1C is an accommodation, not a physiological number and we should treat by physiology, not policy."

Other central topics at the meeting included: the national diabetes prevention program successes and payment model; inpatient management of diabetes; new continuous glucose monitors and how they are helping thousands of people with diabetes further understand their blood sugar patterns; and technology shifts for DSME. I could continue to go on and on about the incredible topics presented, but we are lucky enough to have numerous AADE18 presenters as current authors for this *news*FLASH issue.

Lastly, if you are working in the role of a care coordinator or providing chronic care management services, please consider contacting Michelle Kuppich, RD on the Nutrition Services Coverage Team at mkuppich@eatright.org.

## Message from the Chair

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So, how do we combat this misperception about DCE and eliminate it once and for all? By now, you should have completed the 2018 Members' Survey. Your responses are important to your DCE leadership as we will take into consideration your thoughts and comments during our update of the Strategic Plan. However, this column may have triggered an idea that you want to now share. If so, please send your comments to me at dcechair@gmail.com. It's not too late — we will be working on the Strategic Plan during the year and it will be unveiled in 2019. So, stay tuned … and let's see what future direction you, our members, want for DCE!

*Seated: Liz Quintana, Past Chair, Alyce Thomas, Chair, and Constance Brown-Riggs, Chair-Elect*
*Standing: Mary Angela Niester, Treasurer, Laura Russell, Secretary*
*Not pictured: Patricia Davidson, Delegate*

## Member Benefits

- ***On the Cutting Edge (OTCE)*** – 3 issues a year providing up to 12 hours free CPEU
- ***news*FLASH** – 3 issues a year
- **Webinars** – 5-6 a year and free to DCE members
- **Electronic mailing list** – also known as the "listserv"
- **Diabetes Resource Center** – free access
- Opportunities to develop professional skills and networking relationships
- Complimentary copies of *Diabetes Self Management* and *Diabetic Living*
- **DCE's website** – access to information on education events, monthly journal reviews, legislative updates, patient education materials, award applications, recipes and much more
- **DCE Facebook page**
- **DCE Pinterest page**
- Karen Goldstein Memorial Medical Nutrition Therapy Outcomes Research Award

*Lisa Herzig, Kaydee Brown, Donna Plyler, Janice MacLeod, Laura Russell, Anna Henry, Mary Lou Perry, Mary Angela Niester,Anna Parker, Britt Rotberg, Sarah Williams, Vita Tambone, Jamie Kowatch, Cindy Huang, Linda Flanagan Vahl, Michele Chynoweth, Kathy Warwick, Daisy Seremba, David Trinkle - not pictured Wahida Karmally*

# Practice Update: Diabetes Care and Education in the Hospital

Gwen Klinkner, DNP, RN, BC-ADM, CDE
Madison, WI

Diabetes care in the hospital has changed significantly in the past 20 plus years that I've been in practice. Gone are the days of dedicated units for patients with diabetes. Gone are the long hospital stays to ensure people learned all they needed to know about self-management of diabetes before heading home. Diabetes now affects more than 30 million adults and children in the United States (1). Alarmingly, 7.2 million of these people are reportedly unaware of having diabetes (1). People with diabetes complications such as heart disease, stroke, and lower extremity amputations are more likely to be admitted to the hospital or seek emergency care (1). As prevalence and hospital admissions increase, it's imperative that providers, dietitians, nurses, and other members of the interdisciplinary team stay current on the latest evidence about diabetes care in the hospital.

## Glycemic Targets

Determining optimal glycemic targets for hospitalized patients has been controversial in recent years. The 2018 American Diabetes Association (ADA) guidelines call for glycemic targets of 140 – 180 mg/dL for the most critically ill and noncritically ill patients with lower targets if hypoglycemia can be avoided (2). Evidence from the now well-known Normoglycemia Evaluation and Survival Using Glucose Algorithm Regulation (NICE-SUGAR) trial (3) called into question the long-standing belief that "tight" glycemic control, often defined as blood glucose levels <110 mg/L, resulted in the best clinical outcomes. Patients in the NICE-SUGAR trial with more moderate targets of 140-180 mg/dL fared better in terms of severe hypoglycemia incidence and mortality rates compared to patients intensively managed (target of 81-108 mg/dL) (3).

There is general agreement on the negative effects of hyperglycemia and support for better surveillance (4,5). An A1C test is not only recommended for patients with a known history of diabetes, but also for those with blood glucose levels >140 mg/dL if the test has not been done in the past three months (2). Although test results won't give the entire story about a patient's glycemic management, results will shed light on whether hyperglycemia is acutely related to a patient's condition, or can serve as an indication of more long-standing dysglycemia. Because patients are admitted to the hospital for many other reasons besides diabetes, it is not uncommon to discover previously undiagnosed diabetes. This often complicates care and can be a difficult diagnosis for patients who are already burdened by other medical issues that brought them into the hospital.

## Hyperglycemia Management

The 2018 ADA clinical practice guidelines include recommendations for the management of hyperglycemia: "Insulin therapy should be initiated for treatment of persistent hyperglycemia starting at a threshold ≥180 mg/dL" (2). Intravenous insulin infusions are commonly used in ICUs in addition to noncritical care settings depending on the institution. When subcutaneous insulin regimens are prescribed, basal/bolus or basal with correction insulin regimens are considered to be best practice; sliding-scale only regimens are not recommended (2) and are regarded as potentially harmful for those with type 1 diabetes and those with basal insulin requirements. For patients who use their own insulin pumps at home, many organizations have policies supporting continued use in the hospital if patients can manage safety and independently.

The evidence related to surgical site infections (SSIs) has prompted hospital leadership to take a closer look at hyperglycemia management. It is estimated that 2% of all patients undergoing surgical procedures develop a SSI. This increases risk for extended lengths of hospital stay and increases mortality rates 2-11 times the rates for those without SSIs (6). Financial implications for treatment of each SSI have been estimated at $12,000.00 -$35,000.00 annually (6). Given this evidence, institutions are implementing evidence-based bundles to reduce risk and incidence. The 2018 ADA

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## Practice Update: Diabetes Care and Education in the Hospital

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guidelines include recommendations for perioperative care which promote glycemic targets of 80-180 mg/dL with more specific recommendations for management based on nutritional status (2). The Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection includes a recommendation to maintain blood glucose levels <200 mg/dL during the perioperative period regardless of diabetes history (7). Neither source recommends how to achieve these targets, but with shorter lengths of stay after surgery, clinicians are challenged to quickly identify and manage hyperglycemia. Some institutions are proactively assessing glycemic control during preoperative evaluations for elective surgeries (8). An additional challenge is to arrange for care after hospitalization for those with newly-diagnosed prediabetes and diabetes.

### Hypoglycemia Causes and Prevention

Efforts to manage hyperglycemia must be balanced with hypoglycemia avoidance. The ADA defines hypoglycemia as any blood glucose less than 70 mg/dL (2). Beginning with the ADA guidelines published in 2017, "clinically significant hypoglycemia" is defined as blood glucose levels <54 mg/dL, although institutional definitions may vary. Hospitals must have hypoglycemia treatment protocols in place and plans for prevention (2).

Many factors and conditions increase a patient's risk of hypoglycemia. Many of these relate to nutritional intake. NPO status increases risk especially if medication regimens are not proactively adjusted. Patients receiving enteral and parenteral nutrition can also become hypoglycemic when nutrition is interrupted for tests, procedures, medication administration, or if tubes suddenly become clogged or removed. For patients eating meals, the lack of coordination between glucose monitoring, meal delivery, and insulin administration can also lead to hypoglycemia. Nurses, dietitians, and other members of the interdisciplinary team need to collaborate to determine workflows and best practices that improve coordination and reduce hypoglycemia risk.

### Patient Education and Transitions of Care

Readmission rates after hospitalization are estimated between 14-20% (9). Clinicians providing care and education before, during and after a hospital stay must take advantage of opportunities to optimize glycemic management and provide diabetes self-management education and support (DSMES).

The 2018 ADA guidelines include a list of topics that should be covered prior to hospital discharge (2). This includes the skills of glucose monitoring, use and disposal of needles and syringes, taking medications, "consistent nutrition habits," and knowing how to identify, manage and prevent hypoglycemia and hyperglycemia including sick days. Additionally, patients should know who and when to call a provider. Although this might appear to be a short list, hospitalized patients are not always ready to learn. Staff responsible for providing education must focus on patients' priorities for learning as well as those skills and concepts that will keep them safe once they leave the hospital. Including family and other identified support persons is critically important. In order to focus my conversations with patients and families, I like to start my teaching sessions with, "What are you most concerned about?" The response to this question helps me understand what to address first. Frequently, patients have concerns about nutrition, especially since they have multiple chronic conditions that may impact food choices. I am always grateful for my dietitian colleagues who are best with navigating these discussions.

According to the American Association of Diabetes Educators (AADE), there are four critical times to assess and refer for medical nutrition therapy, DSMES, and emotional health: 1) at diagnosis; 2) at the annual visit; 3) with a change in condition; and 4) when transitions occur (10). Hospitalized patients could fall into any of these categories and benefit from referral and follow-up after discharge from the hospital. A toolkit was developed for clinicians which includes a referral algorithm and tools to implement it, which is available to download from www.dce.org or www.diabeteseducator.org/JPStoolkit. With one in three people in the U.S. projected to have diabetes by 2050 (11), health care professionals must stay up to date on the recommendations for diabetes management, education and support to reduce the burden of diabetes.

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# Integrated Care and the Diabetes Educator

Alexis M. Blount, MSN, MPH, RN, CDE, FNP-BC
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Mental illness and substance abuse are fairly widespread in our society. The National Survey on Drug Use and Health, an annual survey that does not include individuals who are homeless, in the military, or in residential facilities, estimates that in 2016, 44.7 million American adults were living with mental illness. Of this population, a subset of 10.4 million had serious mental illness, a diagnosis that involves increased disability (1). Serious mental illness for the purpose of this study was defined as a mental or emotional disorder that causes impairment in the ability to carry out regular life activities and that excludes developmental and substance abuse disorders (2). An estimated 20.1 million Americans over the age of 12 had a substance abuse disorder in the past year (1).

Individuals with mental illness or addictions who could not be cared for at home lived in asylums prior to the de-institutionalization movement and the federal funding of community psychiatry. Separate, specialized systems to treat individuals with mental illness persisted, even as individuals were de-institutionalized (3). This segmented system of care, one for mental illness and another for primary and specialized care, has proved challenging for patients with mental illness to navigate (4). It is also challenging for clinicians, trained and experienced in one specialty, to understand, treat and develop a plan of care for an individual who has both a mental illness and a chronic medical illness (4).

Our society has shifted away from acute illness as causing the largest burden of disease to chronic illness. In 1900 the leading cause of death was pneumonia; by 1930, heart disease had become the leading cause of death of Americans (5). Chronic disease is widespread with one in two Americans reporting a chronic illness, and one in four having received a diagnosis of more than two (6). According to the CDC, most chronic diseases are caused by a short list of risky behaviors, namely tobacco use and exposure to second hand smoke, lack of physical activity, alcohol abuse, and poor nutrition (6). Individuals with substance abuse and mental illness have an increased risk for chronic illness such as diabetes, coronary artery disease, obesity, all of which are associated with higher morbidity rates (7-9). On average, this population has statistically featured a chronic illness prompted premature death 13-30 years before the general population (10). The burden of chronic disease in individuals with behavioral health illnesses increases costs for society as a whole (11). The causes of this increased risk are complex, multifactorial and require a multidisciplinary approach to treatment and care (10).

