Test-Takers with Diabetes: Accommodating Medical Devices, Managing Security Challenges, and Determining What is Reasonable

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Introduction

Test candidates with disabilities are entitled to have reasonable accommodations during testing, and this includes having the ability to appropriately manage medical conditions during the test. How can we ensure that test-takers with diabetes have access to their medically-necessary equipment and medication, while also protecting the security of the test?

Candidates with chronic medical conditions such as epilepsy and diabetes are increasingly requesting to bring their medical devices into the test room with them. Many of these devices include Bluetooth technology and are intended to connect to other devices or the internet. Some of the newer testing and monitoring devices connect to a person's smartphone, making the smartphone itself "medically necessary." Medical device manufacturers have created smartphone applications to make it easier for people to monitor and manage their condition through their smartphone.

Obviously, all of these new devices and apps-- while innovative and helpful to individuals with disabilities-- are cause for concern among testing organizations who need to protect the security of the test, and for test center staff charged with ensuring the security of all of the various tests that are being administered. Can we ask test-takers with serious medical conditions to leave their smartphone in their locker or at home when the device could be life-saving? Or should we ask the proctors to keep an eye on the smartphone and alert the candidate if they are in danger of fainting or having a serious medical event? These options may not be appropriate for test-takers or those overseeing the testing experience.

This article will share the experiences of testing organizations that have dealt with the challenges of accommodations requests for "smart" medical devices and will offer practical suggestions for managing these requests. The authors include testing-industry professionals who are experts in reviewing test accommodations requests, test security experts, diabetes care and education specialists, attorneys, a representative from a medical device manufacturing company, and a physician living with diabetes.

What is diabetes?

Diabetes is a chronic, progressive metabolic disorder characterized by abnormalities in the ability to metabolize carbohydrates, fats, and protein, leading to a hyperglycemic (high blood glucose) state. This chronic metabolic dysregulation is associated with long-term damage to blood vessels and various organ systems, including the eyes, kidneys, nerves, and heart. According to the CDC, more than 37 million US adults have diabetes, and 1 in 5 of them do not know they have it. [https://www.cdc.gov/diabetes/data/statistics-report/index.html. Accessed 1/19/2024] Diabetes is the eighth leading cause of death in the United States. It is the number one cause of kidney failure, lower-limb amputations, and adult blindness. In the last 20 years, the number of adults diagnosed with diabetes has more than doubled. [https://www.cdc.gov/diabetes/basics/quick-facts.html]

Three of the most common types of diabetes are Type 1, Type 2, and gestational. Type 1 diabetes results from the autoimmune destruction of insulin-producing cells in the pancreas, leading to absolute insulin deficiency. Type 1 diabetes is characterized by the abrupt onset of clinical signs and symptoms associated with markedly abnormal glucose levels. Such symptoms may include increased thirst, extreme hunger, frequent urination, unintended weight loss, blurred vision, fatigue, weakness, nausea, vomiting, fruity breath, deep, labored breathing. Over half of people diagnosed with type 1 diabetes are adults (Leslie et. al., 2021). The overwhelming majority of test accommodations requests from individuals with diabetes are from those with Type 1 diabetes.

Type 2 diabetes is characterized by a progressive defect in insulin secretion and resistance by the body's cells to the action of insulin, otherwise known as *insulin resistance*. In the authors' experience, test-takers with Type 2 diabetes rarely request testing accommodations, as this condition is typically managed in a way that is not likely to cause acute symptoms during the testing process.

Gestational diabetes rarely if ever presents such that test accommodations are needed. However, the use of insulin, insulin delivery devices, and continuous glucose monitors is increasing in this population as coverage expands.

The Tests and the Test-Takers

There are many different kinds of tests. In the academic settings, tests are administered in classrooms, for the purpose of measuring learning and informing future instruction. Test accommodations and support services in this setting are designed to assist students to demonstrate their knowledge and otherwise be "successful."

College entrance exams, such as the SAT or ACT, are tests designed to predict the likelihood of a person's success at a future college or other academic institution, and to inform such institutions of the relative competence of test-takers in skills and abilities that will be important in those institutions. Most of these test-takers are children in high school.

