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ADCES

IN PRACTICE

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EXERCISE

The Role of Exercise in Type 1 Diabetes

Personalization, Technology and Best Practices

In this issue:

- Learn why all DCESs should be conducting evidence-based quality improvement and why honing the associated knowledge and skills are the keys to drive transformative changes in diabetes care.
- Whether we recommend low and no calorie sweeteners or not, it is imperative that we stay current with the literature and standards of care and be acutely aware when the balance of evidence conflicts with our personal opinions.
- Review the evidence regarding the role of exercise in diabetes management in type 1 diabetes, with a focus on personalized care to optimize safety and efficacy during physical activity.
- Deep learning and real-time data processing represent a major leap forward in improving the accuracy of wearable glucose monitors. By accounting for complex variables and providing instant, accurate predictions, these technologies can significantly enhance diabetes management.

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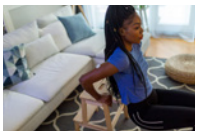

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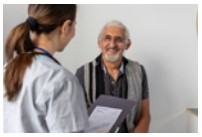

Also in This Issue

ADCES in Practice is a journal of ideas. It's a platform for diabetes care and education specialists and other health professionals to share innovations, challenges, successes, and hopes with colleagues. That's why we are excited to dedicate this page to you, our readers.

We invite you to write to us with your thoughts and impressions about articles we've published. We welcome your reactions and questions about what you've read in these pages. We call on you to comment or expand on the concepts and strategies put forth. We ask that you support or challenge our authors' words, as you see fit, and to give them the opportunity to hear and respond to you.

Our hope is for open and honest discourse that leads to improved care and outcomes for our patients. You may send your comments to adcesinpractice@gmail.com.

From Our Readers is a forum for commenting on articles published in *ADCES in Practice*. The length should not exceed 800 words of text with a minimal number of references. One table or figure may be included, if necessary. Any comments regarding a specific article must include the title, author(s), and date of publication. Comments that include questions or critique of a previously published paper will be forwarded to the author(s) of that article for a reply. The sharing of ideas, experiences, opinions, and alternative views is encouraged. The Editor in Chief of *ADCES in Practice* reserves the right to accept, reject, or excerpt letters for clarity and appropriateness of content, and to accommodate space requirements. Submissions may be sent to adcesinpractice@gmail.com.

ADCES IN PRACTICE

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About this Publication

ADCES in Practice is the official magazine of the Association of Diabetes Care & Education Specialists. It is a bi-monthly, peer-reviewed publication intended to serve as a reference source for the heart, art and science of diabetes self-management education and to provide practical tools and strategies that directly apply current research and best practices.

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Annual Conference, Fall Musings, and Volunteerism

AMY HESS-FISCHL, MS, RDN, LDN, BC-ADM, CDCES

Greetings to all you DCESs! Hope those who attended the annual conference in Phoenix came away with fresh ideas, new insights, and a sense of well-being. How could you not when surrounded by like-minded people looking for the best way to help people with diabetes live their best lives. I know I am always so appreciative of being around so many enthusiastic humans (and some dogs!) so eager to learn new things and meet new people. I want to thank those of you who I met that are current authors or those interested in publishing in *AIP*—I am so grateful for your efforts and interest, and I am thrilled I was able to meet many of you in person.

As I write this, I am preparing to help a friend's daughter move into her college dorm, which always makes me a little sad because it does mark the waning of summer, with fall close on its heels. Don't get me wrong, I love fall—the leaves turning, cooler days and nights that are perfect for a cozy sweater or hoodie, and bon fires in the evening at my summer home on the weekends. But it also marks a shift in our priorities and discussions with the people with diabetes we see for diabetes self-management education and support (DSMES): for kids, what paperwork is needed for school; for teens going to college, the accommodation letters that are required; and for many, questions about the holidays coming up. And can we talk some folks into moving more outside now that the weather is a little cooler? As DCESs, we "go where the wind blows us"—rapid fire questions on a variety of topics is my favorite kind of education visit because it is not planned and never boring; it is person-centered, so we are discussing the topics that mean the most to the person in front of us; and we get to come away knowing we helped someone learn a bit more about their chronic condition. I wonder if any of you do it this way—breaking topics down into seasons. Because I work in an endocrinology clinic, I am lucky that I am able to have DSMES sessions with the same patients every few months, so that means I can spread out the topics based on how they fit in the months while still covering the questions and topics that person wants to discuss. For the most part, our thoughts tend to align because they are also thinking in terms of "What do I need to know to handle the next few months?" Living in the Chicagoland area, I enjoy the changing of the seasons, but those changes also help us shift to more pertinent topic areas based on weather. For many of my snowbird patients, we have yet a different set of topics to discuss. I am sure you can agree, DSMES is never boring if you are letting the patient run the show and ask the questions.

I would be remiss if I did not put out yet another request to all of you—I am always looking

for manuscript reviewers and authors. If you want to review, just email me (inpractice@adces.org) with the topic areas you are most interested in—even if it is all of them. For authors, even if you have a slight interest in writing about something, reach out, and I am happy to talk more about ideas. We have plenty of options to choose from: ADCES7 topics, success stories with a particular patient or group of patients, success stories about a process you implemented where you work and how it improved diabetes care, someone living with diabetes and how a DCES helped them. The sky is the limit. As I have said before, this journal is for you, and I want to make sure we are including the topics you want most. So please let me know if you have ideas.

Thanks, again, to all the authors and reviewers who have worked so hard during my first year of being editor. This is such a fun gig, and I am so lucky to work with all of you. Take care and enjoy the rest of 2025! ■

A Year of Growth, Learning, and Connection

President

VERONICA J. BRADY, PHD, RN, FNP-BC, ACRN, BC-ADM, CDCES, FADCES

Well, as they say, "All good things must come to an end." As I reflect on this past year serving as President of ADCES, I am filled with gratitude, pride, and hope. It has truly been a year of growth, learning, and connection. We have experienced moments of triumph and faced challenges head-on. Still, through it all, I believe we have grown stronger—both individually and collectively—as a community of dedicated diabetes care and education specialists.

One of the most meaningful aspects of this year has been witnessing the power of belonging and the importance of addressing bias in our work. These themes were front and center at the ADCES 2025 Annual Conference, and I hope that those of you who attended—whether in person or virtually—felt inspired and empowered by the conversations and sessions. The emphasis on creating inclusive spaces and mitigating bias is not just a trend; it is a necessary shift in how we approach care, education, and collaboration. When we make an effort to ensure that others feel seen, heard, and valued, we elevate the quality of our work and strengthen our community.

I have heard from many of you about the impact the conference had on your perspective and practice. Some of you shared how the Implicit Bias Preconference Workshop opened your eyes to new ways of thinking and engaging with patients and colleagues. Others expressed a renewed commitment to being more involved in the Association and contributing to our shared mission. To each of you who took that step—thank you. Your engagement is what keeps ADCES vibrant and forward-moving.

As we approach the end of the year, I want to highlight one more opportunity to connect in person: the Diabetes Technology Conference, taking place in Chicago, December 12–13, 2025. This event promises to be a dynamic exploration of the latest innovations in diabetes technology, including a deeper dive into the role of artificial intelligence in our field. It is a chance to learn, network, and envision the future of diabetes care together. I hope to see many of you there.

Finally, I want to extend my heartfelt thanks to each one of you. Thank you for your unwavering support of ADCES, for the work you do every day on behalf of those with and at risk for diabetes, and for your commitment to continuous growth and improvement. My hope is that we continue to build an Association that is welcoming, inclusive, and free from bias—a place where every voice matters and every member feels a true sense of belonging.

May the road ahead be filled with purpose, connection, and continued impact. Until we meet again, I wish you peace and joy in the journey.■

Limiting Noise, Communicating Science

Addressing Misperceptions About Low- and No-Calorie Sweeteners

KRIS SOLLID, BA, BS, RD

Throughout the 20th century, the American food supply advanced to become safer and more secure. So too did it become more abundant. Along with these advancements came predicaments, including excess calorie consumption and rising rates of obesity. As our food supply modernized, food science and public interest drove innovation to meet the needs and desires of our population.

One such innovation is lower-calorie sources of sweetness. Low- and no-calorie sweeteners (LNCSs), such as aspartame, are low in calories per serving, and other LNCSs, such as sucralose, do not contain calories. Six LNCSs (acesulfame potassium, advantame, aspartame, neotame, sucralose, and saccharin) are approved by the US Food and Drug Administration (FDA) as food additives.[1] Four LNCSs (steviol glycosides [aka, stevia], monk fruit [aka, lo han guo], thaumatin, and brazzein) are permitted through the FDA's Generally Recognized as Safe Notification Program.[1] The FDA also permits sugar alcohols, such as erythritol, and rare sugars, such as allulose, in the food supply; however, sugar alcohols and rare sugars are considered separate classes of sweeteners from LNCSs.

Although LNCS approvals are driven by science, research from the Pew Research Center[2] shows the public's trust in science and scientists is in decline. As food and health professionals, it is crucial that we be fluent in the scientific evidence while also remaining conversant with consumers, honing our communications skills to effectively translate scientific evidence into plain language that can be more easily understood. Whether we recognize it or not, we are food and health communicators. Thus, addressing questions head-on, including common myths, is critical to help mitigate the harmful effects that misinformation can have on our most vulnerable populations.

Addressing Misperceptions About LNCSs

We live in the age of information. Never have we had quicker access to information, and yet never has there been more misinformation at our fingertips. Thus, consumers are often left to their own devices to decipher which information is sound, which sounds true, which is false, and which is fake. This is a challenging task, even for the most educated among us, especially when encountering information about food and nutrition.

The discrepancy between evidence from scientific literature on LNCSs and consumer sentiments about them is a prime example of the challenge we face as food and health communicators. Two common misunderstandings about LNCSs are related to their safety and impact on body weight.

Safety of LNCSs

LNCSs have a long history of safe use. The first no-calorie sweetener, saccharin, was discovered in the 1870s and has been used to sweeten foods and beverages since 1900. In the decades that followed, other types of LNCSs were discovered. Currently, the FDA permits 10 types of LNCSs in the US food supply.[1,2]

LNCSs are among the most studied food ingredients in history. Yet even with the established science, LNCSs remain heavily scrutinized. As a result, conflicting opinions about their safety are often presented to the public as though the strength of evidence is equal on both sides of the safety question.

By law,[3,4] the FDA regulates the use of LNCSs in the US food supply. The FDA continues to monitor the scientific literature on LNCSs to ensure that they remain safe to consume. But public understanding of this FDA authority is low. According to the 2024 Food & Health Survey from the International Food Information Council (IFIC), only 35% of Americans believe the US government has LNCS approval responsibility in their purview.[5] Conversely, 10% of Americans believe that there is no US authority responsible for LNCS oversight, and another 18% are unsure who has this responsibility (Figure 1).

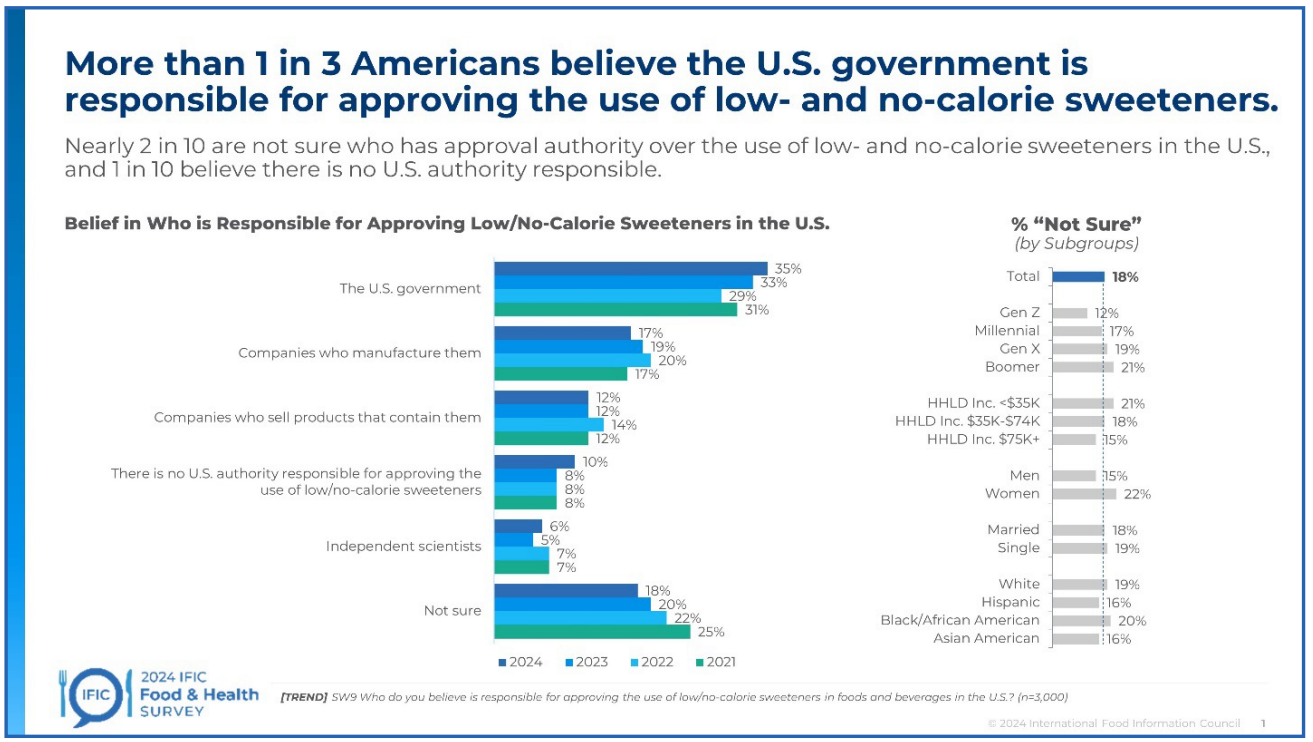

Figure 1.