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## Integrated Care and the Diabetes Educator

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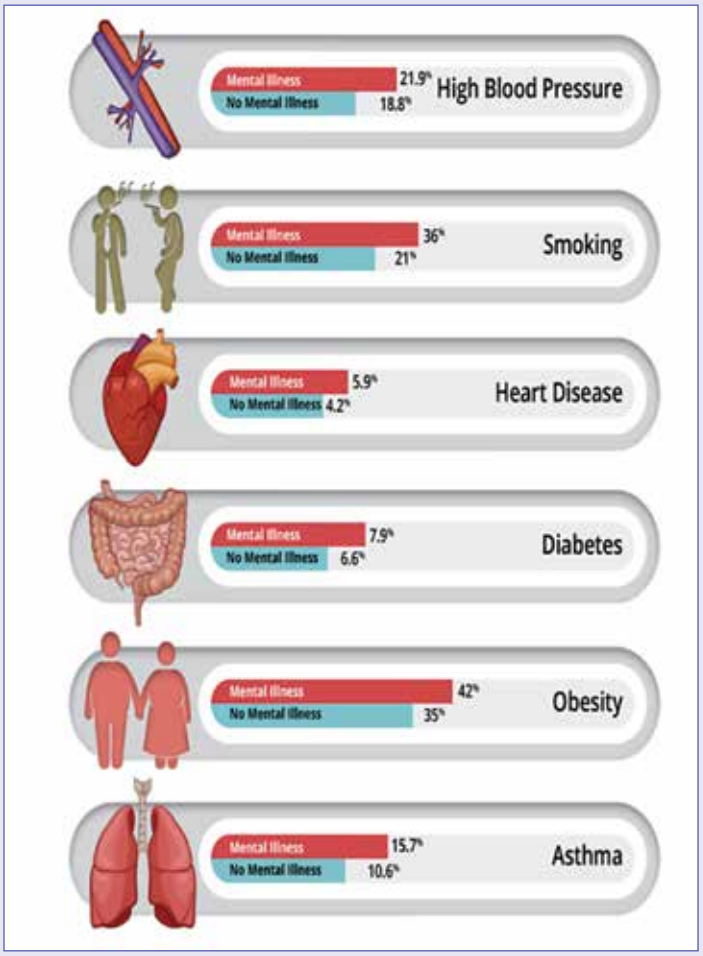
The neurotransmitters targeted by psychotropic medications such as serotonin and dopamine are not only implicated in mental illness, but also play a role in regulation of metabolism, appetite, and satiety (12). Treatment with medication such as atypical antipsychotics and certain antidepressants can increase risk for metabolic illness such as diabetes and obesity (10). Individuals with serious mental illness have decreased rates of exercise (13) and increased rates of smoking (14). Psychologic disturbance can decrease motivation for self-care behavior (15).

The CDC notes that poor nutrition plays a role in chronic disease (7). Individuals with behavioral illness tend to eat diets that are higher in saturated fat and sodium, concentrated sweets, and lower in fresh fruits and vegetables (16,17). There is some evidence that suggests provider bias and poor quality of care offered to individuals with serious mental illness can contribute to poorer health outcomes (18). Persons with serious mental illness are less likely to receive care for cardiometabolic conditions, such as diabetes, hypertension, and hyperlipidemia (19).

Integrated care has been offered as a model of care to dismantle the silos separating primary care and behavioral health. The Agency for Healthcare Research and Quality's Academy on Behavioral Health Integration defines integrated care as "the care that results from a practice team of primary care and behavioral health clinicians working together with patients and families, using a systematic and cost-effective approach to provide patient centered care for a defined population" (20). How integrated care functions can vary from program to program; however, its composition typically includes a mental health provider or team embedded in a primary care team or office, or a primary care team or medical provider or care manager embedded in a mental health setting. For example, a nurse care manager embedded in a behavioral health program who coordinates the care of a population of patients and connects them to primary care can be a form of integrated care (21). The impact of a mental health provider embedded in a primary care team has been better studied than the effects of a medical provider embedded in a behavioral health setting (21).

Some features of the integrated care model include patient registries, regular communication between primary care and behavioral health teams, shared medical records, a unified care plan, and care coordination that may include transitional care and linkage to primary care resources (20). The challenge facing providers attempting to provide integrated care models is the professional training and education of staff, patient engagement, and the complicated nature of motivating

### Figure 1. Co-occurrence between mental illness and other chronic health conditions




Source SAMSHA - HRSA Center for Integration
https://www.integration.samhsa.gov/integrated-care-models/integration-infographic

behavior change, resulting in inconsistent health outcomes and the lack of research and knowledge about best practices in integrated care (21).

The certified diabetes educator is an expert in diabetes care (22). Diabetes education can improve HbA1C, patient knowledge and self-care (22). The diabetes educator role has expanded in recent years and diabetes educators work in many different settings (22). The Affordable Care Act has created opportunities for diabetes educators in the areas of population health, transitions of care and care coordination. Under the Affordable Care Act, a variety of financial incentives and dis-incentives were created to promote the triple aim of health care reform: to deliver cost effective care that would improve patient satisfaction and quality of care while improving health (23).

Diabetes educators will likely continue to be challenged to demonstrate changes across population health in practice environments. Without attention to the mental health needs of persons with diabetes and other chronic illnesses, it will be difficult to meet these challenges, specifically given the interaction of chronic disease and mental health and the ultimate impact on associated treatment costs and disease burden. So, what can diabetes educators do?

In integrated settings, such as patient-centered medical homes, diabetes educators can offer their services as consultant and disease experts while working collaboratively with behavioral health providers, and ensuring that patients are connected and engaged with all available resources. If an educator does not work in an integrated setting, he or she can reach out to community mental health providers seeking opportunities to build linkages with community services and demonstrate the benefit of the diabetes educator role.

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Figure 2.


Figure 1. Source SAMSHA - HRSA Center for Integration https://www.integration.samhsa.gov/integrated-care-models/integration-infographic

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# Monogenic Diabetes: The importance of screening, testing, and diagnosis

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## Introduction

The most common forms of diabetes, type 1 (T1D) and type 2 (T2D), are considered to be polygenic conditions. This means that a person may have multiple changes in their DNA that together confer an increased risk of developing these conditions. Conversely, there are atypical forms of diabetes beyond these types that are increasingly being identified. Diabetes caused by a single gene mutation or abnormality is known as Monogenic Diabetes Mellitus (MDM). This umbrella term encompasses Maturity-Onset Diabetes of the Young (MODY), neonatal diabetes (NDM), and syndromic forms of diabetes, and currently affects approximately 2-5% of all people with diabetes (1). To put this into perspective, if an endocrinologist sees 2,000 individual patients in a year, there are nearly 40-100 possible patients with a monogenic form of diabetes coming into their office. The Monogenic Diabetes Registry at the University of Chicago was created in 2008 to improve the identification, classification and ongoing follow-up of patients with MDM, thereby supporting a better understanding of these rare conditions and improved health interventions. Dissemination of MDM information through diabetes educators, researchers and clinical care providers is crucial because of the relative rarity and frequent misdiagnosis of the disease.

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## Table 1. Clinical Presentation of Monogenic Diabetes Mellitus

| **Maturity-Onset Diabetes of the Young (MODY)** | |
|---|---|
| GCK-MODY | • Persistent elevated fasting blood sugars (BG) typically in the -100-140 mg/di range<br>• Relatively stable hemoglobin Ale (HbAlc) within the range of 5.5-7.7%<br>• 2-3 linear generations of mildly elevated fasting BG, which may be diagnosed as prediabetes, diabetes, or undiagnosed (typically diagnosed under the age of 30)<br>• Negative diabetes autoantibody testing |
| HNF1A-MODY | • Negative diabetes autoantibody testing<br>• 2-3 linear generations of diabetes diagnosed under the age of 30<br>• Sensitivity to sulfonylurea<br>• No history of diabetic ketoacidosis (DKA)<br>• Evidence of endogenous insulin production, such as low insulin requirements and/or positive c-peptide result |
| HNF4A-MODY | • Negative diabetes autoantibody testing<br>• 2-3 linear generations of diabetes diagnosed under the age of 30<br>• Sensitivity to sulfonylurea<br>• No history of diabetic ketoacidosis (DKA)<br>• Evidence of endogenous insulin production, such as low insulin requirements and/or positive c-peptide result |
| HNF1B-MODY | • 2-3 linear generations of diabetes diagnosed under the age of 30 or renal abnormalities<br>• Family history of renal abnormalities (particularly renal cysts), genitourinary problems including fertility issues, and/or liver abnormalities such as ALT/AST/GGT elevations |
| **Neonatal Diabetes** | |
| KCNJ11, INS, ABCC8, 6q24-related diabetes | Any child diagnosed with diabetes under a year of age should be considered for genetic testing |

## Monogenic Diabetes: The importance of screening, testing, and diagnosis

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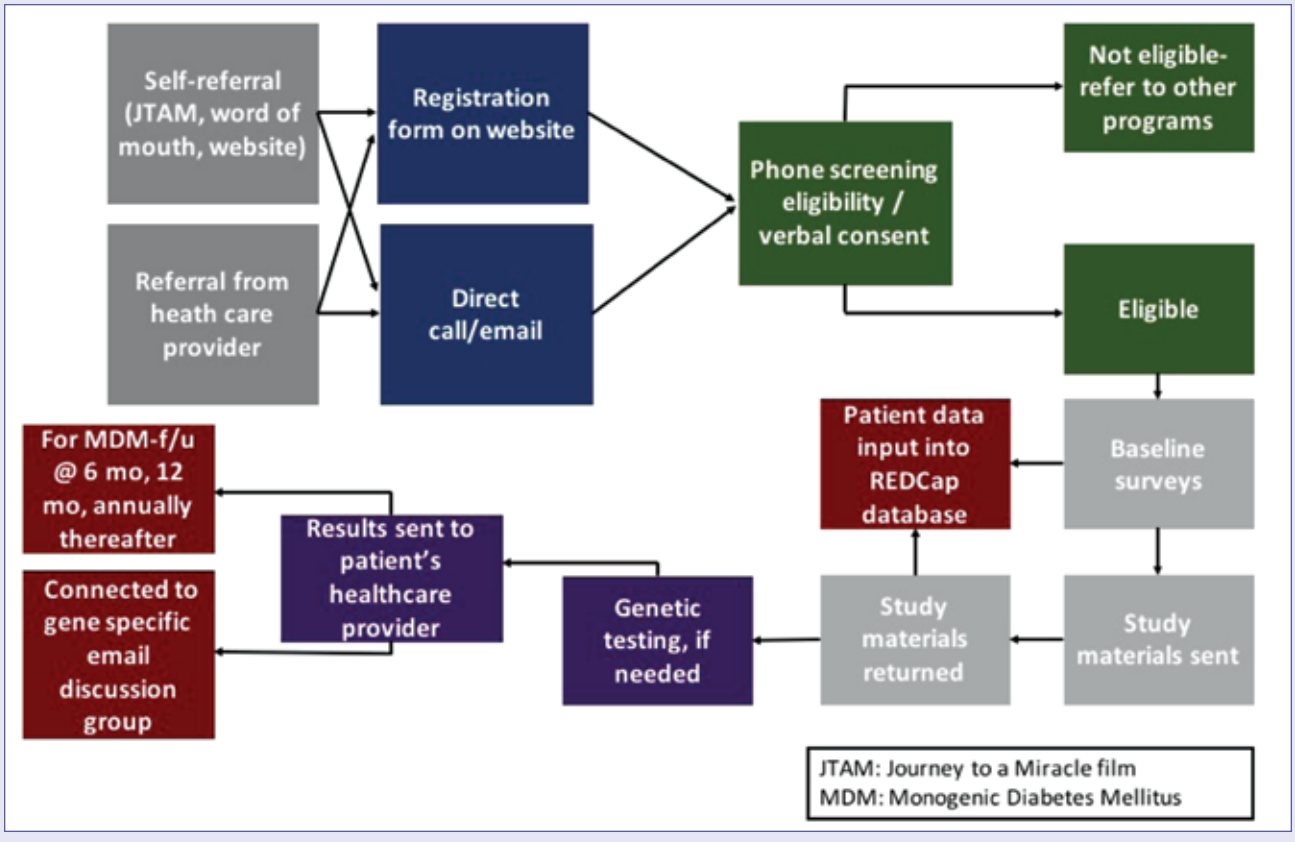
### Maturity-Onset Diabetes of the Young (MODY)

Currently, 14 forms of MODY are recognized in OMIM (2). These heterogeneous forms affect various aspects of beta cell function, but ultimately result in hyperglycemia. GCK-MODY (MODY 2) is the most frequently reported type in the University of Chicago Monogenic Diabetes Registry, although this form is the second most-common in large European databases (3). Mutations in the glucokinase *(GCK)* gene affect the regulation of glucose sensing, and thus insulin release in the pancreas. This form of MDM has a distinct clinical presentation as described in Table 1. Treatment is rarely recommended for people with GCK-MODY as there is no difference in HbA1c levels among people taking pharmacological treatments as compared to those that are not (4). In addition, there is a low prevalence of diabetes related problems such as retinopathy and micro- and macrovascular complications among patients with GCK mutations as compared to controls and young-onset type 2 diabetes patients (5). Hepatocyte nuclear factor-1 alpha and hepatocyte nuclear factor-4 alpha or *HNF1A* (MODY 3) and *HNF4A* (MODY 1), respectively, code for transcription factors which are important for controlling gene expression in the liver and pancreas. Each of these forms present similarly, as explained in detail In Table 1. In rare cases, *HNF1A* mutations have also been associated with liver adenomas (6). Low dose sulfonylurea treatment has been successful in both HNF1A- and HNF4A-MODY with some people completely switching from insulin to oral tablets. Hepatocyte nuclear factor-1 beta (*HNF1B*) encodes for a transcription factor by the same name that is critical for typical development of the pancreas and kidneys. Mutations in this gene cause a less common form of MODY (HNF1B-MODY or MODY 5). Many patients may respond well to oral medications, at least initially, although most will go on to require insulin (7).