Graduate school entrance exams, such as the MCAT, LSAT, and GRE, are tests designed to predict the likelihood of a person's success at a future graduate academic institution, and to inform such institutions of the relative competence of test-takers in skills and abilities that will be important in those institutions (Hanson et. Al., 2022). Most of these test-takers are full-time students, and the majority are under 21. There are serious questions about the predictive validity of such tests when candidates are provided with accommodations (Searcy et. al., 2015), but this issue is beyond the scope of the present article.

> *Education-related testing is not the same as testing that serves as a gateway to professional licensing, however, and it is not subject to the same compelling state interests [to protect the public]. [A]s part of their power to protect the public health, safety, and other valid interests, [states] have broad power to establish standards for licensing practitioners and regulating the practice of professions*. (Oliver v VA Board of Bar Examiners, 2018).

Most professions are regulated at least to some extent by governmental authorities. Certification and licensure exams facilitate credentialing, with the primary purpose to protect the health, safety, and welfare of the public, and to ensure that credential holders meet the ethical and competency standards to practice in their profession. Conversely, there can be fines and penalties for individuals who practice in some professions without holding the appropriate credential. Individuals taking certification or licensure tests are almost always *adults* over 21. In many fields, such as project management, financial planning and advising, and many medical specialties, test-takers are *employed*, either part-time or full-time. In fact, many certification and licensure tests are promoted as a way to enhance or further candidates' careers.

The Test Setting

Until recently, most high-stakes certification and licensure exams were administered in test centers. In this setting, typically, test candidates are in a relatively small room with perhaps 10-20 other candidates who may or may not have been taking the same test. Each candidate sits at

a library-style study carrel, in a U-shape, with everyone facing away from the center of the room. The proctor(s) watches through a glass window to ensure that standards are maintained. Talking in the test room is prohibited.

Today, more high-stakes exams are administered in a remote-proctored format, allowing candidates to test from a location of their choosing. There are numerous possible configurations for remotely-proctored exams. Some remote-proctoring vendors use AI-proctoring with a live-proctor backup; others may use a live proctor with one camera (from the candidate's laptop) or two cameras (laptop plus a second camera with a side view). How these various setups deal with "exceptions" also varies widely. For example, whereas an AI-proctored exam might "red flag" a test-taker who handles their medical equipment during an exam, whereas a live proctor would likely have been notified about a candidate who was pre-approved to have medical equipment with them during the testing session.

Regardless of the test-delivery format, test sponsors and test-delivery vendors may have different policies regarding the use of medical equipment, how it is inspected prior to the start of the exam, and how and when it can be accessed during the exam.

Making accommodations decisions

With respect to certification and licensure exams, it is important to recognize that test accommodations for individuals with disabilities must meet legal obligations under the American with Disabilities Act (42 U.S.C. § 12101 et seq.) (1990) but must be managed in a way that does not undermine the validity of the test scores, which could compromise the mission of the credentialling organization-- public protection. Thus, accommodations are designed to ensure equal access to the test and the testing process—not to guarantee any particular *outcome*, such as "passing", "finishing", "working up to one's potential", or "getting a better job", which are the stated reasons many test-takers request accommodations.

Test sponsors must review requests for accommodations and make appropriate determinations. Given the fact that decision-makers do not know the test-takers personally, organizations must rely on candidates to submit relevant supporting documentation that establishes that they are a person with a disability as defined by the ADA, and that substantiates a need for accommodations in order to ensure equal access. Again, the goal of accommodations is to ensure access—not to guarantee any particular outcome. Decision-makers typically strive to remain "neutral", and not have their judgements affected by factors such as personal experience, demographic biases, or other prejudicial factors. This can be challenging for some individuals who make accommodations decisions, as one's personal experiences—such as having a friend or family member a disability—could result in bias.

What assistance/items can be used during testing WITHOUT the need to request accommodations?

It is critical that test-takers with medical conditions be permitted to manage their condition appropriately during the testing process. This can usually be accomplished without compromising the security, integrity, or validity of the test. In fact, many accommodations can be viewed as adhering to the principles of "Universal Design"—modest modifications that can benefit a wide range of individuals—not only those with disabilities-- and can be self-implemented without the need to request formal accommodations. For example, some tests allow for "self-service" screen magnification. Many other testing organizations permit a wide variety of personal medical items, such as crutches, eye drops, cough drops, hearing aids, or devices that are attached to the body such as a cochlear implant. Several large test-delivery vendors have published lists of personal medical items that test-takers can have with them, without requesting accommodations (see References, below). Importantly, none of these personal medical items use Bluetooth or the internet, and none can capture images, video, or audio. When test-takers need medical devices that have an electronic component, they must request accommodations and have their request vetted and approved prior to taking the exam.