International health authorities on every continent have approved multiple types of LNCSs for human consumption. Like the FDA, these global health agencies continue to monitor emerging scientific literature on LNCS safety to protect public health. A critical step in the safety evaluation process is establishing and periodically reviewing Acceptable Daily Intake (ADI). The ADI is the average amount of a substance that is expected to be safely consumed each day over the course of a lifetime.[6] Scientifically speaking, the ADI represents an amount that is 100 times less than the highest quantity of LNCS intake found to have no adverse effects in animal studies.[7] Thus, the ADI is a conservative number that most people will never exceed. A 2017 observational study from researchers at The George Washington University indicates that our LNCS consumption is increasing[8]; however, current LNCS intake is still considered well below the ADI both globally and in the United States.[9,10]

Impact of LNCSs on Body Weight

The prevailing opinion among nutrition scientists is that weight gain occurs when we consistently take in more calories than we expend. Even though the number of calories that we consume from LNCSs is minimal, questions about LNCS contributions to weight loss, weight maintenance, and weight gain still surface from time to time.

One reason for continued questions about the impact of LNCSs on body weight may be conflicting conclusions between observational research and randomized controlled trials (RCTs). Evidence from observational research shows associations between LNCS consumption and increased body weight and waist circumference in adults. Observational studies are important for generating hypotheses, but due to the way these studies are designed, they cannot prove cause and effect.

RCTs are the gold standard for directly assessing cause and effect. Thus, RCTs are the basis for higher certainty of evidence and strong recommendations. Evidence from RCTs show that reducing total calorie intake through LNCS consumption—mainly by swapping sugar-sweetened beverages for versions containing LNCSs—can assist in maintaining body weight and/or modest weight loss.[11-15] A 2021 citation network analysis from researchers in Denmark and the Netherlands shows that research finding adverse relationships between LNCS consumption and body weight are more likely to cite observational studies, whereas research finding beneficial relationships on body weight are more likely to cite RCTs.[16] Although some have suggested that LNCSs may lead to increased calorie consumption, the scientific literature is thin on evidence demonstrating that people consistently and knowingly overconsume calories because they consumed LNCSs.[17]

A recent guideline from the World Health Organization[18] (WHO) recommends that LNCSs not be used for weight management. Khan and colleagues,[19] from the University of Toronto, point out that in setting this guideline, the WHO placed more emphasis on evidence from observational studies than from RCTs. As a result, the WHO considers its conclusion as "conditional" because it is based on low certainty of overall evidence. In the United States, the most recent formal guidance on LNCS intake and body weight is the Scientific Report of the 2020 Dietary Guidelines Advisory Committee, which concluded that LNCS should be considered an option for managing body weight.[20]

The Type of Evidence We Use Matters

As evidence-based practitioners, the type of evidence we use to inform our opinions and recommendations is paramount. The highest standards of care rely on the highest levels of scientific evidence.

Standards for media headlines, however, are not the same as standards of care for health professionals. Media headlines about food often grab attention by sensationally synthesizing the latest nutrition research to "X causes or prevents Y." Although these headlines stand out, they are often stood up from observational research that cannot support the claim. Such definitive media headlines can mislead the public about the strength of

evidence being presented.

Science literacy is low among Americans, which makes it reasonable to assume that the average American does not think critically when reading about nutrition research in the media. Although the importance of alignment between media headlines and research results may be dismissed by some as a distinction without a difference, as trained food and health professionals, we understand that this distinction can be the difference between making informed and misinformed food choices. The challenge to improve our nation's science literacy is a big one, particularly given the nuanced nature of nutrition research on topics such as LNCSs, where the observational and RCT data often conflict.

There are many resources available to health practitioners on this subject. One example is IFIC's "Understanding & Interpreting Food & Health Scientific Studies: Guidance for Food & Nutrition Communicators."[21] Another example is the "Headline vs Study" section in the weekly Obesity and Energetics Offerings (https://obesityandenergetics.org/), a compilation of the latest scientific publications from the Indiana University School of Public Health-Bloomington and the University of Alabama Birmingham Nutrition Obesity Research Center.

The Words We Use Matter

Words matter, especially the words we use about food. Choosing our words carefully ensures that our message is received as intended.

Authoritative voices, including government agencies, nongovernment organizations, prominent professional societies, and independent researchers, use a variety of terms when referring to LNCSs. These terms range from "artificial" to "high-intensity" to "low-energy" to "nonnutritive" to "non-sugar." The lack of harmonized LNCS terminology can contribute to confusion among the public. Moving toward a common term for LNCSs may provide less ambiguity for the public because shared language helps to establish a foundation from which more thorough understanding can begin.

Consider the differing connotation of 2 terms often used to describe LNCSs: "natural" and "artificial." According to the 2024 IFIC Food & Health Survey, stevia and monk fruit—2 types of LNCSs that are often described as "natural"—are perceived as the "healthiest" and "safest" types of LNCS.[5] But evidence from scientific literature tells us that there is no distinction between the safety or healthfulness of the approved types of LNCSs when consumed within the ADI. Each type of approved LNCS, regardless of origin, must pass the same rigorous safety standards before it is approved for use.

This is an important reminder about the power of our words. Using terms like "artificial" and "natural" to describe types of LNCSs has the potential to reinforce misperceptions or further mislead the public that certain types of LNCSs are healthier, safer, or better than others.

Closing Thoughts

LNCSs have been studied and scrutinized for decades. At present, there is no formal dietary guidance for individual types of LNCSs beyond their established ADIs. Given their unique structures and metabolic fates, health agencies around the world continue to monitor, evaluate, and confirm LNCS safety and related health outcomes.

As health professionals, we do not have to consume or recommend LNCSs. We can acknowledge that LNCSs are not required in a healthy diet and that they do not magically shed or add body weight or cure disease while also recognizing they are a safe, available tool to help to reduce the number of calories we consume from carbohydrates, including added sugars.

As evidence-based practitioners, we must stay current with the literature and standards of care and be acutely aware when the balance of evidence conflicts with our personal opinions. In the case of LNCSs, the scientific literature and diabetes practice guidelines in Europe and America support their safe use and potential benefits for specific populations, including people with diabetes.[22,23] Thoughtful, evidence-based

communication can help restore public trust in science and address misperceptions about LNCSs and other historically stigmatized foods and food ingredients. ■

Acknowledgments

The author is employed by the International Food Information Council (IFIC). IFIC is a nonprofit 501(c)(3) education and consumer research organization with a mission to effectively communicate science-based information about food safety, nutrition, and sustainable food systems.

Declaration of Conflicting Interests

The author is an employee of the International Food Information Council, a 501(c)(3) organization that is primarily supported by agricultural, beverage, and food companies, some of which manufacture low- and no-calorie sweeteners and/or use them in their products.

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Improving the Accuracy of Wearable Devices in Monitoring Blood Glucose

Lessons From **Deep Learning and Real-Time Data Processing**

ATHARE NAZRI-PANJAKI, SUDABE MOODI, LINEH MOHAMMADZADEH, AYLIN ABEYAT, LANA MOHAMMADZADEH, MOSTAFA FANAEI, MA

Continuous glucose monitors (CGMs) play a vital role in diabetes management, but even small inaccuracies can have serious health consequences. Despite technological advancements, CGMs often struggle to keep up with rapid glucose changes, especially after meals or during exercise. These fluctuations can lead to incorrect insulin dosing and an increased risk of hypoglycemia or hyperglycemia. Because they stem from complex metabolic responses, traditional CGM algorithms may not always capture them in real time. To address this, more advanced computational methods are needed—ones that can process multiple physiological signals at once to improve accuracy and responsiveness.[1]

The primary limitation of current CGMs is their delayed response to rapid blood glucose fluctuations. Situations such as physical exercise or carbohydrate-heavy meals can result in significant lags in sensor readings, leading to either delayed or inaccurate adjustments. Additionally, external factors, such as body temperature, skin conditions, and placement of the sensor, may introduce noise that disrupts accuracy, further complicating insulin management and increasing the risk of hypoglycemia or hyperglycemia. The lag time between CGM readings and actual blood glucose levels can be substantial, ranging from 8.3 minutes to 40.1 minutes, depending on the rate of glucose change.[2]

Deep learning, a type of artificial intelligence, helps computers recognize patterns and make predictions by mimicking the way the human brain processes information. This technology is transforming wearable glucose monitors by improving their ability to analyze large data sets and detect subtle glucose fluctuations. By factoring in key influences such as meals, physical activity, body temperature, and circadian rhythms, deep learning makes glucose predictions more accurate and reliable. Unlike traditional methods that rely solely on an individual's past glucose levels, deep learning models are trained on large-scale data sets collected from diverse populations. These data sets incorporate critical contextual factors, such as meal intake, physical activity, and insulin usage, allowing the model to detect patterns that influence glucose trends more effectively. By leveraging this broader training, deep learning enhances prediction accuracy, making CGMs more adaptable to real-world variations and providing more reliable glucose monitoring across different users.[3,4]

These models are especially valuable in wearable devices because they can account for multiple variables, such as physical activity, food intake, and body temperature—factors that traditional CGM algorithms struggle to process. Deep-learning-based CGMs not only improve glucose trend prediction but also enable proactive alerts and personalized recommendations, allowing individuals to respond appropriately to glucose fluctuations before they become critical.[5]

Exercise can affect the accuracy of CGMs, often leading to delayed or less reliable readings. Real-time processing helps address this by incorporating movement data from accelerometers, heart rate variations, and glucose trends. By analyzing these signals, deep learning models can recognize physical activity and distinguish its impact on glucose levels from other fluctuations, leading to more precise and reliable predictions.[6] Recent advancements have shown that real-time integration of deep learning models in CGMs significantly improves the system's overall accuracy. For example, a study introducing GluNet, a personalized deep neural network framework, found that it could predict short-term blood glucose levels for individuals with type 1 diabetes with greater precision, achieving lower root mean square error and shorter time lags compared to traditional methods.[7] These improvements in predictive accuracy highlight the potential for deep learning models not only in glucose forecasting but also as an alternative evaluation metric for CGMs. Whereas current CGM accuracy is often assessed using measures such as mean absolute relative difference, deep-learning-based metrics could provide additional insights into real-time deviations in glucose readings.

Addressing Limitations and Future Considerations

Although the integration of deep learning and real-time data processing in CGMs offers significant improvements, there are several challenges to address. First, deep learning models require extensive data sets to train effectively. Current CGM systems rely on relatively small data sets that may not fully capture the diversity of patients' glucose responses. As a result, expanding data sets to include a broader range of ethnicities, age groups, and lifestyle factors is necessary to improve model accuracy across populations.[4,8] Additionally, wearable devices are limited by their processing power and battery life, which directly affect wear time—the duration a CGM can function before requiring recharging or replacement. Deep learning algorithms can be computationally intensive, requiring a balance between accuracy improvements and the practicality of wearable technology. Further research into optimizing these models for lower powered devices is needed to make them more widely accessible without reducing wear time or compromising device performance. For example, a study proposed a memory- and computation-efficient framework based on online learning, which allows the algorithm to continuously adapt and improve over time while running on wearable devices. This approach achieved 97% accuracy in activity recognition while reducing power usage

by over 40%.[9] By enabling real-time learning and adaptation, this method demonstrates the potential for optimizing algorithms to meet the stringent constraints of embedded sensors in wearables.