Most patients with MODY present with a normal BMI; however, due to increasing rates of overweight/obesity in the US, this should not be used as a sole criterion for testing, rather, the patient's complete medical and family history should be taken into consideration. In addition, most forms of MODY are dominantly inherited which results in the strong linear family history mentioned

### Figure 1. University of Chicago Monogenic Diabetes Registry Enrollment Process



above. Therefore, these autosomal dominant forms of MODY can be passed down to future generations with a 50% chance that a child will inherit the mutation and develop diabetes.

### Neonatal Diabetes

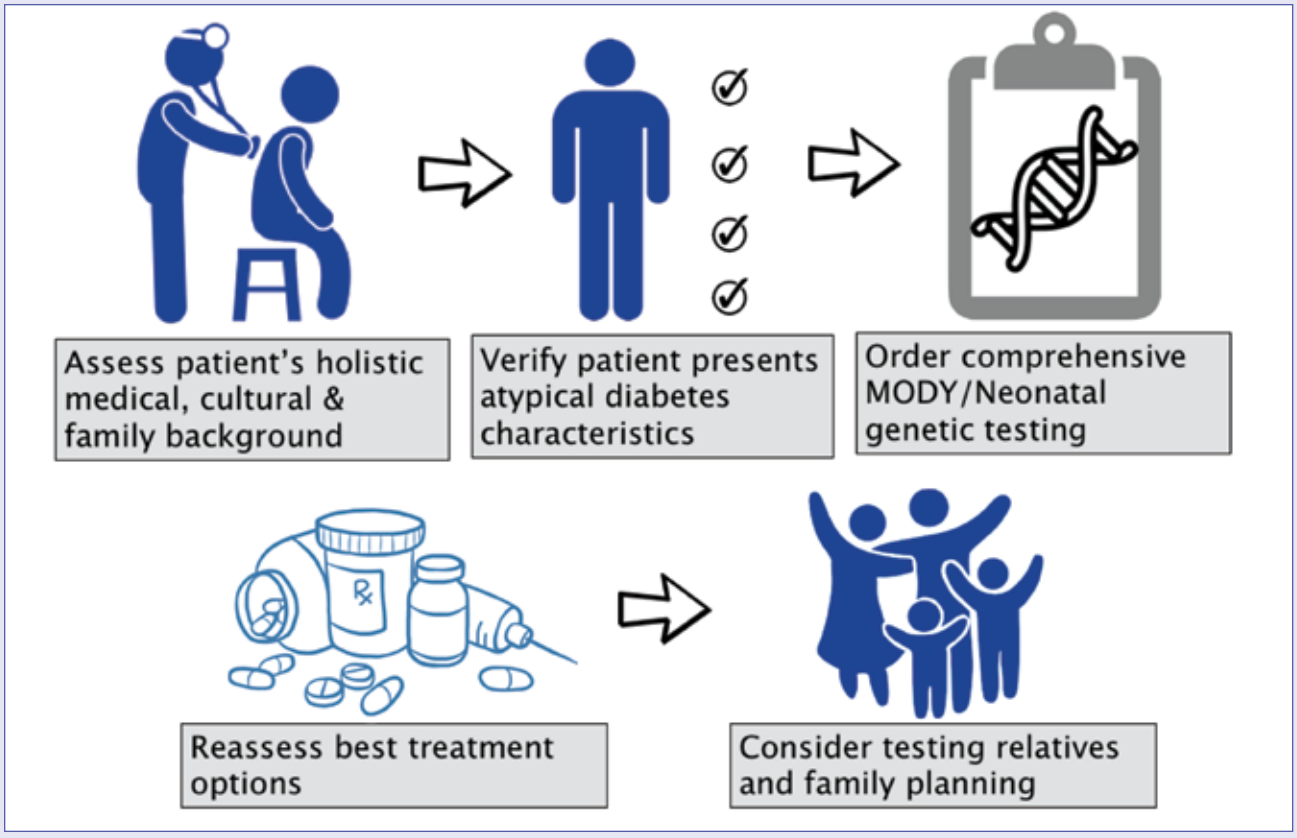
Neonatal diabetes mellitus (NDM), also known as congenital- or infancy-onset diabetes, is typically diagnosed within the first year of life with a few rare exceptions. Unfortunately, NDM can be difficult to diagnose because the clinical presentation can be similar to reassuring features of a baby, including frequent urination and a healthy appetite. There are two subgroups of NDM, permanent and transient, with the latter going into diabetes remission within the first year of life and typically returning around puberty or early adulthood. The most common permanent forms seen in the University of Chicago Monogenic Diabetes Registry are mutations in *KCNJ11* (encodes for part of the ATP-sensitive potassium channel, resulting in poor insulin release from beta cells) and mutations in *INS* (encodes for the insulin hormone and affects the release of insulin into the body). Early sulfonylurea treatment has been successful in managing blood glucose and improving neurological development in patients with *KCNJ11* mutations (8,9). Patients with *INS* mutations will be insulin-requiring. The most common form of transient NDM is due to methylation abnormalities in the 6q24 region. This form of NDM can cause severe growth restriction and transient diabetes. Treatment with sulfonylureas during the infancy period has been successful, however, this form of diabetes almost always returns during adolescence or early adulthood. Many mutations causing NDM are spontaneous, not inherited from parents, and so a linear family history of diabetes may not be present. We recommend that any child diagnosed with diabetes under a year of age have genetic testing completed.

### The Monogenic Diabetes Registry at the University of Chicago

The University of Chicago Kovler Diabetes Center houses the largest monogenic diabetes database in the United States. Many participants find the Registry from healthcare provider referrals and family member recommendations as illustrated in Figure 1. Patients with known monogenic diabetes are eligible to enroll and all patients suspected of having MGM are encouraged to determine their eligibility through our enrollment process. To enroll, each participant completes a patient registration form on our secure website (www.monogenicdiabetes.org).

(continued on page 14)

## Figure 2. Monogenic Diabetes Genetic Testing Process



## Monogenic Diabetes: The importance of screening, testing, and diagnosis

(continued from page 13)

A clinical staff member reaches out to schedule a consultation phone call to consent for study participation and risks, collect medical and family history, and answer any questions. The patient's case is then reviewed for eligibility with clinical research staff and, if eligible, an enrollment packet containing a saliva sample kit is sent to the participant's home. A baseline survey is also sent to collect detailed medical and family history information, and sent indefinitely each year to follow-up on their diabetes care. Once the completed saliva sample kit is returned to the research lab, funding dependent genetic testing may be conducted. If a form of monogenic diabetes is identified, a report will be sent to the participant's healthcare provider (Figure 2). The Monogenic Diabetes Registry staff is available for contact at monogenicdiabetes@uchicago.edu.

### Registry by the Numbers

As of September 1, 2018, there are 3,170 participants enrolled in the Registry with nearly 900 having confirmed monogenic diabetes diagnoses. Of those with a known cause, there are 57% identifying as female and 43% as male. Caucasian/White (72%) remains the highest reported race/ethnicity followed by Hispanic/Latino (8%), Asian (5%), African America/Black (3%), Mixed (3%), and Other (2%). This highlights the importance of culturally-sensitive outreach efforts to increase the racial and ethnic diversity represented in the Registry. Research efforts to better understand barriers to participation and creation of culturally-tailored materials are currently underway. The Registry also includes international participants who reside in nearly 30 different countries, including Canada, India, Ireland and Slovakia.

Often, enrolling in the Registry provides participants with answers to questions regarding their atypical form of diabetes. Many are able to receive free research-based genetic testing that they otherwise would not have had access to due to insurance coverage denials. Many participants in the Registry have access to a more accurate diagnosis after receiving research-based genetic testing. This results in possible changes in treatment because MDM can differ from the typical treatment options of T1D or T2D.

### Contact Information

Comprehensive genetic testing is the only way to confirm a monogenic diabetes diagnosis but unfortunately, not all insurance companies offer full coverage of genetic testing. The Monogenic Diabetes Registry at the University of Chicago strives to further the understanding of monogenic diabetes through research-based genetic testing and long-term patient follow-up. If you or someone you know would like more information on monogenic diabetes we welcome all inquiries to our research team at monogenicdiabetes@uchicago.edu.

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# Brief Action Planning … Motivational Interviewing on Steroids
## An effective and efficient strategy for busy clinicians assisting patients with diabetes to develop action plans that can lead to healthy behavior change

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"Patients, who are more actively involved in their health care, experience better health outcomes and incur lower costs. As a result, many … organizations are employing strategies to better engage patients, such as educating them about their conditions and involving them more fully in making decisions about their care" (1).

Brief Action Planning (BAP) is a highly structured, patient-centered, stepped-care, evidence-informed, self-management support technique based on the principles and practices of Motivational Interviewing (MI). The spirit of MI includes compassion, acceptance, partnership and evocation. The BAP algorithm provides busy clinicians with an efficient and effective technique to facilitate patient-centered goal setting and action planning in time-pressured clinical settings (2).

As the Diabetes Education Coordinator, at the Indiana State Department of Health (ISDH), my role is to increase Diabetes Self-Management Education and Support (DSMES) services throughout the state. This included obtaining my certification in BAP, as well as Train the Trainer for BAP, through the oversight of Michael Hindmarsh from the Centre for Collaboration, Motivation and Innovation. I had the opportunity to assist ISDH Practice Coaches provide BAP training to staff in community health centers as part of the Indiana Primary Care Learning Collaborative. "BAP was introduced as a tool allowing staff to support patients in making the decision of the behaviors they want to change to improve their health" (3).

The scenario below illustrates how a clinician can support a patient to create an action plan for self-management that he feels confident he can achieve. The self-management plan is patient-centered. It represents what the patient wants to do, not what the clinician wants the patient to do.

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### Figure 1. Brief Action Planning Flow Chart (4)

Below is a detailed description of the BAP algorithm that consists of three questions and five skills (2,4).