Diabetes-Related Medical Devices in the Test Setting: Security Challenges & Potential Solutions

The treatment of diabetes is individualized to meet the person's medical needs. Type 1 diabetes must be managed with insulin to replace the insulin the body no longer produces. If the condition is not carefully managed, the consequences can be life-threatening.

The treatment of diabetes has changed dramatically in the last 10 years. Previously, most test-takers might have used a blood glucose monitor (BGM) which requires finger sticks to measure glucose in the blood. However today, the majority of adult test-takers with Type 1 diabetes use a continuous glucose monitor (CGM) that is attached to the body and that detects their glucose level, along with a second (external) device that displays their glucose level in real time-- and that shows which direction their blood-glucose is headed—up or down. These two devices communicate via Bluetooth and must be within 20-30 feet of each other to communicate properly.

In addition to glucose monitoring, there is also the likely need for administering insulin during a lengthy testing session. Insulin delivery can be accomplished with a syringe and vial, an insulin pen (including 'smart' versions), an inhaler, an insulin patch, a patch pump, an insulin pump, or an automated insulin delivery system. Some of these devices require Bluetooth connectivity to the CGM.

There are a number of options for the "display device" that informs the person with diabetes about their glucose level. This display device can be a "standalone" device designed solely for the purpose of displaying a person's glucose; it does not have any "smart" features. However today, many individuals with Type 1 diabetes use a CGM that connects via Bluetooth to their smartphone, via an application ("app"). Thus, the smartphone becomes medically necessary.

Regarding internet access for the smartphone, the app for monitoring and managing diabetes only needs the internet to upload data to a cloud-based platform for later viewing of reports and evaluating data over time (typically by the person's physician), and for most adults this feature can be disconnected for the duration of their test. Therefore, if a smartphone is used to display the person's glucose level, it can be placed in "airplane mode" and set to vibrate, which still allows for data to be transmitted via Bluetooth between the devices themselves.

Security concerns: The devices themselves

Individuals who plan to wear and use such diabetes-related electronic devices during testing typically are required to go through their test-sponsor's standard accommodation approval process. The purpose of this is two-fold: First, to verify that the person does in fact have the condition that they report (diabetes, as documented by a qualified medical provider), and second, to ensure that test proctors are aware that the person has been approved to use such devices during testing. When test sponsors and candidates have followed this process, there should not be a need for proctors to visually inspect any medical items that are attached to the body, such as an insulin pump or CGM, which may be beneath clothing. Instead, the candidate can merely point to the device, and the proctor can cross-reference this with their list of candidates who have been pre-approved for accommodations.

Security concerns: Bluetooth

Given that Bluetooth has a typical range of 20-30 feet, it is theoretically possible that a candidate could somehow tamper with the device and send or transmit data to another device, perhaps in their locker for nefarious purposes. However, in the view of the authors, this is highly unlikely, and for cheating purposes, would certainly not be the most expedient approach. The authors are unaware of any instances of individuals with diabetes using Bluetooth-enabled devices to cheat or steal test content.

Security concerns: Smartphones and other smart devices

As noted above, the use of smartphones to manage diabetes has become "the norm" for many adults. Historically, test sponsors and test-delivery vendors prohibited the use of smartphones or other smart devices during the test, in particular to reduce the risks of cheating and/or theft of test content. [https://www.usatoday.com/story/tech/2019/08/16/how-teachers-preventing-

high-tech-cheating-classroom/2017389001/] However, now that many test-takers with diabetes use their smartphone as a medical device for helping to manage their diabetes, we must consider how to allow for this during testing and think carefully about the potential test security challenges.