Conclusion

Deep learning and real-time data processing represent a major leap forward in improving the accuracy of wearable glucose monitors. By accounting for complex variables and providing instant, accurate predictions, these technologies can significantly enhance diabetes management. However, to fully realize their potential, challenges related to data diversity and hardware limitations must be addressed. As research progresses, wearable devices will likely become even more accurate and reliable, providing individuals with diabetes with better tools to manage their condition and reduce the risks associated with glucose variability. Furthermore, the integration of deep learning into other wearable technologies—such as fitness trackers and heart rate monitors—holds the promise of personalized health management across various domains. The inclusion of these additional data sources can enhance CGM data sets, making them more robust and predictive by capturing a wider range of physiological signals that influence glucose fluctuations. By leveraging real-time data and advanced predictive analytics, future wearables could provide users with tailored insights and proactive interventions, ultimately improving overall health outcomes and quality of life. ■

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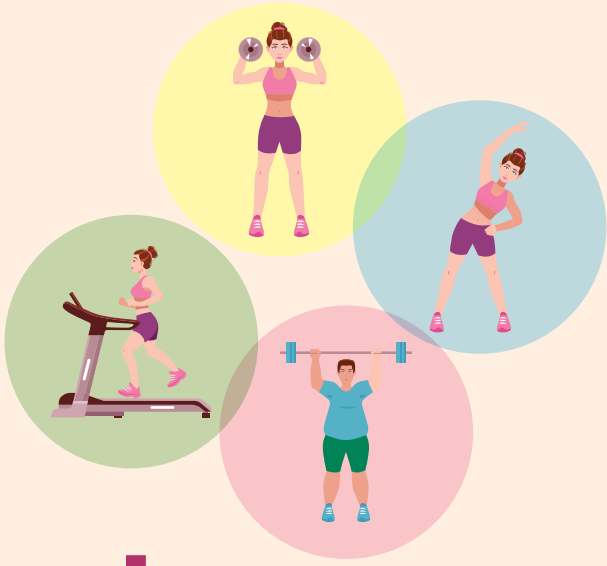

The Role of Exercise in Type 1 Diabetes

Personalization, Technology, and Best Practices

KATHRYN ALVAREZ, MS, ACSM-CEP, CDCES

A wise man once said, "If exercise were a pill, it would be one of the most widely prescribed pills in the world" (Nick Wendell). This sentiment highlights the unparalleled benefits of physical activity, ranging from prevention of cardiometabolic diseases to improvements in mental health, sleep quality, and insulin sensitivity. For individuals with diabetes, managing blood glucose levels during physical activity requires careful planning and monitoring. As such, exercise regimens for people with diabetes must be tailored to their unique needs, considering factors such as the type of exercise, time of day, insulin adjustments, and the use of diabetes technology.

An innovative component of diabetes care includes the DIY (do-it-yourself), open-source options. This global movement enables individuals with diabetes to build and customize their own automated insulin delivery (AID) systems using available tools and algorithms. These systems often provide more flexible and individualized options than commercially available systems, offering advanced features such as customizable targets, remote features, different dosing strategies (temp basal, auto bolus, algorithm adjustments), and integration with wearable devices. Open-source platforms, such as Loop, Android Artificial Pancreas System (AAPS), and Trio, are widely used in this community.

This article explores essential considerations for exercise in diabetes management, including pre-exercise screening and diabetes-specific adjustments. Additionally, it highlights how technological advancements, particularly AID systems, can optimize glucose control and minimize the risk of hypoglycemia and hyperglycemia during exercise.

Pre-Exercise Screening: When to Seek Medical Approval

Before engaging in any exercise program, individuals with diabetes are recommended to undergo a pre-exercise screening to assess their overall fitness and readiness for physical activity. The Physical Activity Readiness Questionnaire (PAR-Q+) is a gold-standard tool used to determine an individual's readiness for exercise (Warburton et al 2011). The PAR-Q+ asks a series of health-related questions, such as whether the person has a history of heart disease, joint problems, or high blood pressure. If any red flags are raised during screening, individuals should seek medical approval from their health care provider before beginning or intensifying an exercise program. The ePARmed-X, an electronic tool designed to address medical concerns identified in the PAR-Q+, offers more tailored recommendations for individuals with chronic conditions, including diabetes.

Fitness level can also be assessed by health care professionals through objective measures such as submaximal exercise testing (eg, Bruce or Balke treadmill protocols), estimated VO2 max, 6-minute walk tests, or field-based performance tests. Subjective assessments can include validated questionnaires such as the International Physical Activity Questionnaire or Godin Leisure-Time Exercise Questionnaire.

The FITT Principle

The FITT principle is a framework for designing exercise programs that are effective, safe, and sustainable. The acronym stands for:

- Frequency: how often the activity is performed (eg, 3-5 days per week);
- Intensity: the level of exertion during the activity (eg, moderate or vigorous);
- Time: the duration of the exercise session (eg, 30-60 minutes);
- Type: the form of exercise (eg, aerobic, resistance, flexibility).

For individuals with diabetes, long-duration exercises may require more careful management of insulin dosing and basal adjustments to avoid hypoglycemia.

Before applying the FITT principle, it is important to understand the different types of exercise and how intensity is categorized. Aerobic exercise includes activities that increase heart rate and breathing, such as walking, jogging, swimming, or cycling. Resistance training involves muscle contractions against resistance, such as weightlifting, resistance bands, or bodyweight exercises. Flexibility and balance exercises aim to improve range of motion and stability and include stretching, yoga, tai chi, or balance drills.

Intensity can be defined as follows: Low intensity is 30% to 39% heart rate reserve (HRR) or VO2 reserve (VO2R) with a rate or perceived exertion (RPE) of 1 to 4 on a 10-point scale. Moderate intensity is 40% to 59% HRR or VO2R with an RPE of 5 to 6. Vigorous intensity is 60% to 89% HRR or VO2R with an RPE of 7 to 8. Metabolic equivalents (METs) can also define intensity: Low intensity is fewer than 3 METs, moderate is 3 to 5.9 METs, and vigorous is 6 or more METs (Colberg et al 2016).

Diabetes-Specific Considerations

Type of Activity

Different types of exercise have distinct effects on glucose metabolism. Aerobic exercises, such as walking, cycling, and swimming, improve insulin sensitivity and usually lower blood glucose levels during the time of the activity. Resistance training, including weightlifting or bodyweight exercises, helps build muscle mass, which can further enhance insulin sensitivity, but the effect is not typically as pronounced and can even see an initial rise in glucose (Colberg et al 2016). High-intensity interval training may offer rapid improvements in insulin sensitivity and cardiovascular fitness, although it can also lead to more significant fluctuations in blood glucose, requiring close monitoring and adjustments.

Time of Day

The time of day can influence exercise outcomes for individuals with diabetes. Morning workouts

are often a favored time for people with diabetes to perform cardio-based exercises due to little to no insulin on board, which is the primary cause of hypoglycemia during sport and exercise, and higher insulin needs from hormones produced in the morning, often referred to as dawn phenomenon or foot to floor. Evening exercise might cause blood glucose drops due to insulin action.

Duration of Activity

Longer duration activities, such as marathon training, require careful planning to prevent hypoglycemia. People with diabetes should adjust insulin doses, meal timing, and carbohydrate intake to support extended periods of physical activity. For long-duration exercise, people with diabetes greatly benefit from a basal reduction about 1 to 2 hours prior to activity. If they are not on a pump, adjusting basal becomes more difficult, and they would have to do so for the entire day. Therefore, they may opt to carb supplement or reduce a mealtime bolus.

Basal and Bolus Adjustments

For individuals using insulin, adjustments to basal (background) and bolus (mealtime) insulin are crucial. Lowering basal insulin doses before exercise may help prevent hypoglycemia, and bolus insulin doses may need to be reduced or timed differently based on meal consumption and exercise intensity. Basal adjustments will typically work best for extended activity (>90 minutes). For bolus reductions, we want to analyze the glycemic index of the meal and consider how much of the food will have time to impact blood glucose prior to the activity. Based on that information, a dose reduction can be made. Generally, if a meal is within 2 hours, some insulin will need to be reduced initially. As they finish, they may need to cover some of what they ate prior to the physical activity. When we engage in activity, the body is no longer focused on digesting the food consumed; rather, it is working to supply the muscles and the lungs with blood. Therefore, many people will see a rapid drop if no adjustment is made. Then, as they finish moving, digestion ramps back up, and blood glucose begins to rise quickly.

A possible consideration is to utilize inhaled insulin. This works rapidly and clears the system much faster as well. Therefore, it would not lead to insulin on board following the meal, resulting in less hypoglycemic risk. Following activity, many people experience delayed onset hypoglycemia. This is primarily caused by improved insulin sensitivity that we have for about 24 to 48 hours after activity and the body refueling muscle glycogen stores. Because of this, a basal reduction or running a higher target blood sugar following activity is often necessary.

Carb Supplementation

To prevent exercise-induced hypoglycemia, individuals may need to supplement with carbohydrates before, during, or after exercise. Sport nutrition products, such as gels, tabs and liquid drinks, provide a quick source of glucose. Ideally, we are looking for dextrose as the first ingredient, which most rapidly increases blood sugar. It is important to match the carbohydrate intake with the intensity and duration of the activity. Additionally, if carb supplementation was only necessary because no adjustment was made at mealtime, some of the carbs supplemented may need to be dosed at the end of activity to prevent a rapid rise in glucose as digestion speeds back up.

Technological Advancements: The Role of AID and Continuous Glucose Monitors

AID systems and continuous glucose monitors (CGMs) are revolutionizing diabetes management, particularly for individuals engaging in physical activity. AID systems, such as Control IQ, SmartGuard, Loop, and Trio, use real-time glucose data from CGMs to automatically adjust insulin delivery, helping individuals maintain glucose control during exercise. These systems can reduce the frequency of hypoglycemic events and simplify insulin management, allowing for more predictable blood glucose levels during physical activity.

Moreover, many AID systems include an

exercise mode that temporarily adjusts insulin delivery rates or suspends insulin during exercise to account for changes in insulin sensitivity. With diabetes, one size does not fit all, so sometimes, the programmed mode does not work efficiently, and a more customized approach is necessary. On the Tandem, users can add multiple profiles and run them in Control IQ or run temporary basal adjustments in Control IQ+. Often, people will need to set an "exercise profile" with an increased insulin sensitivity factor to prevent auto delivery and run with exercise mode. People using the Omnipod 5 might opt to switch to manual mode or run a higher target and correct above rather than use the system's activity mode.

An iPhone app called "shortcuts" can be used with open-source systems to help automate some exercise-related settings in their DIY system. For example, you can set a condition that when the Apple Watch finishes selected workout, it will enable an override, preprogrammed by the user. They can use GPS location, time of day, and more to run these types of commands. In the app, they can also schedule them in the beginning of the day to come on at a later time. A common barrier is users forget to adjust prior to activity. Having the ability to automate some of it greatly benefits many users. Another app that can be used to set conditions with even more specificity is IFTTT, which stands for "If This Then That." AAPS has a similar feature built in. The open-source systems also offer the ability to add "overrides" and/or temporary targets to change overall insulin needs and target glucose. In Trio and AAPS, you can also turn off advanced features, such as super micro boluses, in your presets to prevent extra insulin delivery during activity.

CGM Trends, Lag Time, and Utility in Exercise

CGMs provide real-time glucose trends that are invaluable for exercise planning and execution. These devices show not only current glucose values but also directional arrows that indicate the rate and direction of change, helping users make proactive decisions about insulin, carbohydrate intake, and timing of exercise.

However, CGMs measure interstitial fluid glucose, and during rapid glucose changes, especially common during physical activity, there can be a lag of approximately 5 to 15 minutes between actual blood glucose and what the CGM displays (Moser et al 2020). This means that individuals should interpret CGM values with caution during and immediately after exercise, recognizing that what the CGM shows may not reflect current blood glucose precisely.

Despite this lag, CGM trend data can still guide effective decision-making.

- **Before exercise:** Trend arrows can help decide if a pre-exercise snack or insulin adjustment is needed. A downward arrow may suggest impending hypoglycemia, warranting carb intake or a delay in activity.
- **During exercise:** CGMs can alert users to unexpected drops or rises in glucose, even with lag, and users may still catch directional trends in time to treat lows early.
- **After exercise:** Postexercise trend monitoring is essential for identifying delayed-onset hypoglycemia. If the trend is steady or rising but the activity was intense or prolonged, basal adjustments or a small snack may be required.

Users should also understand how hydration status, sensor site placement, and compression may impact readings.