**Questions**

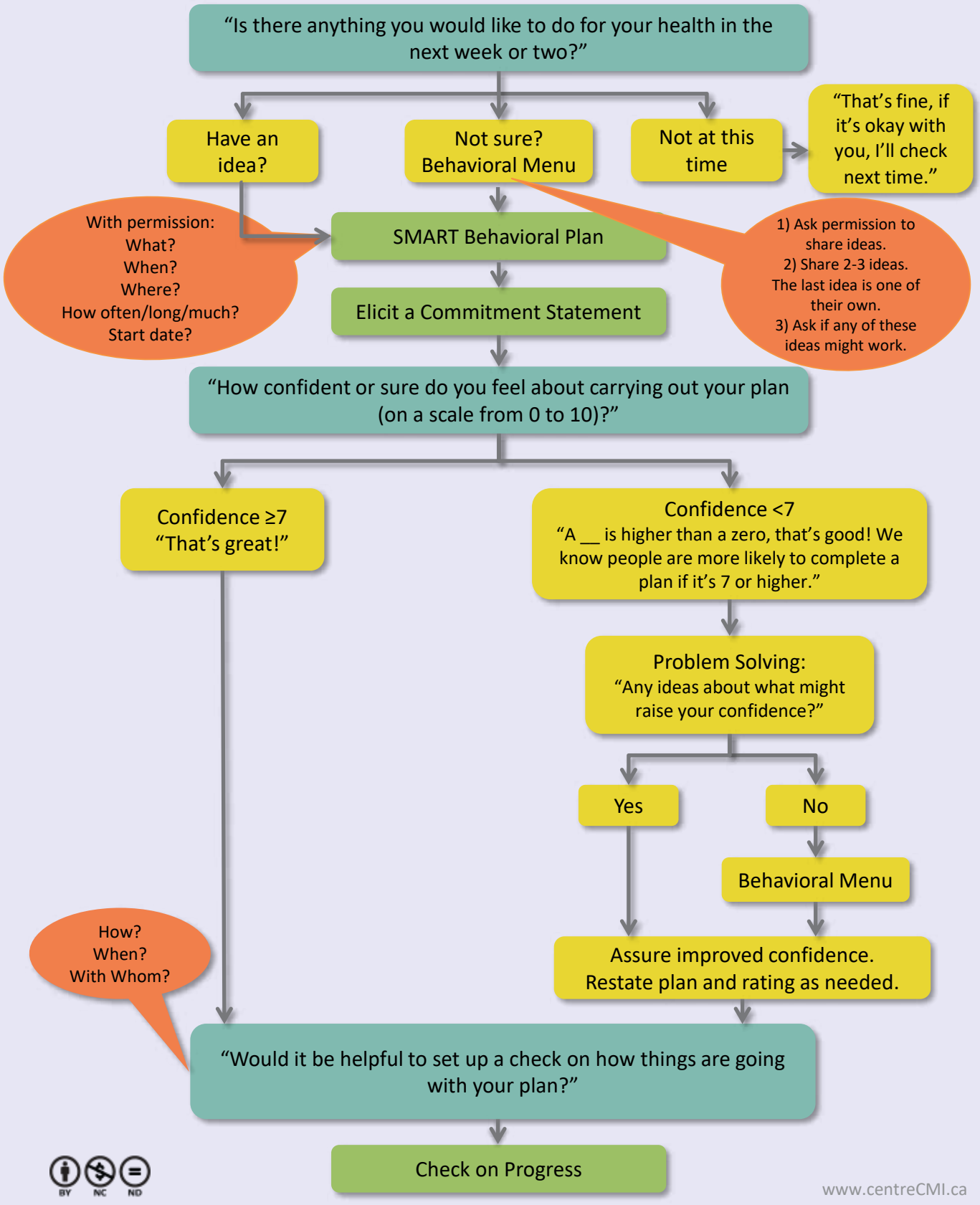
1. Is there anything you would like to do for your health over the next week or two? If the response is "I am not sure," the clinician can offer behavioral menu.
2. How confident do you feel about carrying out your plan on a scale from 0-10? If confidence is <7, problem solve with patient.
3. Would it be beneficial to set up a check on how things are going with your plan? The check-in shows the clinician wants to help the individual succeed and also promotes patient accountability.

**Skills**

1. Behavioral Menu: With permission, clinician can give examples of what has worked for other people.
2. Smart Planning: With permission, assist patient to develop a specific plan by asking key questions.
3. Elicit a Commitment Statement: Just to make sure we understand each other, could you tell me what you've decided to do?
4. Problem Solve for Low Confidence: Help patient to identify changes to his or her plan that would increase confidence.
5. Check on Progress: How did it go with your plan? Providing support, regardless of the outcome, helps to enhance patient self-efficacy.

# Brief Action Planning Flow Chart

Developed by Steven Cole, Damara Gutnick,
Connie Davis, Kathy Reims



## Brief Action Planning

(continued from page 15)

**Clinician:** Mr. Smith, is there something you would like to do for your health over the next week or two?

**Mr. Smith:** Yes. I would like to lose some weight.

**Clinician:** That is a great goal. Would it be okay if I asked you some questions to help you to make a plan to reach your goal?

**Mr. Smith:** Oh sure

**Clinician:** Mr. Smith, do you have an idea of what you want to do to help you lose weight?

**Mr. Smith:** Yes I was thinking I should eat more vegetables.

**Clinician:** Okay how many days a week would you like to start with?

**Mr. Smith:** Oh, I think I should do this every day.

**Clinician:** Which meals do you want to do this?

**Mr. Smith:** Eventually I would like to eat vegetables at lunch and dinner but for now I want to increase how many vegetables I eat at dinner.

**Clinician:** How many vegetables do you want to eat at dinner?

**Mr. Smith:** I want to eat two vegetables every night at dinner

**Clinician:** And when would you like to start this?

**Mr. Smith:** I would like to start today.

**Clinician:** Just to make sure we understand each other, would you please tell me what you have decided to do?

**Mr. Smith:** Oh sure. Starting today, I will eat two vegetables every night at dinner.

**Clinician:** Mr. Smith, how confident are you about carrying out your plan on a scale of 0-10? Zero meaning there is no way I can do this and ten meaning absolutely I can do this.

**Mr. Smith:** I would say my confidence is about a 5.

**Clinician:** A five is better than a zero, that's good. Research shows you are more likely to complete a plan if it is higher than 7. Any ideas about what might increase your confidence?

**Mr. Smith:** Well I need to do some grocery shopping so maybe I will start my plan on Saturday and I will try to eat two vegetables at dinner three times a week.

**Clinician:** If you don't mind Mr. Smith, can you repeat back to me your new plan?

**Mr. Smith:** Of course. Next Saturday, after I have done my grocery shopping and bought more vegetables, I will start to eat two vegetables at dinner three times a week.

**Clinician:** What would you say your confidence level is now?

**Mr. Smith:** My confidence level is an eight.

**Clinician:** Wonderful. Would it be helpful to set up a check on how things are going with your plan in two weeks?

**Mr. Smith:** Yes, I would like that.

**Clinician:** Would you prefer a call, text or email?

**Mr. Smith:** A call would be nice.

Two weeks later, clinician calls Mr. Smith.

**Clinician:** Mr. Smith, how did it go with your plan?

**Mr. Smith:** I was able to carry out my plan two times over the past week.

**Clinician:** Changing behaviors can be challenging. Two times is better than not at all. What would you like to do next?

Brief Action Planning is a self-management support technique that aligns with evidence-based practice for diabetes educators as described in the 2017 National Standards for Diabetes Self Management Education and Support: "The DSMES team member(s) will use clear health communication principles, using plain language, avoiding jargon, making information culturally relevant, using language and literacy appropriate educational materials, and using interpreter services when indicated. Evidenced-based communication strategies such as collaborative goal setting, action planning, motivational interviewing, shared decision making, cognitive behavioral therapy, problems solving, self-efficacy enhancement, teach-back, and relapse-prevention strategies are also effective. It is crucial to develop action-oriented behavior change goals and objectives" (5).

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# Public Policy Update

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Happy fall! Our United States of America government is chugging along in the 2nd year of the 115th Congress. October 2018 is a big month for dietitians in Washington, DC when presence should get some attention during the Public Policy Workshop happening October 23-24, right after FNCE, both hosted in our nation's capital. According to the Academy of Nutrition and Dietetics EatrightPro Advocacy page, the following legislation affects diabetes practitioners and are bills of which we have been asked to "TAKE ACTION!"

### 2018 Farm Bill (H.R. 2 and S.3042)

On June 21, 2018, the House passed its version of the Farm Bill, the Agriculture and Nutrition Act of 2018 (H.R. 2). This is critical legislation, which addresses not only the economic challenges facing the nation's farmers and ranchers, but also features significant investments in opportunities for Supplemental Nutrition Assistance Program (SNAP) recipients. Following the passing of H.R. 2, the Senate passed its own version of the Farm Bill, S.3042, clearing the way for a conference committee to reconcile differences with the House's version of the sweeping agriculture and nutrition legislation.

On August 1, 2018, the Senate moved the Farm Bill to conference in order to reconcile differences in SNAP between the House and Senate versions of the bill, respectively. The bipartisan committee consists of 49 House representatives and nine senators. The first meeting of the committee was scheduled for September 5, 2018, with the currently in-place Farm Bill set to expire on September 30, 2018.

You can find more information about the Academy's position on the House and Senate versions of the Farm Bill at https://www.eatrightpro.org/advocacy/legislation/all-legislation/farm-bill.

Let's hope the conference committee reauthorizes and fully funds SNAP-Ed and EFNEP funding, nutrition research, does not cut SNAP benefits or change the SNAP work requirement!

### Treat and Reduce Obesity Act (H.R. 1953)

A validated IHS Markit microsimulation analysis recently published predicts that increasing Medicare beneficiaries' utilization of clinically effective obesity treatments under TROA could save between $19 and $21 billion over the next 10 years. This new evidence could help to get the bill scored by CBO and attached as a rider given its potential for cost savings.

This year's second Obesity Advocacy Day was held on September 27, 2018 with the Obesity Care Advocacy Network (OCAN). I hope that upon upcoming Action Alerts we can again participate in asking our representative in the 115th Congress to allow RDNs to assist with treating and reducing obesity.

### Expanding Access to Diabetes Self-Management Training Act (H.R. 5768 and S.3366)

On August 22, 2018 Senators Jeanne Shaheen (D-NH) and Susan Collins (R-ME) introduced the Expanding Access to Diabetes Self-Management Training (DSMT) Act (S. 3366) in the U.S. Senate. This is the Senate companion to legislation introduced in the U.S. House of Representatives on May 10, 2018 by Representatives Tom Reed (R-NY) and Diana DeGette (D-CO).

The Expanding Access to DSMT Act (H.R. 5768 and S. 3366) will reduce barriers and improve Medicare beneficiary access to DSMT services in the following ways:

- Allows the initial 10 hours of DSMT during the first year to remain available until fully utilized. If there is a determination of medical necessity, then an additional six hours of training/education may be added.
- Allows six hours of DSMT, increased from prior years' two hours.
- Removes the restriction related to coverage of DSMT and Medical Nutrition Therapy (MNT) services furnished on the same day.

- Excludes DSMT services from Part B cost-sharing and deductible requirements.
- Permits physicians and qualified non-physician practitioners who are not directly involved in managing an individual's diabetes to refer them for DSMT services, such as an ophthalmologist or podiatrist treating a comorbidity like gangrene or vision loss.
- Revises the Medicare Benefit Policy Manual to allow DSMT services to be furnished in a community-based location.
- Establishes a 2-year demonstration of virtual DSMT, potentially paving the way for future Medicare coverage of virtual DSMT services.

### National (Diabetes) Clinical Care Commission

This bill passed both Houses and was signed into law in the fall of 2017. It is important to DCE members because its charge is to "*evaluate and provide recommendations on the coordination and leveraging of federal programs for complex metabolic or autoimmune diseases that result from insulin-related issues and represent a significant disease burden in the United States. The Commission will consist of both federal and non-federal members who will provide recommendations to the Secretary and Congress on coordination and leveraging of federal programs related to these issues.*" In April 2018, the Office of Disease Prevention and Health Promotion Commission took nominations for the Commission. We nominated DCE members to be on the Commission and are awaiting news as to who will be serving. Stay tuned!

### Preventing Diabetes in Medicare Act (H.R. 3124)

As an example of how long a bill can hang around while pending review, the Preventing Diabetes in Medicare Act (HR. 3124) was first introduced in 2007. Representative Diana Degette (D- CO-1) reintroduced H.R. 3124 to the House in the 115th Congress in June 2017. It did not take it long to be promptly referred to both the Committee on Energy and Commerce and the Committee on Ways and Means who both referred it to the Subcommittee on Health where it has been waiting its turn for discussion since July 2017. This bill has 34 Democratic and seven Republican cosponsors. The Preventing Diabetes in Medicare Act amends title XVIII (Medicare) of the Social Security Act to extend Medicare coverage for medical nutrition therapy services to beneficiaries with pre-diabetes or risk factors for developing type 2 diabetes.

### DCE's Advocacy Engagement Scores

The table below, recently released from the Academy's Policy Initiative and Advocacy team, shows the rate of DCE member Action Alert and ANDPAC participation in FY2018 (spanning the period of June 1, 2017 through May 31, 2018). I think we are doing better compared to last year, but there is obviously room to improve! Let's get more of us to TAKE ACTION and more of us to TAKE ACTION more often!

#### DCE Action Alert and ANDPAC Participation Rates

| DPG23 DCE | Legislation |
|---|---|
| 4.22% | Oppose ACHA and the Better Care Resolution Act |
| 3.83% | Nutr. Ed in Farm Bill June 2017 |
| 4.58% | 100 yrs. Cent. Resolution |
| 5.82% | Prevent Diabetes in Medicare Act |
| 2.31% | Senate Oppose Cassidy-Graham |
| 3.07% | TROA FNCE 2017 |
| 2.65% | Nutr. Ed in the Farm Bill FNCE 2017 |
| 6.01% | Co Sponsor Cost-saving TROA Feb. 2018 |
| 3.76% | Farm Bill Feb. 2018 |
| 3.28% | Farm Bill H.R. 2 Release |
| 3.91% | Oppose Farm Bill H.R.2 |
| 3.95% | Avg. Action Alert Rate |
| 8.04% | ANDPAC Average Rate |

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https://health.gov/news/announcements/2018/04/call-for-nominations-for-the-new-national-clinical-care-commission/

https://www.eatrightpro.org/advocacy

https://cdn.ihs.com/www/pdf/BudgetaryImpactAnalysisMedicareAnti-ObesityDec17.pdf

# Using Metabolic Memory: Making the Case for Early Control of Diabetes

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## Introduction

Early glucose control has been shown in research to prevent development of a multitude of complications. This article will carry out the following: 1) discuss research supporting importance of controlling diabetes early; 2) explain long-lasting effects of hyperglycemia and the relationship to metabolic memory; 3) explore how the diabetes educator can explain how early intensive diabetes management and interventions are key to preventing cellular changes that cause diabetes-related complications. In conclusion, safely achieving near normal plasma glucose and HbA1C levels from the time of early diagnosis promotes the establishment of effective metabolic memory (2).