Environmental Factors

Environmental conditions can significantly impact blood glucose levels during exercise. Temperature, dehydration, and UV exposure are key considerations for individuals with diabetes. Exercising in hot or humid environments increases the risk of dehydration, which can affect glucose regulation. Similarly, higher altitudes can alter glucose metabolism due to changes in oxygen availability, requiring further adjustments in insulin and carbohydrate management.

In addition to meal timing and insulin on board being considered, caffeine intake is another variable to consider. It can increase glucose levels due to its stimulating effect on adrenaline, which

may raise glucose production and impair insulin action (Colberg et al 2016).

Unique Differences and Personalization of Exercise Programs

Exercise management for individuals with diabetes must be personalized, taking into account variables such as device use, fitness level, medication regimens, and lifestyle factors. Furthermore, individual factors such as fitness level and response to exercise vary, requiring ongoing monitoring and data analysis to optimize insulin and carbohydrate management. Regular use of CGMs and detailed tracking can help identify patterns and refine exercise plans for each person's unique needs. Using the data to adjust strategies will help lead to success in spending more time within target glucose range during activity.

Conclusion

Exercise plays a pivotal role in the management of diabetes, offering a range of benefits, from improved insulin sensitivity to enhanced cardiovascular health. However, for individuals with diabetes, exercise must be carefully managed to optimize glucose control. Utilizing tools such as the FITT principle, the PAR-Q+ screening, and advanced technologies like AID systems and CGMs can help promote exercise that is both safe and effective. As personalized medicine continues to evolve, the integration of data analysis and real-time insulin adjustments will enable individuals with diabetes to achieve better exercise outcomes and improved overall health. ■

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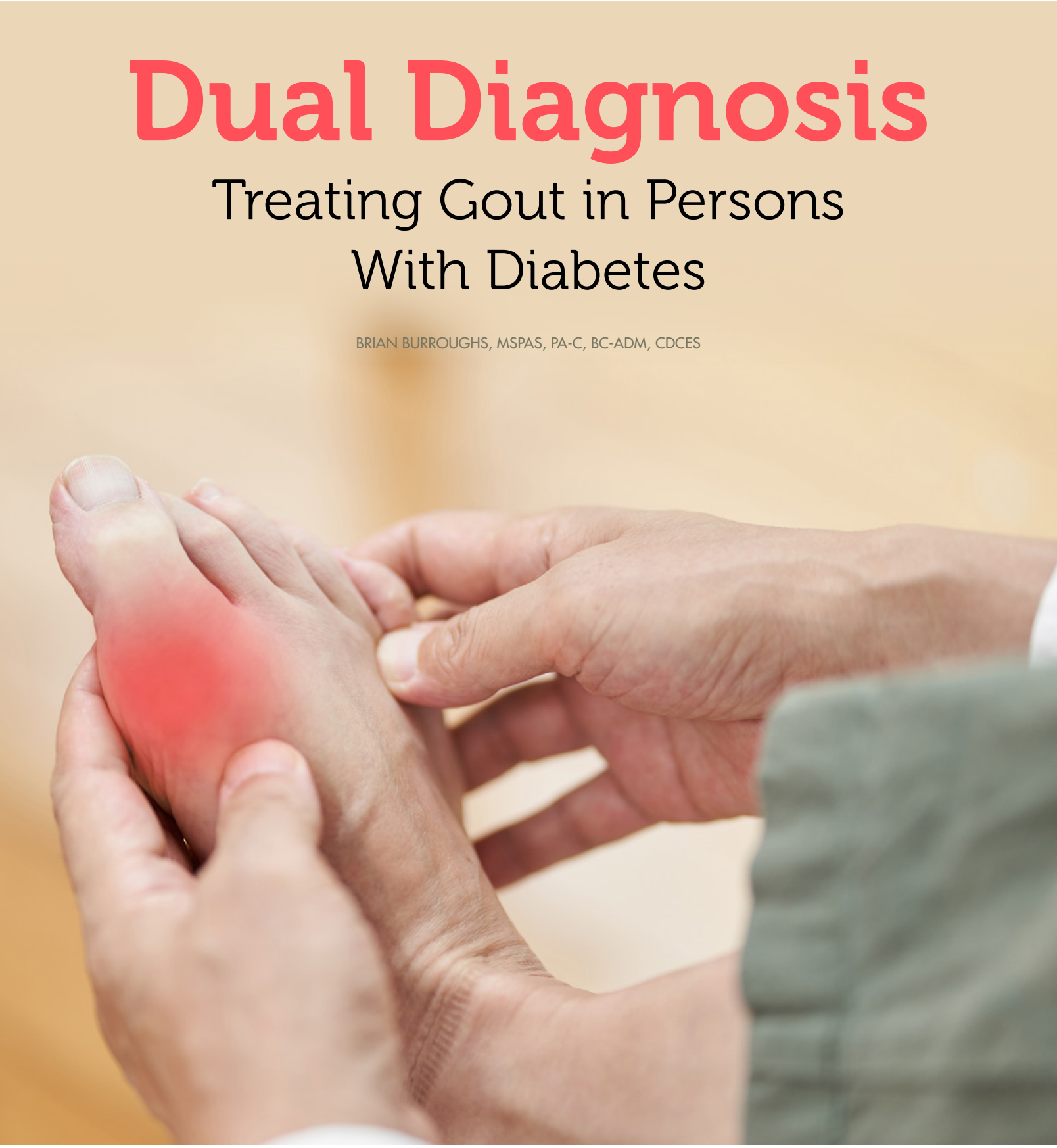
Dual Diagnosis

Treating Gout in Persons With Diabetes

BRIAN BURROUGHS, MSPAS, PA-C, BC-ADM, CDCES



Gout and diabetes frequently coexist, with shared metabolic pathways complicating management. Elevated uric acid levels, a hallmark of gout, are associated with insulin resistance and an increased risk of type 2 diabetes.[1] A comprehensive management approach for individuals with both conditions can improve outcomes.

Allopurinol and febuxostat, xanthine oxidase inhibitors, effectively reduce serum uric acid levels and are generally safe for use in individuals with diabetes, although renal function should be monitored.[1] Sodium-glucose cotransporter-2 inhibitors, widely used for glycemic management, also show promise in lowering uric acid levels and reducing gout flares.[2]

Acute gout flares require prompt treatment to alleviate pain and inflammation. Nonsteroidal anti-inflammatory drugs (NSAIDs) and colchicine are effective, although NSAIDs should be used cautiously in patients with diabetes due to potential renal and cardiovascular risks.[3] Colchicine, particularly low-dose regimens, is a safer option for many individuals. Corticosteroids are highly effective but may exacerbate hyperglycemia; they should be used judiciously with close monitoring of blood glucose levels.[3] Adjunctive measures, such as joint rest, elevation, and ice packs, can also reduce symptoms.[3]

Dietary recommendations include limiting high-purine foods, such as red meat, and certain seafood while encouraging the consumption of vegetables, fruits, whole grains, and low-fat dairy products.[4] Adequate hydration enhances uric acid excretion, and maintaining a healthy weight can improve insulin sensitivity and reduce gout recurrence.[1] Periodic monitoring of serum uric acid levels and renal function is essential to tailor therapy. Patient education should emphasize the relationship between gout and diabetes, the importance of medication taking, and lifestyle modifications.[1,3]

By combining pharmacological treatments, lifestyle interventions, and education, diabetes care and education specialists can help patients manage gout and diabetes more effectively, improving overall quality of life. ■

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Diabetes Care and Education Specialist in Pediatric Diabetes Regardless of Etiology

Part 3

CARLA COX, PHD, RDN, CDCES, FADCES AND AMY POETKER MS, RDN, CDCES

This is the third and final article in a series highlighting the 2023 practice paper "The Role of the Diabetes Care and Education Specialist in Pediatric Diabetes Regardless of Etiology."

Maturity onset diabetes of youth (MODY) accounts for approximately 1% to 5% of all diagnosed cases of diabetes. MODY is the result of the monogenic mutation of 1 to 14 known genes. The gene mutation(s) causes hyperglycemia by impairing beta cell function rather than by beta cell destruction or impaired insulin action. Understanding the etiology of MODY is important because the treatment strategies used to achieve normoglycemia vary greatly and are dependent on the specific gene mutation identified. Although obesity can alter the disease by leading to insulin resistance, it is not part of the cause. MODY does not have an autoimmune pattern, and because it is genetic, MODY can be seen trending in families. In fact, family history of diabetes is a key factor when making the diagnosis.

Clinical presentation of dysglycemia due to MODY varies because there are many possible gene mutations that cause the condition. Individuals with MODY may present with normal fasting glucose and mild postprandial hyperglycemia, or they may have consistently elevated glucose throughout the day. Treatment can vary greatly as well and is chosen based on the form of MODY. Persons with MODY may or not require medications including insulin therapy. As with other forms of diabetes, treatment may need to change over time as the condition evolves.

A diagnosis of MODY should be considered in children diagnosed with diabetes under 6 months old, individuals with a family history of diabetes without type 2 risk factors, mild fasting hyperglycemia in young and nonobese, and negative autoantibodies without signs of obesity or insulin resistance.[1]

Initially, no medication may be required, or an insulin secretagogue may be used versus initiation of insulin. Diabetes education mimics all diabetes recommendations, including maintaining a healthy weight, exercise, monitoring glucose as recommended, and taking medication if prescribed.

Secondary forms of diabetes are the result of another condition or medication that promotes insulin resistance. Cystic fibrosis related diabetes (CFRD), steroid induced diabetes, and postpancreatectomy diabetes are 3 common forms of secondary diabetes.

Cystic Fibrosis Related Diabetes

Approximately 20% of adolescents with cystic fibrosis (CF) will develop diabetes. CFRD is thought to result from an increase in mucus production in the pancreas that may lead to the demise of the insulin-producing cells, or the CF genetic defect may play a role in genetic changes in the beta cell itself. High glucose levels in turn can contribute to increased mucus secretions, promoting bacterial infections and worsening lung function.[2] Interestingly, the effects of these defects may wax and wane, changing the treatment needed to maintain euglycemia.

The 2-hour GTT is the gold standard for diagnosing CFRD. Hypoglycemia may occur initially and may indicate progression to CFRD.

Insulin therapy is the only recommended treatment for CFRD to achieve recommended glucose levels. Insulin must be individualized and monitored closely for changing conditions

CF transmembrane conductance regulator (CFTRs) is a newer class of CF drug that has led to improved CF and CFRD outcomes. This class of drug is reported to reduce infection and inflammation and improve pancreatic function, including insulin secretion. Individuals with CFRD on insulin therapy that are taking CFTRs should be counseled regarding the potential for hypoglycemia because pancreatic function may improve.

Diabetes technology, such as continuous glucose monitor (CGM) and insulin pumps/ automated insulin delivery devices, have the potential to help in the management of CFRD and ease the burden that this diagnosis can add to an already medically complicated patient population.

Diabetes education must be individualized and should include a personalized nutrition plan in addition to meeting assessed diabetes self-management education needs because weight loss is common in this population.

Steroid Induced Diabetes During Hospitalization

Steroid induced diabetes is defined as diabetes that occurs in an individual who has started steroid therapy without previously known diabetes. Steroids alter glucose metabolism by reducing insulin production, increasing insulin resistance, and increasing glucose production.[3] Steroids can cause diabetes and worsen insulin resistance in persons previously diagnosed. There are currently no best practice standards for screening for steroid induced diabetes in pediatric

patients, but it is reasonable to consider screening any individual receiving moderate to high doses of glucocorticoids.

Additionally, no national or international guidelines exist for managing steroid induced hyperglycemia in children. American Diabetes Association Standards of Care for Diabetes Care in the hospital setting recommend initiating insulin therapy for hyperglycemia when glucose rises above 180 mg/dl on 2 or more occasions with an initial target glucose range of 140 to 180 mg/dl for patients in the ICU and 100 to 180 mg/dl for non-critically ill patients provided this can be achieved without significant hypoglycemia. Ongoing glucose monitoring is recommended, and doses of insulin should be adjusted as needed as medication is altered.[4]

The diabetes care and education specialist (DCES) should address learning topics such as an overview of steroid induced diabetes, the importance of monitoring and taking medication, hypoglycemia symptoms and treatment, importance of follow-up as steroid doses are adjusted, and basic insulin delivery instructions.

Post Total Pancreatectomy Diabetes

Total pancreatectomy with islet auto-transplantation (TPIAT) is a surgical procedure that removes the pancreas due to intractable pain and reliance on narcotics due to severe pancreatitis.[5] The beta cells are preserved and reinfused into the liver for regeneration and minimization of the impact on glucose values and severe glucose fluctuations. Following this procedure, 37% to 55% of children demonstrate exogenous insulin independence.