## Metabolic Memory

The term "metabolic memory" refers to the ability to store and recall early glycemic control by leaving an imprint in the cells of the vasculature and target organs that effect future development of complications (2,4). Metabolic memory, with early control from the start of diabetes, can profoundly influence prognosis later in life (5). The concept of metabolic memory (or historical glycemic control) suggests very early, aggressive treatment of hyperglycemia is mandatory for "long-term" benefits in terms of vascular complications (3). Metabolic memory is a good motive to encourage everyone to work toward achieving excellent glycemic targets from the start of diagnosis, whether it be the treating health care professional or the person living with diabetes.

## Evidence from Clinical Trials

The Diabetes Control and Complications Trial (DCCT), Epidemiology of Diabetes Intervention and Complications Trial (EDIC) and United Kingdom Prospective Diabetes Study (UKPDS) demonstrated and supported the following:

1. Persons with diabetes who were treated with early tight control had a lower risk of developing micro-and macrovascular complications (5).
2. The benefits of early glucose control on preventing long-term complications can continue even if control is relaxed and the levels of A1C show poor glucose control later in life (6).
3. The concept that the early glycemic environment leaves a mark on the tissues and vascular cells create the phenomenon known as "metabolic memory" (5).

These findings give diabetes educators a reason to encourage early control as long as it can be safely achieved without hypoglycemia. When persons with diabetes are not meeting blood glucose targets and treatment plans need to be changed, the diabetes educator can facilitate open-ended discussions to assist with making behavior and/or medication changes.

## Long-Lasting Effects of Hyperglycemia

The long-lasting effects of hyperglycemia are associated with increased oxidative stress, non-enzymatic glycation of proteins, epigenetic changes, and chronic inflammation (5-7). These factors trigger multiple complex cellular changes that can cause damage or dysfunction to the eyes (retinopathy), kidneys (nephropathy), endothelial cells (cardiovascular disease), vascular system (i.e. stiffness of the tendon, muscle, bone and skin from collagen changes), central and peripheral nervous system, and others (5). The disturbing news is exposure to high blood glucose early on places an imprint on the cells that can cause irreversible molecular and cellular changes. Even after a period of improved control, the early effects of hyperglycemia increased the risk of complications. The uplifting news is that early treatment to normalize glucose can stop the process that leads to permanent cellular changes and complications. The shorter the exposure to glucose toxicity, the lesser chance of complications. Developing therapeutic strategies to reduce the effects of hyperglycemia may reduce the major burden of diabetes complications and poor quality of life that results from poor control (8).

### Therapeutic Implications

Early treatment of hyperglycemia, using agents that can reduce cellular reactive species and glycation, can reduce long-term complications. Metformin, pioglitazone and some angiotensin receptor blockers (ARBs) can reduce advanced glycation end-products (AGEs) formation and may help reduce oxidative stress (1,3). There is some evidence that Vitamin C, along with glycemic control, normalizes endothelial dysfunction and decreases oxidative stress (1,3). Early insulin use can decrease inflammatory markers and reduce glucose and lipid toxicity (6). Insulin helps to improve beta cell recovery (early on), decrease free fatty acids, decrease triglycerides and increase cholesterol-HDL (6).

### Diabetes Educator Role

Diabetes Educators can help patients understand that early control of diabetes is essential by explaining the "legacy" effect of metabolic memory using analogies.

### Personal Experience

Analogy use has been a critical component of teaching for centuries. After sharing analogies regarding good glycemic control, I often observe patients having more eye contact, asking questions and verbalizing understanding. My future plans are to incorporate these concepts into my teach-back questions to facilitate the "chain of impact" (10) for behavioral change.

### A Pathway to Promoting Positive Metabolic Memory

Diabetes Educators play a role in helping empower persons with diabetes to learn diabetes self-management skills that are critical to achieving and maintaining good glucose control. Diabetes Educators need to encourage the Primary Care Physician to refer patients to Diabetes Self-Management Education & Support (DSMES) early in diagnosis, and at the critical times as outlined by American Association of Diabetes Educators (AADE), to support early and ongoing glycemic control (11). Figure 1 summarizes the Diabetes Self-management Education and Support for Adults with Type 2 Diabetes: Algorithm of Care.

Diabetes Educators hold a valuable position to help persons with diabetes live a long and healthy life. In conclusion, evidence from clinical trials suggest that chronic hyperglycemia causes imprints on cells that can cause irreversible cellular changes, aiding the future development of complications. The case is made: early intervention has profound long-term benefits.

### Acknowledgements

A special thank you to Joyce Najarian, MSN, RN, CDE of Lehigh Valley Health Network for guidance in researching the topic for application to teaching persons with diabetes and editorial support.

## Example Analogies to Explain Metabolic Memory

1. **Procedural Memory Example**
   Why does your body never forget how to ride a bike? Once you learned how to ride a bike in early childhood, it is then stored in your memory.

   You will never lose this memory as it was stored and encoded by the brain and will always be easy for the brain to retrieve (9).

2. **Favorable Memory Example**
   Teaching a child how to approach a dog to have a favorable outcomes versus cause long-lasting fear.

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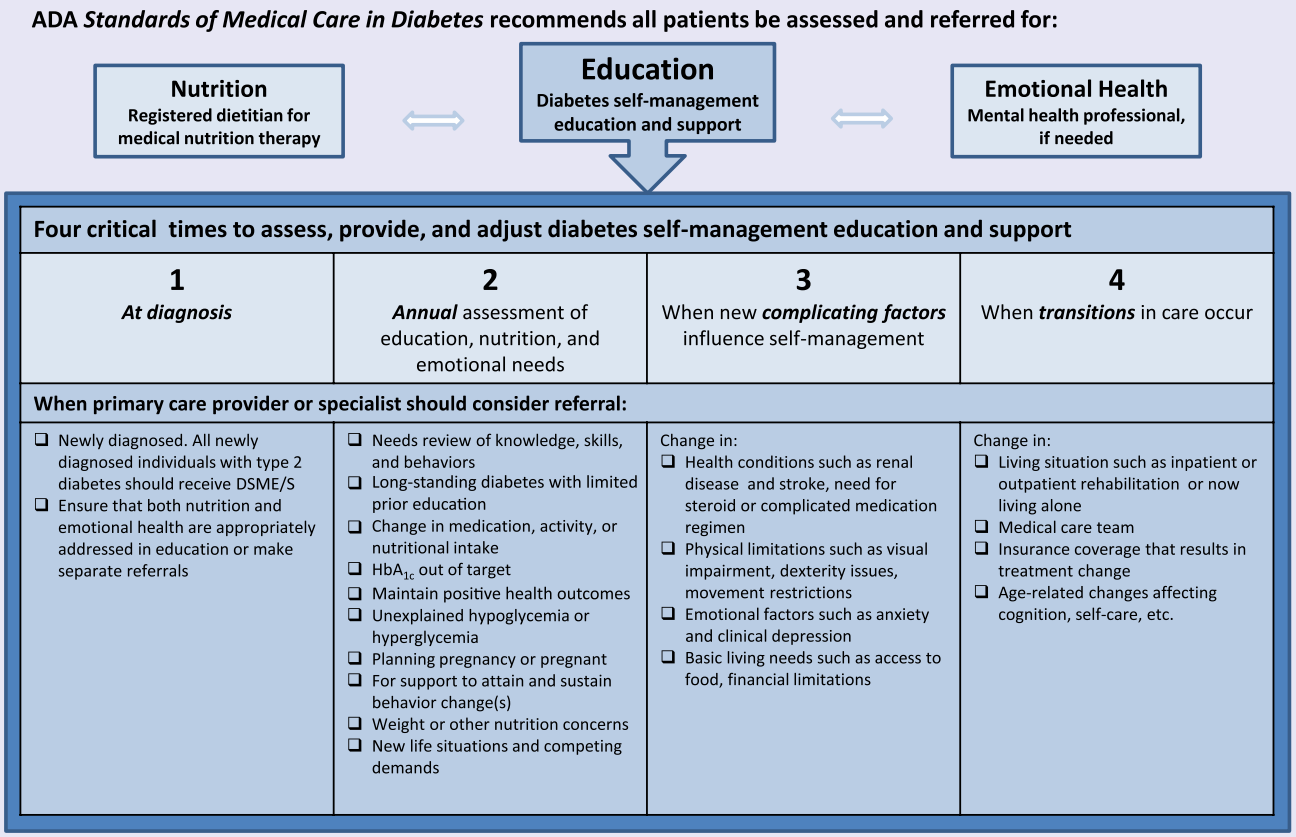
## Figure 1. Diabetes Self-management Education and Support for Adults with Type 2 Diabetes: Algorithm of Care.




## Using Metabolic Memory: Making the Case for Early Control of Diabetes

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# HAVE YOU READ?

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- Castle JR, El Youssef J, Wilson L, et al. Randomized Outpatient Trial of Single- and Dual-Hormone Closed-Loop Systems That Adapt to Exercise Using Wearable Sensors. *Diabetes Care*. 2018;41(7):1471-1477. doi. org/10.2337/dc18-0228.

In this randomized trial the authors investigated the efficacy of single- and dual-hormone closed-loop systems that use wearable sensors to decrease the incidence of hypoglycemic episodes as a result of exercise. The trial included 20 adults with type 1 diabetes (T1D) and had four separate arms with three bouts of aerobic activity (moderate-intensity) included for each arm. The four arms were continuation of the individual's current practices, predicted low glucose suspend, single-hormone closed-loop system and double-hormone closed-loop system. Subjects completed each of the arms in random order on four separate days on an outpatient basis. Researchers collected data on the percentage of time the subjects had blood glucose levels <70 mg/dL (hypoglycemic) and blood glucose levels in the stated target range of 70-180mg/dL. Results show that of the four arms, the dual-hormone closed-loop system was the most effective at preventing hypoglycemia (3.4% of the time spent with a blood glucose <70mg/dL). The most effective at keeping the subject within the target range of 70-180mg/dL was the single-hormone closed-loop system (74.3% of the time). The authors conclude that the dual-hormone closed-loop system reduces low blood glucose episodes in exercising adults with type 1 diabetes.

- Martinez-Laguna D, Christian T, Nogues X, et al. Fracture Risk in Type 2 Diabetic Patients: A Clinical Prediction Tool Based On A Large Population-Based Cohort. *PLoSONE*. 2018;13(9):1-15. doi. org/10.1371/journal.pone. 0203533.

Martinez-Laguna et al. describe the development of a tool that can predict the five-year fracture risk of individuals with type 2 diabetes (T2D). A large population-based cohort in Spain of 51,143 subjects (50-85 years old, 57% males) were followed from the time of diagnosis with T2D until a fracture occurred, death or the end of the study. Statistical modeling with Cox proportional hazards regression was selected as the method to predict the five-year fracture risk for major fractures and also specifically for hip fractures. Various factors were built into the regressions including age, gender, previous major fractures, dietary supplements (calcium and vitamin D), and the use of statin medications. Previous stroke was also built in for the prediction of major fractures and previous ischemic heart disease for hip fracture. Use of the clinical prediction tool revealed the incidence rates per 1,000 person-years to be 1.84 [95% confidence interval 1.64-2.05] for hip fractures and 7.12 [95% confidence interval 6.72-7.53] for major fractures. Internal testing with discrimination and calibration plots determined strong internal validity for the predictive tool for both hip fractures and major fractures. Given that the predictive tool has strong internal validity and utilizes commonly available data in most electronic health records indicates the potential for wide spread use.

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- Natali A, Nesti L, Venturi E, et al. Metformin Is The Key Factor For Elevated Plasma GDF-15 Levels in Type 2 Diabetes: a nested, case-control study. *Diabetes Obes Metab*. 2018 Sep 3. doi: 10.1111/dom.13519.