The DCES should provide information on glucose monitoring and management of care postoperatively. Families must learn diabetes care survival skills, such as recognition of hypoglycemia and hyperglycemia, giving insulin, monitoring glucose, and how to achieve target glucose values. Diabetes technology education and support are often needed because the use of insulin pumps and CGM has been shown to promote islet cell survival and improve glucose levels compared to multiple daily injections. Presurgery, early postsurgery, and follow-up education are essential to success.

Beyond the diabetes education required for this population, TPIAT patients are usually placed on a feeding pump in the postoperative period, adding to the education burden of the caregivers of TPIAT patients. A registered dietitian familiar with medical nutrition therapy and tube feedings is an essential part of the care team in addition to the DCES.

Summary

Although most diagnoses of diabetes in children is type 1 diabetes, followed by type 2, there are multiple other etiologies that are important for the DCES to recognize. Each etiology requires assessment of the child, the condition, and the family and requires the DCES to think through the most important aspects of education and care to promote the best possible outcomes. The biggest challenge for the DCES may be to recognize the variations that exist in the etiology of diabetes in children and find the best education principles that apply. ■

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It's Amazing Where Life Can Take You **When You Embrace the Power of "Yes"**

TAMI ROSS, RD, LD, CDCES, MLDE, FADCES

Stepping back to my college days, an early passion for science and the culinary arts resulted in my earning a degree in nutrition and dietetics from the University of Kentucky. Admittedly, the coursework on diabetes was definitely not my favorite. I found it overwhelming because there were so many factors involved in managing a complicated condition. In fact, my early aspirations were to work in food service management or the food hospitality industry in some capacity. So you can imagine how thrilled I was when I landed my first professional job as a food service manager at a physical rehabilitation hospital! That role also included clinical responsibilities, which I quickly learned involved caring for many patients with diabetes and teaching diabetes education classes. The diabetes education aspect of the role was really what I refer to as "baptism by fire." But through it, I embraced the power of "Yes." Yes, I can and will do this (which I honestly didn't want to do at the time), and Yes, I will learn as I go.

A move and a job later, I embraced Yes again and found myself working with an endocrinology practice as a diabetes educator (as we were known as at the time) and quickly became hooked in the diabetes world. Due to the encouragement of a colleague and mentor, I soon said Yes again and began accruing practice experience and proudly passed the Certified Diabetes Educator exam (CDE then; CDCES now).

In retrospect, that first job and first Yes were all part of the plan and set the stage for the rest of my career. The challenging aspects of managing diabetes are now the very reason that diabetes care and education is my passion. Every position I've worked in throughout my career has focused on helping people affected by diabetes live their best life. From endocrinology to primary care to research to industry. From consultant to speaker to blogger and author. When asked to coauthor what became my first book, I initially thought, "I don't know anything about what that takes . . . I'm not sure I can do it . . . but Yes, let's do this." What I learned in that one experience was how much I enjoyed writing and translating science into practice in ways that are understandable and doable. And that led to me saying Yes to several

more books and many consumer and professional publications. All of these life-changing experiences began with saying Yes and stepping forward with faith, not quite sure what the next venture would bring but excited to take the risk and find out.

Over the years, I have said Yes to a multitude of different volunteer opportunities in the diabetes space, both locally and nationally. Saying Yes to leadership in the Diabetes Dietetic Practice Group (DPG) introduced me to colleagues that I now call friends from Washington to Michigan to New York and Georgia. Through serving in a variety of leadership roles in that DPG, I continued to strengthen my personal writing, speaking, advocacy, and leadership skills, all while learning the power of networking. As one mentor told me, "You never know where a conversation or connection may lead."

How very true those wise words were as several conversations and connections eventually led to encouragement from colleagues to apply for the ADCES (then AADE) Board of Directors. Wow, that seemed daunting. But after consideration, I embraced again the power of Yes. Had you asked me if it was possible that one day I would be elected by my colleagues to serve as president of ADCES, I would have replied, "That is not possible!" And yet, in 2013, I found myself humbled, honored, and extremely proud to serve and represent this group of passionate diabetes educators. As an extremely shy child, engaging in conversations, presenting in front of the class, or generally being the center of attention brought me great angst. But by saying Yes and serving in leadership, I learned to work through those uncomfortable situations and speak in front of thousands at the ADCES annual conference!

My life has been greatly enriched by giving back to the diabetes community through ADCES . . . Yes to leadership, Yes to media spokesperson, Yes to Core Concepts faculty, Yes to a multitude of work groups, and Yes to ADCES in Practice as Food for Thought editor several years ago! One of the great things about being involved in a common cause is experiencing the power of partnership.

All of the colleagues I have met along the way have shown me what dedication and passion means. They have provided support and taught me about diplomacy and the power of positive thinking, the importance of maintaining a sense of humor in all situations, and that amazing life-changing experiences happen when you step outside your comfort zone. In all of these opportunities, I could have easily found excuses and declined. But then I reflect on all I would have missed in life if I had not said Yes when opportunities came along. I am deeply grateful for each of these experiences. Not only has Yes fostered personal growth, more importantly, it's been a way for me to make a difference and give back. I challenge you to consider Yes when opportunities come your way and consider embracing the power of Yes . . . it's amazing where life can take you! ■

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BEYOND THE REQUIREMENT

The Power of CQI to Improve Outcomes for People With Diabetes

Accredited and recognized diabetes self-management and education support (DSMES) programs must have continuous quality improvement (CQI) strategies in place to optimize outcomes for people with diabetes. CQI can be challenging for many quality coordinators, and they may not know where to begin. Angelica Santana, MPH, RD, CDN, CDCES, BC-ADM, the quality coordinator (QC) of the DSMES program at New York Presbyterian Hospital, shares her experience executing a successful CQI project with her DSMES team. She also shares her insights and advice on the CQI process for DSMES quality coordinators and DSMES teams.

1. **What were you trying to improve, fix, or accomplish with your CQI project, and what process did you undergo to determine this?**

   In recent years, there have been many advancements in diabetes technology. We're all aware of the well-established benefits of one such technology, continuous glucose monitoring. Despite this, I found that most of our patients receiving diabetes management with their primary care team did not have access to continuous glucose monitors (CGMs). In reviewing the literature (Plan section of the Plan, Do, Study, Act [PDSA] cycle), I found there are disparities in CGM use among Blacks/African Americans and Hispanics/Latinxs, a large portion of our patient population and groups disproportionately affected by type 2 diabetes (T2D).[1] I also found barriers to implementation of CGMs, including lack of primary care team knowledge, prescribing workflow, insurance coverage limitations, and technology literacy/access issues among patients.[1,2] Given these barriers, our program initiated a CQI project to demonstrate CGM benefits among our patient population, promote technology equity among patients with diabetes, and address barriers in prescribing practices.

2. **Describe the tasks in your plan and how your DSMES team was involved throughout (and others in your organization).**

   We identified 1 primary care clinic to start this initiative (Do section of the PDSA cycle). At this clinic, I began providing guidance to primary care providers and medical residents on benefits of CGMs, Medicare and Medicaid coverage, prescribing workflow, and strategies to overcome technology literacy barriers among patients.

I developed a guide for providers to help understand basics on CGMs along with order/prescribing guidelines. The guide was updated periodically to reflect the ever-changing coverage guidelines of Medicare and New York State (NYS) Medicaid. The medical director of this clinic included the updated guide in a monthly newsletter, making the large team of medical residents aware of updates. I contacted patients and provided an explanation of the CGM order process (especially for those patients on Medicare), and patients were given DSMES appointments for CGM setup and education. Patients continued to receive education in DSMES and in shared diabetes clinic visits with a resident and myself. In the shared diabetes clinic visits, I also provided education to the resident on how to review CGM data, including ambulatory glucose profile reports.

3. As you and your team were performing the tasks and collecting data, were there any unexpected findings or barriers that you encountered?

In learning about the different prescribing guidelines for Medicare and NYS Medicaid, I began to understand why providers found it confusing. For example, for patients with Medicare, their CGM orders have to be processed through a durable medical equipment (DME) pharmacy; however, our team was not working with any DMEs that processed CGMs. At an Association of Diabetes Care & Education Specialists conference, I learned about a digital platform embedded within the electronic health record to place DME orders. I worked with our IT team and the customer service department of the digital platform company to learn more about it and be able to guide our providers on how to use it as well. For those patients able to get their CGMs prescribed as a pharmacy benefit, one barrier we encountered was that our electronic health record had many outdated models within the order system. This often resulted in prescribers ordering incorrect models. I worked with our medical director and a lead medical attending to create a list of commonly prescribed CGMs. This was added to the electronic medical record favorites list of our primary care doctors, making it easier to order for our patients with pharmacy benefits.

4. What were the results of your project?

As part of the CQI project (Study section of the PDSA cycle), I completed a retrospective chart review of 30 randomly selected patients wearing a CGM. A1Cs pre-CGM and after 3 months or more of using a CGM were analyzed. For demographics, CGM type, and A1C results, see Tables 1 through 3.

5. How did this project improve your DSMES services and outcomes for your DSMES participants?

The CQI project results support the adoption of CGMs in a primary care practice (Act section of the PDSA cycle). It has highlighted the important role of the certified diabetes care and education specialist (CDCES) in advocating for technology use in primary care along with how vital DSMES is in a primary care setting. As the CQI project has grown, CDCESs at other primary care practices within our hospital system are now advocating for CGM use among their patients and working with providers to address barriers. By doing so, our DSMES services have been changing prescribing behaviors to make CGM access more equitable and improve the lives of our patients living with diabetes.

6. As a QC and CDCES, how has your view on CQI changed over time?

When I first became the QC of our DSMES services, the idea of developing a CQI project seemed overwhelming as I was

unfamiliar with the process. Eventually, the idea for a CQI project came organically when we uncovered the needs of our patient population and areas to improve. What started off as a small CQI project in one clinic is currently being duplicated in other clinics and has even motivated other members of the health care team to get involved.

Table 1 Demographics.

Average age	**65.6 y**
Ethnicity and race	23 Hispanic/Latinx 2 African 4 African American 1 refused to answer
Diabetes type	28 with T2D[a] 2 with T1D[a]
Insurance	24 Medicare 6 Medicaid

Abbreviations: T1D, type 1 diabetes; T2D, type 2 diabetes.
[a]Living with diabetes for >7 years on insulin

Table 2 Continuous Glucose Monitor Type

rtCGM	4
isCGM	26
Smartphone app	9
Reader/receiver	21

Table 3 A1C

Average A1C pre-CGM	9.63%
Average A1C post-CGM for ≥3 mo	7.92%

Abbreviation: CGM, continuous glucose monitor.

7. How has your DSMES team adapted over time to its understanding of CQI and its importance to the people with diabetes that you serve?

If we're all honest, for many of us, a CQI project initially sounded like another task to cross off our DSMES to-do list. We all now understand that in many ways, a CQI project is the cornerstone of our program as it's an opportunity to better serve our patients living with diabetes and highlight our services by sharing our successes.

8. What advice do you have for other CDCESs who are less experienced with CQI?

It's important for us to stay up to date with diabetes standards of care and evolving technology. By doing so, we can identify gaps in our services and advocate for change. It's helpful to use the PDSA (Plan, Do, Study, Act) cycle as it can help break down the stages into more attainable steps. At first trying to tackle gaps in care may seem daunting, but it's important not to underestimate the power of starting small as it can plant the seeds for a larger CQI that will result in positive change. ■

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 155-25

10 Time-Saving AI Prompts Every DCES Should Try (and Why Your Expertise Still Matters)

DANA MOREAU, MS, AND LAURIEANN SCHER, MS, RD, CDCES, FADCES

Artificial intelligence (AI) tools like ChatGPT are rapidly transforming how health care professionals gather information, streamline documentation, support patient education, and manage administrative tasks. For diabetes care and education specialists (DCESs), who are often juggling multiple priorities from device training to medication support to counseling on self-care behaviors, AI offers practical ways to save time and increase impact.

But as we all know, AI is no replacement for clinical expertise. These prompts are starting points, not endpoints, and they work best when combined with the DCES's deep knowledge of diabetes care, patient-centered communication, and ethical standards. AI is a tool to help you in clinical practice, just like any tool in your toolbox.

So how do you actually use AI in your daily practice? The key is in crafting clear, specific prompts. Prompts are the instructions you type into an AI tool like ChatGPT to generate a response. Think of prompts as conversation starters: The more detail you provide (eg, the patient's literacy level, cultural considerations, or the format you want), the more useful and accurate the output will be. These are not "one and done" answers but drafts and ideas you can adapt, edit, and apply with your professional judgment. For example:

- **Prompt:** "Explain carbohydrate counting in plain language for a 10-year-old with type 1 diabetes."
- **AI output (draft):** "Carbs are the part of food that turn into sugar in your body. Counting carbs helps you know how much insulin to take. Think of it like adding up points—if your meal has 30 grams of carbs, that's the number you use to match your insulin dose."
- **DCES role:** Review for accuracy, personalize for the child and family, and add visual aids or hands-on practice.

Table 1 Ten High-Impact AI Prompts for DCESs[a]

Prompt	Rationale
Explain [*x* diabetes topic] in plain language for a patient with [specified literacy level or age group].	Helps tailor education to different patient learning needs and improves health literacy
Create a sample patient education handout about [topic], tailored to [specified language/culture/literacy level].	Speeds up creation of customized, culturally relevant materials
Draft a care plan for a patient with [T1D/T2D], [*x* comorbidities], and using [*y* medications/devices] based on this care plan [paste in content from your previous content and specify desired format].	Helps organize care for complex patients, especially in team-based settings, and saves time when you have a required template format
Generate documentation for a DSMES visit focused on [specify the goal/topic]. Include your site-specific template and instruct AI to use that format.	Reduces time spent charting and promotes consistency of notes
Write a short message that can be sent to the individual's prescribing provider requesting [specified Rx/device/therapy change] with rationale.	Improves care coordination and communication with providers of diabetes care team
Summarize the latest guidance or research on [*x* topic] relevant to clinical practice. Request a list of references so that you can check the accuracy of the content.	Keeps DCESs up to date without needing to scan multiple journals
Create a simple explanation of how to use [*x* diabetes app/device] for [specified category of patients].	Supports tech training and follow-up for patients and caregivers
Suggest strategies to improve engagement for a patient struggling with [*x* barrier or behavior].	Provides quick ideas to support behavior change and problem-solving
Generate questions that can be used to assess a patient's understanding of [specific topic or content from uploaded information].	Assists in evaluating knowledge gaps and reinforcing learning
Generate a response to a denial of requested device for an individual with [*x* type of diabetes] indicating it is medically necessary for a patient with [*x* details] based on the standard of care.	Saves time in administrative tasks that can be reviewed by you for modification based on your knowledge and experience as a DCES

Abbreviations: AI, artificial intelligence; DCES, diabetes care and education specialist; DSMES, diabetes self-management education and support; T1D, type 1 diabetes; T2D, type 2 diabetes.
[a]Remember to not put specific patient health information into ChatGPT or any other generative AI tool or chatbot to ensure patient privacy.

Table 1 shows 10 practical, ready-to-use prompts designed with DCESs in mind. Each includes a rationale to help you see where it might save time or enhance your impact in patient care, documentation, and professional communication.

Pros and Cons of Using AI in Diabetes Care and Education

Although these prompts can be powerful time-savers and idea generators, it is important to be aware of both their strengths and limitations. Table 2 lists pros and cons of using these prompts.

Table 2 Pros and Cons of Using AI in Diabetes Care and Education

Pros	Cons
Speeds up writing and documentation	AI-generated content may contain inaccuracies or outdated information.
Offers inspiration when you are stuck	Lacks the nuance and empathy of in-person education
Improves efficiency in patient education and care planning, especially when it comes to repetitive documentation or resources	Requires expert review to ensure safety and alignment with current standards. Remember to review the output carefully before sharing it with your patients. Provide feedback to correct any inaccurate information in the application if you do see it to help make the knowledge set better.

Abbreviation: AI, artificial intelligence.

Remember, Your DCES Expertise Still Matters More Than Ever

AI can help DCESs work more efficiently, but it will never replace the clinical judgment, empathy, and personalized care you bring to every encounter. Think of AI as an assistant for administrative and routine tasks while you remain the expert who ensures accuracy, builds trust with patients, and helps interpret the nuances of their lives with diabetes. Always review and refine AI-generated content before using it in practice.

Additional Ideas to Take These Prompts Even Further

To make the most of these prompts, consider these strategies:

- Add context about the patient's specific needs, barriers, or technology experience without sharing identifying personal health information.
- Ask the AI to generate multiple options and review them critically.
- Use AI to draft materials and then personalize and fact-check them before using.
- Pair prompts with clinical guidelines to cross-check for alignment.
- Save your preferred responses in files for easy access.
- Use prompts to generate content you can later refine with your team.

Find more technology resources, information, and tools on danatech.org, the official ADCES diabetes technology website.

And of course, this article was AI augmented. ■

Author Contributions

All authors listed contributed to the writing of the article.

Declaration of Conflicting Interests

Dana Moreau is an employee of ADCES, danatech. LaurieAnn Scher is a consultant who works for ADCES, danatech.

Guarantor Statement

NA.

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Changing Diabetes Care Through ADVOCACY

ADCES Public Policy Forum

CAROL J. HOWE, PHD, RN, CDCES, FAAN, KIRSTEN ROBERTSON, MSN, RDN, LD, CDCES, AND HANNAH MARTIN, MPH, RDN

ADCES is actively involved in legislative activities to benefit us as clinicians and the patients and families we serve who live with diabetes. The Association advances federal legislation, responds to federal regulations, works to improve reimbursement and payment, supports state-level initiatives, and grows our advocacy network through partnerships with other organizations dedicated to those who live with diabetes. Although we are fortunate to have staff leading this work for the Association, much of the outreach to the hundreds of members of Congress and thousands in our state legislatures depends on us being active members. Our potential to realize positive outcomes from diabetes advocacy is powered by our numbers; we are a large organization whose members know diabetes issues firsthand.[1]

In contrast, many of our legislators do not know a lot about diabetes, relying on people like us to tell them how different bills and acts will benefit or harm the lives of people who live with or are at risk of developing diabetes.

Maybe at This Point You Are Asking, "What Would This Take?" and "How Do I Get Involved?"

Anytime you learn something new, all the information can feel overwhelming. Like people newly diagnosed with diabetes, who are often anxious about learning diabetes self-management, we, too, can be nervous as we reach outside of our comfort zone. Most of us are very comfortable advocating for patients and their families within our health care systems, but we may not feel confident or knowledgeable enough to take on a "bigger" advocacy role. Although we are experts in diabetes care and management, knowing all the jargon, medicines, technology, and so on, we usually do not land in this field as experts in legislative action.

To do this, we have to learn and be trained. The ADCES Advocacy Committee understands this and holds an annual training called the Public Policy Forum (PPF), which is typically held in the spring of each year. The event is free and open to all ADCES members. For those who are unfamiliar, this half day of training includes presentations by experts outlining current events on the Hill, panel discussion from members who are active advocates, and in-depth presentations on the ADCES legislative priorities. This past June, attendees learned about and received training on how to discuss key legislation, including the Expanding Access to Diabetes Self-Management Training Act (DSMT Act), Medicare payment rates, and the new Diabetes Interventions Addressing

Barriers to Enrollment, Technology, and Education Services (DIABETES) Act.

Will I Really Be Prepared to Talk to Congress About Bills I Just Learned About?

The PPF Hill Day is scheduled for the following day. All that we learned is fresh in our minds, making it easy to step into our advocacy role! To help us feel fully prepared, the PPF ends with breakout sessions (by Hill Day team) with a grassroots coordinator, ADCES Advocacy Committee member, or other seasoned advocate serving as a facilitator to discuss meeting plans for Hill Day. Typically, each team has at least 2 to 3 PPF-trained diabetes care and education specialists. Not all PPF attendees participate in Hill Day, but we see more and more participation each year.

During team breakout sessions, roles and responsibilities for the meetings are set. Some groups may agree that each person will discuss one of the bills, and other groups may have one person discuss the bills and have others add personal stories on how these bills will affect diabetes care and education. Personal stories have the most impact because they give a voice to why these bills are so important.

Virtual meetings with Congressional offices are set in all states that PPF attendees are from. Meetings take place throughout the day and typically last 15 to 30 minutes. Most meetings are held with a staffer assigned to health issues for the senator or representative. After the first meeting on Hill Day, the group easily falls into their roles and scripts for great meetings with legislators. By the end of the day, after 4 to 8 virtual Hill meetings, you may feel exhilarated, exhausted, proud, or all of the above.

How Do I Keep Track of All the Information on the Current Legislative Priorities?

Like print education materials that we provide to patients and families to support what they learn, ADCES provides many resources to support this advocacy effort, including an outline for preparing, executing, and following up on the meetings with legislators and a suggested helpful topic outline for the meetings. We are also provided with detailed Leave Behind handouts on each legislative act or bill for us to review more carefully (named for when advocates would "leave behind" these handouts with offices after in-person meetings). Take a look at the 2025 agenda and leave behind materials.

Advocacy is a natural response to address the gaps in diabetes care. As you participate in the ADCES Public Policy Forum, you will become better equipped to advocate. We hope you will

join the others who have been thrilled to add this to their skill set, increasing the number of ADCES members involved and making an impact by meeting with your state legislators on Hill Day next year. Being a part of ADCES Advocacy will help you see the greater influence that you have as diabetes care and education specialists, locally and nationally, on important legislative decisions.

Our Top 5 Tips for a Successful Hill Meeting

1. **Be ready:** Read over your prep materials before the training. Know what you know and what you don't know. Ask questions for clarification.
2. **Work together:** Make a plan so you know what you will be doing and saying. Consider role-playing with your team during your planning time. If this is your first Hill Day, rely on your group members to guide and support you.
3. **Know your environment:** Be professional and respectful. This includes everything from dressing nicely and showing up on time to keeping the conversation polite despite political differences. Also, know who you are talking to and meet them at their level regarding the issue—it's okay to oversimplify.
4. **Speak from the heart:** Your experience matters, and knowing your personal story will have more of an impact than a generic one. Consider your why and build that into your ask.
5. **Ask with confidence:** Make a clear request for what you would like to see happen after the meeting. Use specific language related to the issue and be ready to explain further to prove your point.

I'm fired up! Now what!

Visit the Diabetes Advocacy and Policy page on the ADCES website. There, you will find lots of information about current legislative priorities, upcoming events, and ways to get involved. Visit the ADCES Legislative Action Center to send letters to your senators and your representative. Take a minute to add in a personal story to these predrafted messages, or if short on time, just click send. These emails and the number of emails are noted in our congressional offices, so it does make a difference.■

Author Contributions

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Part 2

Empowering the DCES as a Leader in **Evidence-Based Quality Improvement**

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Diabetes care and education specialists (DCESs) are well positioned to design and conduct evidence-based quality improvement (EBQI) initiatives. Mastering the goals of EBQI and honing the associated knowledge and skills are key to successfully engaging in this process and driving transformative changes in diabetes care. Despite the increase in evidence-based practice and quality improvement literature, there remains variability in terminology, methodology, and reporting and a glaring gap in guidance on how the DCES can actively participate and integrate these processes into diabetes self-management, education, and support (DSMES) programs. This article, the second in a 3-part series, is a call for DCESs to engage in clinical inquiry. It aims to define EBQI, explore EBQI models, and identify opportunities for DCESs to leverage EBQI, thereby advancing clinical inquiry and elevating the diabetes care.

What Is EBQI?

Evidence-based quality improvement represents a systematic approach to clinical inquiry that integrates the principles of evidence-based practice (EBP) with quality improvement (QI) strategies. EBP emerged from the evidence-based medicine movement of the early 1990s.[1] It entails "integrating the best available research evidence with clinical expertise and the patient's unique values and circumstances."[2] Over the past 3 decades, EBP has become the cornerstone for developing and evolving standards of practice across health care disciplines, serving as a foundation for promoting problem-solving in clinical settings based on scientific evidence. EBP supports the utilization of evidence to modify practice and achieve high-quality care.[3]

The principles of QI originated in the industrial field with the foundation of the plan, study, do, act (PDSA) cycle, which was designed to facilitate continuous improvement.[4] QI is defined as "a systematic continuous approach that aims to solve problems in healthcare, improve service provision, and ultimately provide better outcomes for patients."[5] Within a QI initiative, clinicians collect data to understand system operations, identify potential areas for improvement, establish measurable goals, and monitor the effectiveness of implemented changes.

A primary distinction between QI and EBQI is the latter's consistent focus on the deliberate and systematic integration of existing scientific evidence within the improvement process. The EBQI approach requires an iterative process grounded in the principles of understanding the root causes of clinical challenges, collecting and analyzing both internal and external evidence, and planning, implementing, and evaluating their impact and sustainability across the health care system.[6-8] This approach is adaptable and can be effectively applied across various health care settings where DCESs practice.

EBQI Models

When engaging in EBQI, it is important to use a guiding model and follow a step-wise approach (Table 1).[9-11] There are several models available to support this process. Descriptions of two models that are commonly used in health care settings are provided in the following.