This study investigated Growth and Differentiation Factor 15 (GDF15), a member of the Transforming Growth Factor-beta superfamily and produced in response to hypoxic and inflammatory events, such as those found in cardiovascular disease. GDF15 has been found to be elevated in subjects with type 2 diabetes (T2D) that were prescribed metformin; therefore, the aim was to examine the association of GDF15 with the oral hypoglycemic agent metformin, as well as with major cardiovascular risk factors. To achieve this aim, data from the SUMMIT cohort was utilized that includes a sample size of 1,438 subjects in a multi-center, nested, case-control design. Pertinent data from the SUMMIT cohort included biomarkers of atherosclerosis in the context of whether the subject also had T2D and/or cardiovascular disease. Univariate analysis of data revealed linear increases of the major cardiovascular risk factors (except for total cholesterol and gender) across the quartiles of GDF15. Age, diuretic use, smoking, hemoglobin A1c and N-terminal pro-brain natriuretic peptide were found to be independently associated with GDF15 regardless of whether the individual had diabetes or not. Additionally, it was found that individuals prescribed metformin had a 40% increase in GDF15 independent of the other factors measured. The authors concluded that there is the possibility metformin may upregulate circulating levels of GDF15 and may represent a mechanism for the cardioprotective effects of the drug.

- Omar DF, Kamal MM, El-Hefnawy MH, El-Mesallamy HO. Serum Vitamin D and Its Unregulated Protein, Thioredoxin Interacting Protein, are Associated with Beta-Cell Dysfunction in Adult Patients with Type 1 and Type 2 Diabetes. *Canadian Journal of Diabetes*. 2018;1-7. doi: 10.1016/j.jcjd.2018.02.012.

Recent research has suggested a link between vitamin D and thioredoxin interacting protein (TXNIP) and beta-cell dysfunction. The purpose of this study was to investigate any correlations between markers of beta cell function and serum levels of vitamin D and TXNIP among patients with type 1 diabetes (T1D) and type 2 diabetes (T2D). 55 subjects were included in this study and divided into three groups. Group I was the control group of 15 healthy subjects. Group II included 20 subjects with T1D. Group III included 20 subjects with T2D. The markers for beta-cell function that were used included homeostatic model assessment of beta cell function (HOMA-beta), homeostatic model assessment of insulin resistance (HOMA-IR), proinsulin (PI), proinsulin:insulin ratio (PI/I) and proinsulin:C-peptide ratio (PI/C). Results show a significant, positive correlation between Vitamin D and HOMA-beta and TXNIP and a negative correlation with HOMA-IR, PI/C, PI/I and PI. These results suggest the possibility that low serum vitamin D levels can be used clinically in predicting beta cell function in patients with diabetes mellitus.

Further, a positive correlation of TXNIP with HOMA-beta was found as well as a negative correlation with PI/C and an overall decrease of serum TXNIP in conjunction with beta-cell deterioration. In whole, this study confirmed that patients with different types of diabetes exhibit different stages of beta cell dysfunction and vitamin D and TXNIP are parameters that can reflect beta cell function in patients with diabetes. Further research is needed to fully understand the roles of vitamin D and TXNIP in beta-cell function and insulin resistance in diabetes mellitus.

- Viguiliouk E, Kendall CW, Kahleova H, et al. Effect of Vegetarian Dietary Patterns on Cardiometabolic Risk Factors in Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Clinical Nutrition*. 2018;1-13. doi.org/10.1016/j.clnu.2018.05.032.

This article provided a systematic review and meta-analysis of randomized controlled trials lasting at least three weeks in duration that investigated the effect of vegetarian dietary patterns on glycemic control and cardio metabolic risk factors among individuals with diabetes. A total of nine studies met the eligibility criteria with at total of 664 participants combined. All trials were conducted in the outpatient setting

with a median follow-up duration of 12 weeks, an equal distribution of middle-aged men and women, and 99% of participants with type 2 diabetes (T2D). A significant reduction in hemoglobin A1c, fasting glucose, body weight, body mass index and waist circumference was found in the participants following a vegetarian dietary pattern compared to the control groups. Only one study included data for fasting insulin showing no significant findings in the intervention group compared to the control. For cardio metabolic risk factors, the vegetarian dietary patterns significantly reduced low density lipoprotein cholesterol but did not significantly alter high density lipoprotein cholesterol, triglycerides, systolic blood pressure or diastolic blood pressure. In conclusion, this review presented evidence that vegetarian dietary patterns have the potential in improving glycemic control and cardiometabolic risk factors in middle-aged, overweight or obese individuals with T2D. Further research is needed to investigate the benefits of this dietary pattern for individuals with type 1 diabetes as well as the effect of different forms of vegetarianism.

- Yamamoto JM, Kellett JE, Balsells M, et al. Gestational Diabetes Mellitus and Diet: A Systematic Review and Meta-Analysis of Randomized Controlled Trials Examining the Impact of Modified Dietary Interventions on Maternal Glucose Control and Neonatal Birth Weight. *Diabetes Care*. 2018;41(7):1346-1361. doi. org/10.2337/dc18-0102.

This article performed a systematic review and meta-analysis of randomized controlled trials investigating dietary components, maternal glycemia and birth weight to further investigate the optimal diet for achieving euglycemia and improved perinatal outcomes. Eighteen randomized controlled trials with a total of 1,151 pregnant women with gestational diabetes mellitus (GDM) were included. Most trials had small sample sizes ranging from 12 to 150 participants and assessed individual dietary adherence using food diaries. Type of modified dietary interventions included low-glycemic index, Dietary Approaches to Stop Hypertension (DASH), low-carbohydrate, fat-modification, soy-protein enrichment, energy-restriction, high-fiber, behavioral intervention and ethnic diets. Results for all modified dietary interventions showed decreased maternal fasting and post-prandial glucose levels and a lower need for medication compared to the control group, as well as lower infant birth weights with less macrosomia; however, the quality of evidence was assessed at low to very low. There were no significant changes in hemoglobin A1c or homeostatic assessment model of insulin resistance. To conclude, modified dietary interventions showed favorable outcomes for pregnant women with GDM in terms of improving maternal glycemia and neonatal birth weight. Additional studies of higher quality are needed, however, this review highlights the key role of nutrition management in GDM.

- Saylor J, Less S, Ness M, et al. Positive Health Benefits of Peer Support and Connections for College Students with Type 1 Diabetes Mellitus. *The Diabetes Educator*. 2018;44(4):340-347. doi: 10.1177/0145721718765947.

This study investigated the health outcomes of 317 college students (18-30 years old) with type 1 diabetes (T1D) participating in a local chapter of a university-based diabetes student organization, College Diabetes Network (CDN). Student members of CDN completed a survey designed to assess psychosocial and clinical outcomes of young adults with T1D and the impact of CDN. Participants included an equal distribution of freshmen, sophomores, juniors and seniors with lesser representation from graduate students. Participants involved in CDN were significantly less likely to report feeling isolated, depressive symptoms, anxiety, and fluctuations in hemoglobin A1c levels, as well as decreased hypoglycemic and diabetic ketoacidosis events. Overall, results of this study illustrated the health benefits to young adults with T1D participating in a local chapter of a university-based diabetes student organization as a means of providing social support.

- Mezuk B, Thornton W, Sealy-Jefferson S, et al. Successfully Managing Diabetes in a Community Setting: Evidence from the YMCA of Greater Richmond Diabetes Control Program. *Diabetes Educator*. 2018;44(4):383-394. doi: 10.1177/0145721718784265.

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The purpose of this study was to demonstrate the impact of a collaborative community-based participatory research partnership between a YMCA and a Diabetes Control Program (DCP) on improving diabetes care and mental health outcomes in an economically and racially diverse community. Descriptive characteristics of program participants from 2015 to 2017 were analyzed comparing pre- to post-DCP outcomes. Of the 312 participants (mean age of 53.9 years, 71.4% female, 69% African American) that started the program, only 141 participants completed the entire 12 weeks of the program. By the end of the program participants exhibited improved hemoglobin A1c levels, improved mental health (described as decreased clinically depressive symptoms), and increased frequency of self-management behaviors such as self-monitoring of blood glucose; however, the body weights did not improve. In addition, it is unclear which aspects of the program directly improved those outcomes. Findings from this analysis present the benefits of community-academic partnerships in improving the health and well-being of individuals with diabetes at the community level as well as providing evidence in the usefulness of continued investment by philanthropic donors in these programs.

- Cogan KE, Egan B. Effects of Acute Ingestion of Whey Protein With or Without Prior Aerobic Exercise on Postprandial Glycemia in Type 2 Diabetics. *European Journal of Applied Physiology*. 2018;118(9) 1959-1968. doi.org/10.1007/s00421-018-3931-y.

Researchers investigated the combined effects of a single bout of exercise and co-ingestion of whey protein on the glycemic response to an oral glucose tolerance test (OGTT) among participants with type 2 diabetes (T2D). Eight untrained males (mean age 55 years old and body mass index of 33.7) diagnosed with T2D for at least two years were recruited for the randomized crossover design study. The study was divided into three separate trials separated by 7-14 days. Participants received standardized pre-packaged and pre-weighed food providing 24 kcal per kg body mass with a macronutrient distribution of 55% carbohydrates, 25% fat, and 20% protein, and avoided heavy exercise two days before each trial. Baseline characteristics of OGTT, body composition and aerobic fitness measured by maximal oxygen uptake were determined in Trial 1. Trials 2 and 3 included the following in a random order: 1) OGTT with 82g of dextrose powder dissolved in water; and 2) OGTT supplemented with whey protein concentrate (0.33g per kg body mass) at rest or 15 minutes after an acute bout of stationary bike exercise. It was found that neither protein ingestion alone, nor protein ingestion paired with prior exercise reduced postprandial glycemia.

- Anquetil F, Mondanelli G, Gonzalez N, et al. Loss of IDO1 Expression from Human Pancreatic β-Cells Precedes Their Destruction During the Development of Type 1 Diabetes. *Diabetes*. 2018;67(9):1858-1866. doi: 10.2337/db17-1281.

This study investigated the immunoregulatory enzyme indoleamine 2,3 dioxygenase-1 (IDO1) in pancreatic tissue of individuals with type 1 diabetes (T1D) in various stages of the disease as compared to individuals with type 2 diabetes (T2D) and those without diabetes. This enzyme plays many important roles in regulating immunity and has been found to be deficient in individuals with T1D. Pancreatic sections were analyzed from donors without diabetes (n=8), with multiple positive autoantibodies (AAb+) categorized as prediabetes (n=10), with recent-onset T1D (n=6), with T1D for longer duration (n=11), and 5 donors with T2D. IDO1 and insulin expression were analyzed by immunofluorescence assay. IDO1 expression was completely absent in the tissues from donors with long-term T1D. It was also found that the loss of IDO1 expression preceded beta-cell decay suggesting targeting IDO1 may be a promising therapeutic approach in preventing the progression of beta-cell dysfunction in individuals with T1D.

- LeBlanc ES, Pratley RE, Dawson-Hughes B, et al. Baseline Characteristics of the Vitamin D and Type 2 Diabetes (D2d) Study: A Contemporary Prediabetes Cohort That Will Inform Diabetes Prevention Efforts. *Diabetes Care*. 2018;41(8):1590-1599. doi: 10.2337/dc18-0240.

Authors summarized the baseline characteristics of the vitamin D and type 2 diabetes (D2d) study. The D2d is an ongoing, multi-center trial with

22 sites across the U.S. and is categorized as a double-blind, randomized, controlled trial focused on primary prevention of diabetes. The D2d examines the impact of daily vitamin D supplementation (cholecalciferol 4,000 IU/per day orally) compared to a placebo on the incidence of type 2 diabetes in an at-risk cohort. To be considered at-risk, the subject had to meet at least two of the three of American Diabetes Association (ADA) 2010 glycemic criteria for prediabetes. Subjects (n=2,423) were randomly divided into the Vitamin D intervention group or the placebo group. Baseline characteristics of the cohort include 45% female, 33% nonwhite, average age of 59 years old (± 9.9 years), average body mass index of 32 (± 4.5). All three ADA 2010 glycemic criteria for prediabetes were met in 35% of subjects with black participants exhibiting higher hemoglobin A1c levels than other races. End results will hopefully address two primary knowledge gaps: 1) the role of vitamin D supplementation in preventing diabetes; and 2) how the 2010 ADA criteria for prediabetes impact the usual course of development of prediabetes.