The Johns Hopkins EBP model includes a 3-phased approach: formulating a clinical practice question, collecting evidence, and applying the findings into practice. Initially, the team formulates

Table 1 Common Elements of Evidence-Based Quality Improvement Approaches[9-11]

Step	Description
1. Stakeholder engagement	Identify and involve key stakeholders early, including clinicians, administrators, patients, and community members, to ensure relevance and buy-in.
2. Assemble a multidisciplinary team	Form a team with diverse expertise (eg, clinical, administrative, quality, patient representatives) to guide the project.
3. Identify a champion/executive sponsor	Secure leadership support to advocate for the project, allocate resources, and help overcome barriers.
4. Define goals and metrics	Establish SMART goals and select appropriate process and outcome measures to evaluate progress and impact.
5. Resources for project design support	Ensure access to expertise in project design, including QI methodology, implementation science, and clinical research.
6. Statistical analysis support	If needed, provide access to biostatistical expertise for data analysis, interpretation, and ensuring methodological rigor.
7. Design the intervention	Adapt evidence-based practices to the local context; develop protocols, workflows, and training materials tailored to the setting.
8. Implement the intervention	Use iterative methods like PDSA cycles; begin with pilot testing and scale up based on feedback and results.
9. Monitor and evaluate	Continuously collect and analyze data; compare outcomes to baseline and predefined goals to assess effectiveness.
10. Refine and sustain	Use evaluation data to refine the intervention; develop strategies for long-term sustainability and integration into routine practice.
11. Disseminate results	Share outcomes with stakeholders, publish findings, and contribute to the broader evidence base to inform future EBQI efforts.

Abbreviations: PDSA, plan-do-study-act; QI, quality improvement; SMART, specific, measurable, achievable, relevant, and time-bound.

Table 2 Examples of EBQI Initiatives for DCESs in Clinical and Community Settings[18-20]

EBQI Initiative	Setting	Goal	Example Activities
Increase the number of patients that meet annual quality measures as per national standards	Clinic/health system	Increase the number of recommended routine examinations and screenings	Modify workflows to identify patients in need of interventions such as annual eye and foot examinations, annual microalbumin measurement, A1C testing, and vaccinations
Address barriers to lifestyle changes	Community/ clinic	Improve engagement in healthy eating and physical activity	Develop a peer support program
Improve A1C follow-up rates	Clinic	Increase timely follow-up for individuals with elevated A1C	Audit charts to identify gaps, implement reminder calls or texts, track follow-up completion rates
Enhance DSMES participation	Community/ clinic	Boost enrollment and retention in DSMES programs	Partner with local organizations, offer flexible class times, use patient feedback to improve content
Optimize CGM use	Clinic/health system	Increase appropriate use of CGM	Identify eligible patients, provide support for obtaining insurance coverage, provide training, monitor outcomes and satisfaction
Provide culturally tailored medical nutrition therapy	Community	Improve engagement and outcomes in diverse populations	Develop materials in multiple languages, collaborate with community leaders, evaluate impact on behavior change
Reduce hypoglycemia events	Clinic	Decrease frequency of hypoglycemia in high-risk patients	Implement risk screening tools, adjust medication therapy, increase uptake of glucagon prescribing, provide targeted education
Medication-taking improvement	Clinic/ community	Improve persistence to prescribed diabetes medications	Use refill data to identify inconsistencies, provide motivational interviewing, implement incentives, track changes over time
Foot care screening initiative	Clinic	Increase routine foot exams for people with diabetes	Train staff on foot screening, implement annual screening reminders, document findings in medical record
Telehealth DSMES expansion	Community	Expand access to DSMES via telehealth	Set up virtual education sessions, provide tech support, evaluate client and/or referring provider satisfaction and outcomes
Depression screening integration	Clinic	Identify and address depression in people living with diabetes	Incorporate PHQ-9 screening, refer to behavioral health, track follow-up and outcomes
Healthy eating campaign	Community	Promote healthy eating habits among people with diabetes	Host cooking demos, provide grocery store tours with education, distribute culturally relevant recipes, partner with local food programs
Improve implementation of guideline-directed medical therapy	Clinic/health system	Increase adherence to evidence-based treatment protocols for diabetes and related conditions	Conduct chart reviews, provide provider education, implement clinical decision support tools in EHR

Abbreviations: CGM, continuous glucose monitor; DCESs, diabetes care and education specialists; DSMES, diabetes self-management education and support; EHR, electronic health record; EBQI, evidence-based quality improvement; PHQ-9, Patient Health Questionnaire-9.

a clinical practice question by identifying the patient population, interventions, and outcomes. In the next phase, a literature search is conducted, and the evidence is appraised for its strength and quality before ultimately determining recommendations for best practices. This model incorporates various tools to facilitate the design and implementation of the EBQI project.[11,12]

The Institute for Healthcare Improvement model, also called the "model for improvement," is another widely recognized framework. It poses 3 fundamental questions: What are we trying to accomplish? How will we determine if a change constitutes an improvement? What changes can we implement that will result in an improvement? In this model, the PDSA cycle is employed to carry out an EBQI project. Additionally, the model for improvement offers a Quality Improvement Essentials Toolkit, which serves as a valuable resource for implementing EBQI.[13-15]

A large initiative conducted by the T1D Exchange underscores the significance of EBQI in facilitating practice changes. Five endocrinology centers, including adult and pediatric clinics, piloted an equity-focused QI study. The study tested several interventions, including bias training, continuous glucose monitor (CGM) material translation, multilingual education, health

screening, and shared decision-making. Using the Institute for Healthcare Improvement's model and tools, a key driver diagram identified primary drivers and changes for enhancing equitable CGM use in people with type 1 diabetes.[16]

Following implementation of these interventions, median CGM use increased by 7% among non-Hispanic White individuals, 12% among non-Hispanic Black individuals, and 15% among Hispanic individuals. The disparity in CGM use between non-Hispanic White and non-Hispanic Black patients decreased by 5%, and the gap between non-Hispanic White and Hispanic patients decreased by 8%.[16] Additionally, the T1D Exchange initiative led to the development of the Equity Change Package, a no-cost QI framework resource.[17] This work exemplifies how EBQI approaches can enhance equitable diabetes care delivery and outcomes.

The Role of the DCES in EBQI

Embarking on an independent project may initially seem daunting; however, EBQI initiatives provide an unparalleled opportunity to make a significant impact. Imagine drawing inspiration from cutting-edge research or recent publications that align with your clinical practice interests, such as effectively reducing A1C levels in adolescents by implementing targeted clinical guidelines. By leveraging the elements of the EBQI framework alongside a robust EBQI implementation model, you can craft a powerful and transformative quality improvement plan. To help spark ideas, Table 2 provides examples of EBQI initiatives in diabetes care that can be adapted to various clinical and community settings. This is your opportunity to drive significant change and raise the standard of care in your field. ■

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ADCES's DELTA Team Leading the Charge to Improve Equity and Access to Diabetes Care

SLOANE FISHER, MPS, AND WILLIAM R. BARSHOP, MPH

Diabetes continues to be a major public health challenge, affecting millions of individuals and disproportionately impacting underserved communities. To address this important matter, ADCES launched the DELTA LEAD initiative—Delivering Evidence Led inTerventions Across the Lifespan to improve Equity and Access to Diabetes Care. This initiative is a 5-year cooperative agreement with the Centers for Disease Control and Prevention (CDC), which aims to transform diabetes care and prevention by implementing evidence-based programs and increasing access to effective and quality care for those disproportionally impacted by diabetes.

What Is DELTA?

DELTA was driven by the necessity for a layered framework. Natalie Elleson, project director, public health practices and diabetes programing, explains, "This initiative provides an opportunity to conduct multitiered approaches to preventing, treating, and managing diabetes from youth through older adulthood using evidence-based programming."

Currently, more than 30% of adults and about 17% of children and adolescents in the United States are living with higher weight or obesity, and diabetes rates are rising. DELTA focuses on tackling these issues early to prevent long-term health complications.

ADCES is one of 77 recipient projects supported by the Diabetes MATCH (Mobilizing Access Through Capacity Building and Health) Initiative. Through the DELTA initiative, ADCES implements 3 evidence-based strategies to address prevention of diabetes and management across the life span.

1. **Family healthy weight programs (FHWPs):** Intensive health behavior and lifestyle treatment programs focused on nutrition, physical activity, and behavior change strategies. Designed for children ages 2 to 18 and their caregivers to help treat and prevent childhood obesity.
2. **The National Diabetes Prevention Program (National DPP):** A structured 12-month lifestyle change program designed for individuals with prediabetes. It emphasizes calorie reduction, physical activity, and weight loss to prevent or delay the onset of type 2 diabetes.
3. **Diabetes self-management education and support (DSMES):** An evidence-based intervention to help people with diabetes manage blood glucose levels, improve overall health, and prevent or delay diabetes-related complications.

Elleson emphasizes that "prevention is key! Preventing the onset of diabetes by starting with our youth (FHWP), preventing or delaying type 2 diabetes for adults (National DPP), and preventing future complications for those with diabetes (through DSMES). These evidence-based programs all have similar goals and complement each other, so how can we think creatively to find linkages between them!"

DELTA aligns closely with ADCES's mission and values, prioritizing equity, prevention, and evidence-based programming to deliver long-term health improvements.

Focus on Populations Most Affected by Diabetes

One of DELTA's main goals is to address health disparities by targeting those at highest risk and enhancing access to diabetes care and prevention programs. Through collaborations with federally qualified health centers (FQHCs) in high-need counties, the initiative is making strides in reaching historically underserved populations, including Black/African American men and Spanish-speaking individuals in complex, English-dominant health care systems. These FQHCs serve as vital partners, addressing social needs that impact health outcomes and delivering culturally relevant care to improve health for populations most affected by diabetes and related risk factors.

ADCES's DELTA team works closely with 3 FQHC partners, located in Georgia (MedLink Georgia, Inc), Indiana (Eskenazi Health), and California (Ampla Health). These FQHCs have sites embedded in both rural and urban communities and play a critical role in engaging at-risk populations by providing tailored programs and

building sustainable diabetes care models. The DELTA team supports these sites through shared resources, training, and implementing best practices to address the unique needs of their communities.

FQHC Focus on Populations Most Affected by Diabetes

The DELTA team identified the populations most affected by diabetes to target, but each FQHC served different populations in different geographic regions. To narrow down populations for each, the DELTA team facilitated discussions with each partner to determine which groups would benefit most from increased enrollment and retention in diabetes services. A funnel diagram tool was introduced to help each diabetes care team brainstorm and analyze which populations they currently serve, who is at higher risk for diabetes and its complications, and who has been historically or systematically underserved.

- MedLink Georgia: Operating in a predominantly rural area, MedLink targets populations facing substantial socioeconomic barriers, such as transportation, phone, and internet access. African Americans, a group with high diabetes risk and low enrollment in diabetes programs and services, were chosen as a priority for increased outreach and program participation.
- Eskenazi Health: With a robust system for assessing social determinants of health (SDOH) and strong community ties, Eskenazi identified 2 key groups for their programs. African American men, who have been difficult to engage in DSMES and diabetes prevention program, were prioritized for targeted adaptations to the DSMES curriculum to increase cultural relevance. FQHC patients speaking Spanish will be targeted for increased diabetes prevention program enrollment. The DELTA team engaged a consultant to support this process.
- Ampla Health: Serving a mix of rural and urban communities in northern California, Ampla focuses on immigrant populations from Mexico and Central America. Recognizing that Hispanic/Latino individuals face significant barriers to care and are at higher risk for diabetes, Ampla is working to increase engagement with Spanish speakers and strengthen relationships within these communities. For the diabetes prevention program, Ampla launched their first Spanish-language cohort.

The funnel diagram (Figure 1), or similar tool, and collaborative brainstorming sessions used to

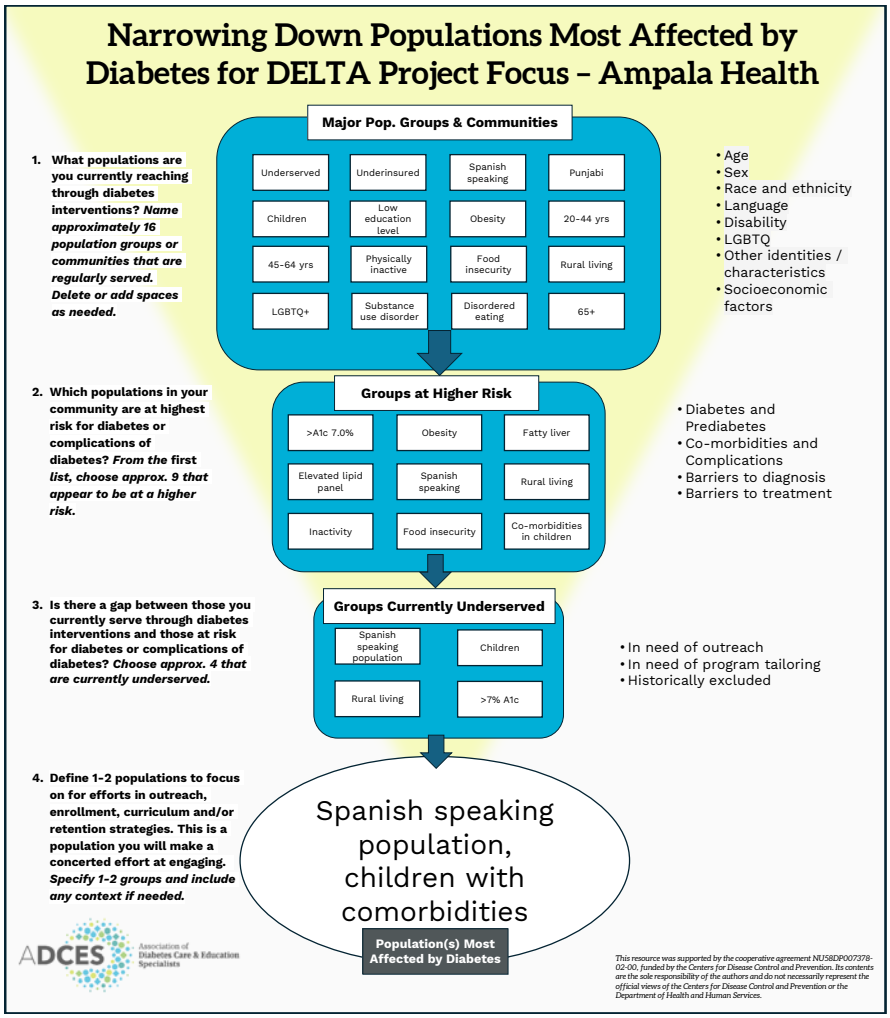

Figure 1: DELTA designed funnel diagram used to facilitate discussions identifying population(s) most affected by diabetes to focus on completed by Ampla Health.

identify populations most impacted by diabetes can serve as a practical tool for others looking to replicate this work. These are opportunities to better understand what resources partners have available and the populations they serve. The funnel diagram facilitates in-depth discussions with partners to narrow down those at highest risks to target. By targeting specific populations, DELTA aims to bridge the disparities gap in diabetes care in the United States.

Accomplishments and Impact

In its first year, DELTA established a strong foundation for long-term success and has made significant progress:

- increasing the number of community sites offering DSMES
- FQHC partner becoming a CDC-recognized diabetes prevention program
- assessing community readiness and developing targeted marketing plans
- training care teams on SDOH
- exploring complementary diabetes support programs and best-fit FHWP models
- establishing reimbursement and sustainability plans to support long-term viability.

The work conducted by the DELTA team and its FQHC partners aims to have far-reaching impacts, including better health outcomes for populations most affected by diabetes and the development of scalable models that can be replicated nationwide. By focusing on underserved communities and integrating culturally relevant interventions, DELTA's approach provides a roadmap for reducing health disparities and improving diabetes care at a systemic level. DELTA's focus on sustainability and cross-program integration offers a blueprint for creating lasting improvements in health equity.

Looking Ahead

The DELTA initiative provides more than technical assistance and support for the FQHCs it works with; it represents a transformative approach to improving health equity and access. By leveraging evidence-based strategies, increasing the sustainability and capacity of multidisciplinary care teams, and fostering collaboration among FQHCs, ADCES is improving access to diabetes care and education.

As the initiative progresses, ADCES's DELTA team remains committed to scaling successful strategies, sharing lessons learned, and advocating for expanded access to culturally responsive programs. Through the DELTA and MATCH Initiatives, ADCES is addressing the immediate needs of individuals at risk for or living with diabetes while laying the groundwork for a healthier and more equitable future. ■

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What's Your Advice?

How Do You Prevent Burnout?

Boundaries are essential. We all want to help more, do more, give more. We give until we are empty. Set the boundary. Give yourself whatever fills your cup so that you can show up tomorrow refreshed because you prioritized self-care.

Patient care: With patients, if you are not helping them, it could be your approach, or it could be their own state of mind. After a few attempts, acknowledge that you are not helping them and report it to their health care provider.

Creativity with education programs including music, dance, and cooking/food demonstrations. And hobbies such as my reptile rescues, hiking, and old classic movies!

Daily walks, morning prayers with my dog and coffee, and then yoga classes at night. I'm in a small town, so seeing people that I've worked with out in their day-to-day activities gives me a motivation push!

Volunteering for organizations: Remember the definition of volunteering; you do what you want to do, not what you feel obligated to do.

It's hard, but I try to sit still and **not let my mind race**. It's hard because I feel like I should always be doing something, but it does help calm my mind.

Lean on your people. Asking for help doesn't make you less capable—it makes you more sustainable. I've learned to rely on coworkers when I need to delegate, vent, or just troubleshoot a tough case. Building a team culture where we support each other makes the hard days feel just a little bit easier.

Sometimes, I feel overwhelmed by huge projects, but if I break them down into a series of smaller tasks, I feel less stressed and less overwhelmed. I then make an actual checklist of the steps and feel really good as I check activities/tasks off.

Leave work at work. When the day ends, I do my best to mentally clock out, too. Having activities planned outside of work—like running clubs, family time, or even just a walk—gives me something to look forward to that has nothing to do with diabetes.

Check your battery. I've learned to pay attention to my energy—when I start feeling drained, I try to step back before I hit a wall. Sometimes, that means taking a full weekend to unplug, and other times, it's just stepping away for 10 minutes to clear my head.

Three ways:

- **Trust in God's purpose** for my career and all aspects of my life; spirituality/faith/prayer
- **Peer networking**; engagement and collegial support
- Foster a **supportive work environment and communicate** needs effectively: professional development and teamwork

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Test YOUR KNOWLEDGE

Note: Adapted from *Review Guide for the Certified Diabetes Care and Education Specialist Exam*, 6th Edition, (c) 2023. Association of Diabetes Care & Education Specialists. Reprinted with permission.

Answers appear on page 58.

1 JT is referred to a diabetes care and education specialist (DCES) for education on blood glucose monitoring. She sits down at the appointment with her arms crossed and states, "My health care provider wants me to check my glucose more often, but I don't see the need for it. When I check twice a month it's always around 200 mg/dL and I feel fine." Other known information:

- 52-year-old married woman with 2 teenagers and her aging mother at home
- Type 2 diabetes for 3 years
- Owns a working glucose monitor
- Recent A1C 7.6%

In what stage of change is JT in with regard to her glucose monitoring?

A. Precontemplation
B. Contemplation
C. Preparation
D. Action

2 A DCES is consulted to provide discharge education for an 18-year-old woman diagnosed with type 1 diabetes. When the DCES enters the hospital room, the woman is quietly sobbing and explains she is sad and anxious about her new diagnosis. Before the woman is discharged, which of the following should the DCES review with her?

A. Signs and symptoms of hypoglycemia and appropriate treatment
B. Epidemiology of diabetes and the incidence of depression
C. Incidence of birth defects associated with hyperglycemia
D. Health behavior modifications and carbohydrate counting

3 A 72-year-old woman is referred to begin twice-daily insulin injections via vial and syringe. Other known information:

- Lives alone
- Limited income
- Polypharmacy
- Prescribed insulin: 70/30 premixed insulin, 17 units before breakfast, 14 units before dinner

Because she will be taking insulin via vial and syringe, which physical capability is particularly important for DCESs to assess?

A. Visual acuity
B. Balance
C. Hearing
D. Peripheral sensation

4 After 2 previous cancellations, a 67-year-old man with diabetes presents for glucose monitoring education. He states several times he is only at the appointment to satisfy his health care provider; however, he is fairly attentive and engaged until the lancet device is removed from the package. At that point, he begins to fidget and appears agitated. Based on this information, what would be the DCES's best assessment of this man's behavior?

A. Hypoglycemia
B. Hyperglycemia
C. Needle anxiety
D. Short attention span

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Test Your Knowledge Answers

Questions appear on page 56.

1. **A:** Precontemplation is correct. JT has not begun to consider the need to check her glucose more often. This essential step precedes contemplation of the change value (B) and preparation (C) of the necessary elements to begin the change. The action stage (D) in JT would be identified by more frequent glucose monitoring.

2. **A:** Initial teaching should focus on survival-level skills that the newly diagnosed young woman would need to safely manage her disease upon discharge, that is, the signs and symptoms and the appropriate treatment of hypoglycemia. Information on the epidemiology of diabetes (B), the association between hyperglycemia and defects (C), and carbohydrate counting (D), although important, are not information/skills that are needed immediately.

3. **A:** Drawing up an accurate insulin dose and injecting it correctly requires both dexterity and visual acuity. These are key areas to assess when initiating insulin therapy, especially in those using a vial and syringe. Balance does not typically impact ability to use vial and syringe (B). Hearing does not impact insulin injection technique (C). Although peripheral sensation is important to assess, decreased sensation typically does not impact insulin injection technique (D).

4. **C:** Needle anxiety occurs in almost everyone to varying degrees. If severe or persistent and left unresolved, diabetes management may suffer because of missed injections, inadequate checking, and avoidance of health care follow-up visits. A skilled diabetes care and education specialist will learn to match and individualize the presentation of glucose monitoring so that the fears of the person with diabetes may be alleviated.

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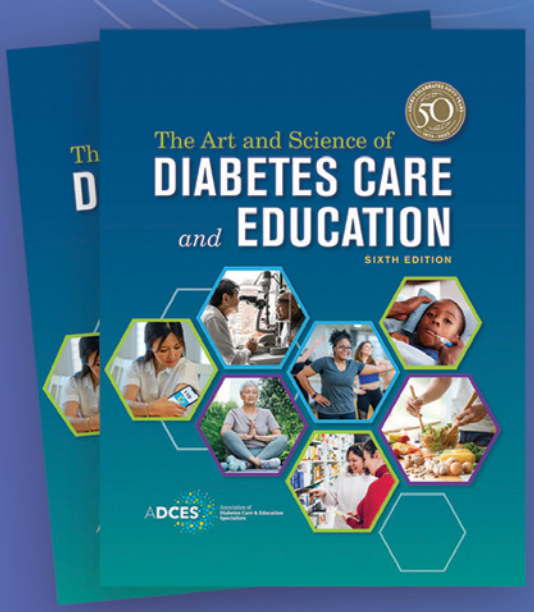

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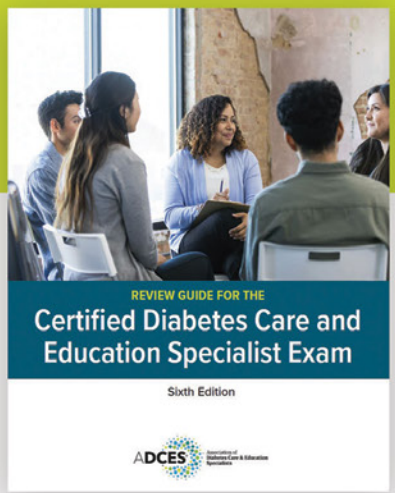

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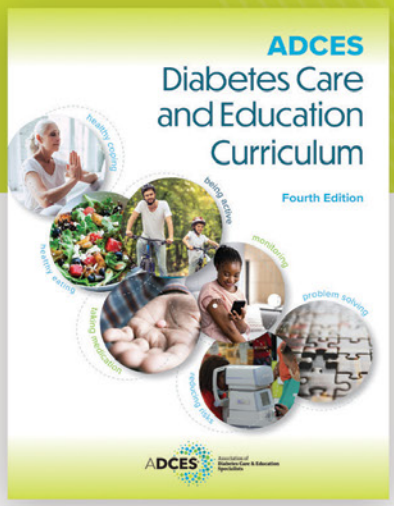

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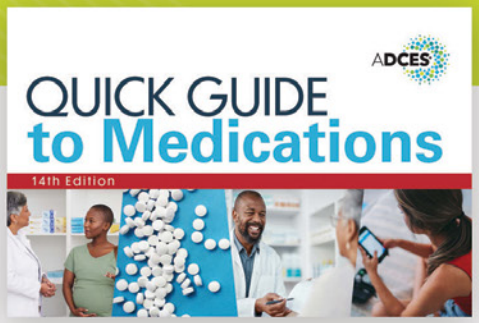

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