- Fisher L, Hessler D, Polonsky WH. A Randomized Controlled Trial to Reduce Diabetes Distress Among Adults With Type 1 Diabetes. *Diabetes Care*. 2018;41(9):1862-1869. doi: 10.2337/dc18-0391.

Researchers aimed to compare the effectiveness of two interventions, OnTrack and KnowIt, in improving glycemic control and diabetes distress (DD) among adults with type 1 diabetes (T1D). OnTrack is an intervention focusing on regulating emotions to help individuals with T1D cope with diabetes. KnowIt is an education and behavior-based intervention that provides participants with information about the causes and management of T1D. Participants were randomly assigned to one of the two interventions and then attended a full-day workshop. Additionally, there were a total of four online meetings during the subsequent three months as follow up. Findings showed that both forms of intervention successfully reduced DD and hemoglobin A1c, but there were no significant differences between the two interventions. This suggests that both educational/behavioral-based and emotion-based intervention programs can be beneficial in improving the well-being and glycemic control of individuals with T1D.

- Umpierrez GE, Klonoff DC. Diabetes Technology Update: Use of Insulin Pumps and Continuous Glucose Monitoring in the Hospital. *Diabetes Care*. 2018;41(8):1579-1589. doi. org/10.2337/dci18-0002.

The authors provide a summary on the use of insulin pumps (continuous subcutaneous insulin infusion, CSII) and continuous glucose monitoring systems (CGM) for the management of hospitalized patients with diabetes. Overall, the American Diabetes Association, the Endocrine Society, the American Association of Clinical Endocrinologists and the Diabetes Technology Society support the use of these technologies in select patients with the necessary knowledge and skills for use, noncritical illness, lack of mental status changes and the involvement of inpatient diabetes specialists. The use of CSII and CGM may help promote better glycemic control with less hypoglycemic episodes and other harmful outcomes as long as the patient is physically and mentally able. If the decision to permit the use of diabetes technologies among hospitalized patients with diabetes is reached, clear policies and procedures in the care of these patients is necessary to ensure the safety of the patient. The authors advocate for future randomized controlled trials investigating the use of these technologies in inpatients.

- Smith BT, Siddiqi A. Letters: Maternal Type 1 Diabetes and Risk of Autism in Offspring. *Journal of the American Medical Association*. 2018;320(1):89-90.

In a retrospective cohort study, the authors investigated potential associations between preexisting maternal type 1 diabetes (T1D) or type 2 diabetes (T2D) or gestational diabetes (GMD) and the risk of autism spectrum disorder (ASD) in offspring. Offspring were tracked using the electronic health record starting from age one. The children were monitored until there was a clinical diagnosis of ASD, last date of continuous membership at the hospital, death or study end date which was December 31, 2017. A total of 419,425 children were monitored of which 51% were male. Of that total, 621 were offspring from mothers with T1D and 9,453 were offspring from mother's with T2D. For the children born to

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mothers who experienced GDM, 11,922 were offspring of mother's who were diagnosed by 26 gestation and 24,505 were offspring of mother's who were diagnosed after 26 weeks gestation. GDM diagnosed after 26 weeks gestation was not found to be associated with ASD. Overall, 5,827 children were diagnosed with ASD by the median follow-up of 6.9 years. Incidence rates of ASD per 1000 children annually (unadjusted average) reveal the highest rate for offspring of mother's with T1D (4.4/1000) followed by rates of 3.6 for offspring of mother's with T2D, 2.9 for offspring of mother's with GDM diagnosed by 26 weeks and 2.1 GDM diagnosed after 26 weeks. For comparison, the incidence rates of offspring born to mothers without any form of diabetes was 1.8. Evidence from this study indicates the elevated risk of ASD in children with mothers with T1D, T2D, and GDM diagnosed by 26 weeks.

- Hayashi A, Oguchi H, Kozawa Y, et al. Daily Walking Is Effective For The Management of Pregnant Women With Gestational Diabetes Mellitus. *Journal of Obstetrics and Gynaecology Research*. 2018;44(9):1731-1738. doi:10.1111/jog.13698.

This longitudinal study examined whether or not daily walking could be effective in the management of gestational diabetes mellitus (GDM). This study took place in Japan where the prevalence of GDM is 8%. The women who participated in the study were recruited in their second trimester with confirmed GDM and were given an accelerometer to measure the total amount of steps taken each day until the third trimester began. The accelerometer was attached to the waistbands of the women's clothing and measured steps taken, the intensity of physical activity (PA), as well as the physical activity related energy expenditure (PAEE). From the 73 women originally included in the study, data was available on 24 of them. From these 24 women, 13 demonstrated a decrease in the casual glucose level (CGL) but no significant effect on the hemoglobin A1c values. The results from this study showed a statistically significant positive correlation between number of steps walked and PAEE. This result implies that for pregnant women, walking every day does sufficiently contribute to energy expenditure. However, there was no statistically significant relationship between number of steps taken and energy consumption. In conclusion, this study suggests that light daily walking is an effective tool to help control CGL in pregnant women with GDM, regardless of dietary intake. Since PA has long been established as an effective and helpful tool in controlling blood glucose in pregnant women, it is likely a good recommendation for pregnant women with GDM to prevent the development of type 2 diabetes after delivery. It is important to note, though, that this study was done on only Asian women, and there is a known ethnic variation of glucose tolerance. Additionally, the authors note that further studies should be done to check that insulin resistance is also improved in pregnant women with GDM, and not just CGL.

- Bjerregaard LG, Jensen BW, Angquist L, et al. Change in Overweight from Childhood to Early Adulthood and Risk of Type 2 Diabetes. *New England Journal of Medicine*. 2018;378(14):1302-1312. doi:10.1056/NEJMoa1713231.

This study in the *New England Journal of Medicine* set out to research whether remission of overweight before early adulthood impacts the risk of developing type 2 diabetes (T2DM). The interest in this topic stems from the fact that puberty is a period associated with a notable decrease in insulin sensitivity, so examining one's weight status during this time period is of high importance. Boys born between 1939 and 1959 had doctors or nurses in the school setting record their heights and weights each year. The criteria for involvement in this study were not having a diabetes diagnosis before 30 years old, as well as availability of medical information. The results of this study showed an increase in prevalence of overweight from 5.4% at seven years old to 8.2% in adulthood, and 10.7% were diagnosed with T2DM in the follow up years. Being overweight at any stage of life (at seven years old, 13 years old and in early adulthood) in this study was correlated with a risk of T2DM, and the highest incidence of T2DM was in men who were overweight in early adulthood. Interestingly, men who were overweight before puberty but had achieved normal weight status by 13 years old had similar level of risk of T2DM in adulthood as the men who were never overweight. This research implies that the negative impact

associated with overweight during childhood is potentially reversible. For example, the men who were successful in losing weight to normal BMI ranges by early adulthood decreased their risk of T2DM by half when compared to men who were overweight at all life stages. Ultimately, overweight in the years surrounding puberty and early adulthood had higher risks of T2DM when compared with men who were only overweight in adulthood, thus, finding ways to normalize weight before this timeframe may reduce the T2DM risk and prove beneficial to overall health.

- Ruiz PLD, Tapia G, Bakken IJ, et al. Pandemic influenza and subsequent risk of type 1 diabetes: a nationwide cohort study. *Diabetologia*. 2018 June 22. doi:10.1007/s00125-018-4662-7.

In this study, researchers in Norway utilized national population-based registries to examine the relationship between pandemic or seasonal influenza and subsequent type 1 diabetes (T1D) in those under the age of 30. Pandemic influenza was defined as identification by clinical diagnosis or a laboratory-confirmed test result during the period from June 2009 through May 2010; whereas, the seasonal influenza was defined as being identified by clinical diagnosis during October through May each year from 2006 to 2013. Analysis of results reveals there is no clear correlation between pandemic or seasonal influenza and T1D. However, results did reveal that of the 2,286,650 individuals in the study, 3.3% received a diagnosis of pandemic influenza (n=76,173), and 0.1% were diagnosed with new-onset T1D (n=2,376) during the period of time monitored for pandemic influenza. Authors noted a 20% higher risk of T1D in those diagnosed with pandemic influenza but this result was not statistically significant. Additionally, a higher risk of T1D in those diagnosed with seasonal influenza was noted in all seasons monitored but there was only one season that reached statistical significance (2010-2011). The authors conclude that respiratory infections such as influenza may be related to the onset of T1D but additional studies are needed.

- Cheung LTF, Chan RSM, Ko GTC, et al. Diet Quality Is Inversely Associated With Obesity In Chinese Adults With Type 2 Diabetes. *Nutrition Journal*. 2018;17(1):63. doi.org/10.1186/s12937-018-0374-6.

Diabetes is of heightened concern in Asian countries, as the residents are diagnosed at younger ages with lower body mass index (BMI) and have more severe complications than other populations. Other studies have found that compliance with high quality diets like Dietary Approaches to Stop Hypertension (DASH) were correlated with reductions in risk of obesity, heart disease, cancer, type 2 diabetes (T2DM) and all-cause mortality. Because of this, authors wanted to study the relationship between diet quality and obesity in T2DM patients. This study examined two groups with T2DM, one group of obese individuals (BMI≥30), and one without obesity (BMI of 18.5-24.9) as a comparison group. Dietary intake was established with the use of a validated food frequency questionnaires (FFQ). To minimize the impact from incomplete reporting the authors also utilized food models and common utensils to facilitate understanding of proper portion size and appropriate reporting. Scores were derived from the results of the FFQ based on three assessment tools for diet quality. The tools included the Alternate Health Eating Index – 2010 (AHEI-2010), the DASH diet, and the Diet Quality Index-International (DQI-I). The higher the score in each of these tools are associated with better diet quality. Ultimately it was found that the obese group of T2DM individuals had significantly lower dietary quality scores for all three tools, higher total energy consumption, a higher percentage of energy from protein and lower intakes of vegetables than the comparison group. The strongest inverse relationship between diet quality and obesity was measured with the AHEI-2010. The authors conclude there is an association between dietary quality and, therefore, it may prove beneficial to promote dietary habits in line with AHEI-2010, DQI-I, and DASH as opposed to specific nutrient requirements. Each of these dietary patterns includes a high consumption of plant-based foods and limited intake of high-fat and processed foods.

- Aiken CEM, Hone L, Murphy HR, Meek CL. Improving Outcomes In Gestational Diabetes: Does Gestational Weight Gain Matter? *Diabetic Medicine*. November 2018. doi:10.1111/dme.13767.

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Research has shown that gestational diabetes (GDM) is more prevalent in women who have a high body mass index (BMI) before pregnancy and those who gain excessive weight during pregnancy, but it still is not clear whether or not women with GDM can limit complications by restricting gestational weight gain. Because of this, the authors set out to research if weight control during pregnancy, although controversial, can prove to be beneficial for both mother and child and reduce complications related to pregnancy. Additionally, since most women do not receive a GDM diagnosis until later in pregnancy, the authors investigated if early (0-28 weeks gestation) or late (28-36 weeks gestation) weight gain impacts pregnancy outcomes. The study was a retrospective observational study performed in the United Kingdom between October 2014 and March 2017. After receiving a GDM diagnosis, the women in the study were weighed during scheduled visits with the interdisciplinary team every 2-4 weeks. Participants were also advised to check their blood glucose four times each day and glucose tolerance after giving birth was assessed 6-8 weeks after delivery. The results of this study indicated that total weight gain during pregnancy showed a strong correlation to fetal growth. There was a positive association with large for gestational age (LGA) and the need for a caesarean section, and a negative correlation with small for gestational age (SGA). Weight gain late in pregnancy, defined as 28-36 weeks gestation, was correlated with increased risk of LGA and instrumental delivery, as opposed to spontaneous vaginal delivery. Additionally, women who experienced higher late-pregnancy weight gain also had higher glucose concentrations when tested after delivery, which was associated with the need for higher daily insulin doses. No associations between early gestational weight gain and pregnancy outcomes were detected. Subjects that received a diagnosis of GDM and subsequently minimized their weight gain experienced lower blood glucose levels and required only 50% of the daily insulin dose versus subjects with higher weight gains. The results of this study indicate that weight gain should continue to be monitored and limited in women with GDM during pregnancy to avoid risks of negative pregnancy outcomes, especially late in pregnancy.

- Willers C, Iderberg H, Axelsen M, et al. Sociodemographic Determinants And Health Outcome Variation In Individuals With Type 1 Diabetes Mellitus: A Register-based Study. *PloSOne*. 2018;13(6):e0199170. doi. org/10.1371/journal. pone.0199170.

Health equity is something that is often considered in the healthcare field. This retrospective registry-study was developed to investigate how sociodemographic variants impact the care and health outcomes of people with type 1 diabetes (T1D) in Sweden (n=16,367). The sociodemographic factors included were sex, age, education level, marital status and birth region. The results of this study showed that both higher education and being married were correlated with lower hemoglobin A1c levels. Additionally, lower education levels were associated with a higher risk of heart disease and non-married status was associated with a decline in the glomerular filtration rate. Results also revealed gender and age differences with females and younger individuals (age <25 years old) experiencing worse blood glucose control. Overall, this study demonstrated a strong association between sociodemographic factors and T1D and its risk factors. The results of this study also stress the need to educate patients and highlight the importance of providing the best care to a patient regardless of background.

- Salunkhe VA, Veluthakal R, Kahn SE, Thurmond DC. Novel Approaches To Restore Beta Cell Function In Prediabetes And Type 2 Diabetes. *Diabetologia*. 2018;61(9):1895-1901. doi. org/10.1007/s00125-018-4658-3.

Since prediabetes and type 2 diabetes (T2DM) are being diagnosed at a higher rate than preventive efforts are being developed, this review was conducted to provide a summary of advances from the past decade. Previous studies have shown that consistent hyperglycemia in combination with insulin resistance places a large demand on the beta cells and as a result, it is likely that beta cells deteriorate and eventually fail. By decreasing insulin resistance, beta cell demand will also decrease, which may protect the beta cell and

allow it to function effectively for longer periods of time. Additionally, targeting the brain may prove beneficial in novel therapeutics due to central regulation of glucose metabolism. Due to the fact that bariatric surgery promotes recovery of beta cell function, it is worth looking into further studying gut hormones and other mechanisms within the gut. Furthermore, investigation into a patient's phenotype may yield results in how to more appropriately and personally treat individuals with diabetes. Ultimately, T2DM is a complex disease that needs to be addressed on multiple tissue levels. The authors conclude that future research should examine if the philosophy to push a weakened beta cell to work harder will yield the best results or if the best solution is to more adequately address insulin resistance.


- Kuo I-C, Lin HY-H, Niu S-W, et al. Anemia Modifies The Prognostic Value of Glycated Hemoglobin In Patients With Diabetic Chronic Kidney Disease. *PloSOne*. 2018; 13(6) e0199378 doi.org/10.1371/journal.pone.0199378.


Anemia is common among patients with chronic kidney disease (CKD), but in patients with diabetic kidney disease, anemia can be diagnosed earlier and is often more severe. This study examined if anemia (using hemoglobin as the marker) modifies the predictive ability of hemoglobin A1c in people with diabetic CKD (stages 3-4) who did not receive erythropoietin stimulating agents. The study takes place in Taiwan from November 2002 through May 2009. The participants (n=1558) were divided into two groups, the first group was individuals whose hemoglobin levels were below 10g/dL (n=411) and the second group was the individuals with hemoglobin levels greater than or equal to 10g/dL(n=1147) and followed for three years. Clinical outcomes of interest were end stage renal disease (ESRD), cardiovascular events and blood lipid levels, as well as all-cause mortality. In both groups, the results showed that those with higher hemoglobin A1c levels had higher blood cholesterol and triglyceride levels but no difference in cardiovascular events. Patients with <10g/dL showed a 32.1% incidence of ESRD and the group with >=10g/dL had a 15.7% incidence of ESRD. Patients with higher hemoglobin A1c levels were found to have an association with increased risk for renal replacement therapy and all-cause mortality. Overall the results of this study reveal an association between anemia, blood glucose control and clinical outcomes such as ESRD, blood lipid levels and all-cause mortality.

***Are you working in the role of a care coordinator or providing chronic care management services?***

if so, would you please consider contacting Michelle Kuppich, RD on the Nutrition Services Coverage Team at mkuppich@eatright.org. Thanks!

Michelle Kuppich

***Do you know someone with diabetes who is going off to college?***

If so, there is a wonderful support group called College Diabetes Network in various universities around the country.

Also, the CEO of CDN Christina Roth recently received the Boston Business Journal's "40 UNDER 40" recognition as a top organizational CEO.

Find out more information at: www.collegediabetesnetwork.org

# CINSULIN STIPEND AWARDEE

Laura Andromalos, MS, RD, CD, CDE
Everett, WA

At my first national AADE meeting, I went all in. After flying from Seattle to Baltimore, I woke up at 6 a.m. (3 a.m. my time!) on day one to get my groove on at the Zumba fitness event. I filled the day with various presentations, including reaching patients in the comfort of their home via telehealth, integrating nutrition science and culinary tips into counseling sessions, and educational engagement. I visited nearly every booth in the exhibit hall and volunteered at the DCE table. And finally, at 5 p.m. that day, it was my turn to contribute.

My presentation covered embracing metabolic surgery as a treatment for type 2 diabetes. The majority of the audience was currently working in metabolic and bariatric surgery, which was heartening. While surgery is included in the ADA treatment algorithm, it remains underused for many reasons, including stigma, misconceptions and lack of access to care. My presentation featured an overview of the anatomy and physiology of metabolic surgery, as well as nutrition and diabetes management protocols for optimizing care pre- and postoperatively. One critical takeaway of the presentation: early referral matters! Patients who have had diabetes for less than eight years at the time of surgery have a higher likelihood of going into remission than those who have had diabetes for more than eight years.

Audience members shared their concerns having witnessed firsthand frightening cases of malnourishment in patients, specifically in the intensive care and inpatient settings, who were not receiving follow-up care several years postoperative. I see this as a call-to-action to all of us: whether or not we work in the surgical setting, we need to be aware of our patients' surgical histories and encourage lifelong emphasis on hydration, protein intake and micronutrient supplementation. Refer to surgical colleagues for detailed recommendations but don't disregard the impact you can have by engaging a patient in this conversation.

The questions lasted well past 6 p.m. and eventually the room emptied except for one woman. She disclosed to me that she was a CDE who had had surgery nearly 10 years ago. Her diabetes was still in remission and she was incredibly grateful for her improved quality of life. She thanked me for bringing attention to this topic and we commiserated over the challenges we face in getting the diabetes and obesity communities to fully embrace this life-saving treatment. And while those challenges are real, I left the room feeling uplifted, because it's the people like her who inspire me to continue doing my job.

***SAVE THE DATE FOR OUR NEXT WEBINAR***

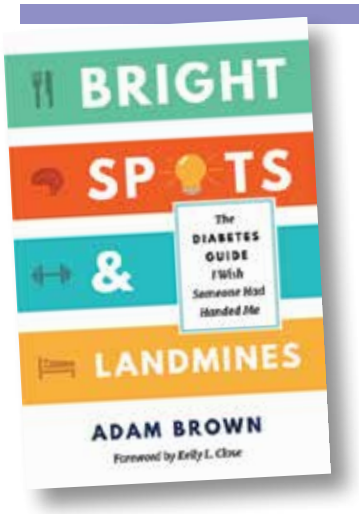
***THURSDAY, NOVEMBER 15, 2018***

Scheduled for 8:00 a.m. Pacific/11 a.m. Eastern

*Sponsored by Chobani*

# *What to Do When Your Partner Has Diabetes: A Survival Guide*

Elizabeth (Libby) Downs Quiroga, MS, RD, CDE
Grand Rapids, MI




*Bright Spots & Landmines: The Diabetes Guide I Wish Someone Handed Me*

Adam Brown

This book is bound to inspire anyone who reads it with careful attention and deliberated investment. As someone who lives with diabetes, author Adam Brown writes with a unique perspective while covering the full gamut of actionable strategies to help to live optimally and purposefully with diabetes, not just for the future, but for today, in his book, *Bright Spots & Landmines: The Diabetes Guide I Wish Someone Handed Me.* Brown's shared strategies are not just the result of his extensive research, but also informed by his intentional and often highly-calculated experimentation. Heavily cited and full of advice that most healthcare providers would love to glean themselves and offer patients, Brown's book is exactly what he claims it to be: an inspiring text which explores way in which to make living with type 1 and type 2 diabetes easier.

*Bright Spots & Landmines: The Diabetes Guide I Wish Someone Handed Me* begins with a sincerely heartfelt forward by Brown's colleague, Kelly Close, the founder and chair of the diaTribe Foundation. In fact, all proceeds of this book benefit the diaTribe Foundation. The driving logic behind Brown's book is simple: "Identify what works and focus on doing those things more often" (Diabetes Bright Spots) and "Uncover what doesn't work and find ways to do those things less often" (Diabetes Landmines). Each chapter (including, "Food," "Mindset," and "Exercise and Sleep," among others) is organized by Brown's "Bright Spots" and "Landmines." Beyond the detailing of each "Bright Spot" and "Landmine," there are questions posed to the reader at the end of each chapter. which are meant to stimulate personal reflection on finding Bright Spots and Landmines that are specific to the person reading.

Brown explores his own life experiences with thoughtful consideration and purpose. Throughout reading Brown's book, it becomes clear that using glucose data has endlessly helped him uncover so many intracacies of diabetes management, which is why he frequently encourages continuous glucose monitoring (CGM), if possible, in the treatment of others. Any form of glucose monitoring is a critical part of successful problem solving. The author points out that his CGM data has revealed that some of the food advice he received at the time of his diagnosis in 2001 was "unquestionably the biggest problem in retrospect."

Accordingly, Brown casts a concentrated focus upon food and diet, specifically carbohydrates. Brown openly states that he eats less than 30 grams of carbs at a time and does not exceed 70-120 grams per day. He also honors that such a dietary regime may not work for everyone, and furthermore, that healthcare providers may not agree with such a low-carb eating approach. Brown does, however, attribute experiencing less hypoglycemia to his smaller insulin doses, making any potential dosing mistake smaller too.

*"Eating fewer carbs is the single most important decision I've ever made for keeping my blood glucose in a tight range, taking insulin safely, reducing my diabetes burden and stress, and improving my quality of life and overall health."*

Generally speaking, the food chapter is jam-packed with great advice addressing topical issues such as caffeine, online food shopping for maximize value, insulin dosing schedules prior to eating a big meal, and even how to get more test strips.

(continued on page 34)

## Book Review

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Also featured are a number of mouthwatering recipes, like the chia seed pudding. Brown is undeniably knowledgeable about all things food, quoting Michael Pollan and Brian Wansink and also hitting on the issue of food waste and how to avoid it. Other fun topics covered include why it pays to invest in a quality non-stick pan and community supported agriculture (CSA) program.

*"BG numbers are NOT good or bad. They are just information to make a decision. No judgement, no blame."*

The chapter on mindset is equally insightful. In this chapter, Brown discusses mindfulness, gratitude, and establishing connections with others who live with diabetes. Besides leading a deliberate life, himself, Brown is also well-read on the subject and anyone reading his book, no matter if they have diabetes or not, could easily benefit from its tips. Brown also covers the art of talking to the important people in the reader's life about the challenges of living with diabetes and how they can help. He encourages asking the right questions to motivate action instead of focusing on the negative, such as why diabetes is unfair or limiting.

Beyond mindfulness apps or book suggestions, Brown outlines explicit criteria about goal setting alongside unique tactics like the idea of public commitment to a goal. Brown himself shares how he used a website that helped him set stakes of donating to a political "anti-charity" that he did not support in order to complete the first draft of this book.

*"When Diabetes feels overwhelming and exhausting, ask: 'How do in-range blood sugars benefit me now or today?' The ideal answers are specific, short-term, and involve the people I love."*

The chapter on exercise is easily one that will be cherished by many readers; in it, Brown suggests how much to reduce bolus insulin for endurance exercise, walking or strength training. The deep dive portion of this chapter might be exceedingly interesting to those who are familiar with Dr. Sheri Colberg's work on the subject.

Lastly, it is refreshing to see an entire chapter of a diabetes book dedicated to the importance of sleep. Again, anyone reading this could pull something from it to improve their own sleep hygiene.

The author, Adam Brown, was diagnosed with diabetes in 2001. He is a Senior Editor at *diaTribe* and leads Diabetes Technology & Digital Health at Close Concerns. Brown writes and speaks extensively about diabetes and is recognized as a leading expert in diabetes technology.

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a dietetic practice group of the
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Diabetes Care and Education (DCE) is always looking for members interested in becoming involved in DCE activities. Dozens of members volunteer in many ways to promote the activities and goals of DCE. If you would like to get involved in DCE, let us know. You may email the appropriate contact listed below.

☐ **Committee Involvement**
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