The authors and contributors have wrestled with these issues, and suggest the following approach if a smartphone is medically necessary to manage diabetes during testing:

<u>If testing at a test center:</u>

1. The candidate will NOT be tested in a private room.
2. At all times *except when the candidate is seated at the exam workstation,* the smartphone will be kept in the candidate's pocket.
3. Prior to entering the testing room, while the proctor is watching, the candidate must disable internet connectivity; Bluetooth may be enabled to allow the medical devices to communicate with each other and with the smartphone. These settings must not be changed at any time prior to the end of the testing session, including breaks.
4. Prior to entering the testing room, while the proctor is watching, the candidate will cover the camera(s) on the smartphone with a non-transparent tape prior to entering the testing room and the camera must be kept covered for the entire duration of the exam including when the candidate takes breaks.
5. If testing at a test center, warning alerts on the phone must be set to not disturb other test-takers.

<u>For testing either at a testing center or via online (remote) proctoring:</u>

6. Prior to launching the exam, while the proctor is watching, the candidate will cover the camera(s) on the smartphone with a non-transparent tape and the camera must be kept covered for the entire duration of the exam including breaks.

<u>For testing via any modality:</u>

7. Aside from the app to manage the medical condition, the candidate is prohibited from using any other functions or features of the smartphone during the entire duration of the exam including during breaks.
8. During testing, the smartphone should be kept out of arm's reach unless the proctor is directly supervising the candidate.
9. "Smart" devices *other than* smartphones—such as smart watches—should not be approved.
10. As with all candidates, the exam may be audio and video recorded. If the proctor notices anything suspicious during the exam, or if upon post-exam review there are

security concerns, the exam may be canceled, and the test sponsor may impose additional penalties.

Test-sponsors and test-delivery vendors have experimented with various other strategies to reduce potential security risks of medically-necessary smart devices during testing; however, the authors do NOT recommend these approaches:

- **Close down the entire test center** (for all candidates except the person with diabetes who needs the smartphone). The concern here is that if a test-taker with diabetes is using their smartphone during testing, even if that candidate's own test sponsor has approved of such an accommodation, *the content of other tests* that are being administered at the same time could be at risk—and the sponsors of those other tests have not "signed off" that such a device will be present during their candidates testing. The authors and contributors do not favor this approach, as other strategies as outlined above can be employed that should adequately address security concerns.
- **Let the proctor keep the smartphone during testing**. Some test sponsors have permitted a candidate with diabetes to have a smartphone during testing, but only if kept with the proctor. The proctor is tasked with monitoring the smartphone and the person's medical condition as reported on the smartphone, and for alerting the candidate if there are any issues. However, the authors have serious concerns about this approach for several reasons. First, proctors have many responsibilities, including checking in/out candidates, answering the phones, supervising those taking tests, and other administrative tasks. Watching a candidate's smartphone for medical alerts is not a duty that most individuals, regardless of their role in the testing environment, e.g., proctor, have received any training to perform. Second, proctors are not acting in the capacity of a medical provider and cannot be responsible for interpreting medical information and relaying this to the person with diabetes. Third, the diabetes app on the smartphone conveys confidential, personal medical information, which the candidate may not want the proctor (or anyone else) to be privy to. Lastly, the potential liability of the test vendor and credentialing body should be considered when using an employee to monitor medical information. Again, this approach is not recommended.
- **Allow the smartphone but only if kept in the candidate's locker.** This strategy has many of the same flaws as those above, in particular, forcing a person with a potentially life-threatening condition to part with their medical device for extended periods of time. This approach is not recommended.

Extra testing time for diabetes

Candidates who request disability-related test accommodations almost always want extra time. In a survey conducted by the primary author in 2015, for accommodations requests to a

credentialing organization, during a one-year period, over 90% included a request for some degree of extra time on the exam. Despite the call from disability-advocacy organizations to carefully individualize accommodations and to see each person with a disability as uniquely-abled, the exact same accommodation-- extra time-- is requested by almost all test-takers, regardless of disability type.

Requests for extra time may be based on the perception that additional time will lead to a more favorable outcome on the test. However, as noted above, the ADA is outcome-neutral, and the purpose of accommodations is to ensure equal access, not to guarantee and desired outcome. Nevertheless, test candidates with diabetes also sometimes request extra testing time.

The primary author, Dr. Hosterman, reviewed all 475 accommodations requests from one credentialling organization in a medical specialty field. All requests were submitted to the organization from March 1, 2022 – Jun 30, 2023 (16 months). Dr. Hosterman personally reviewed all 475 accommodations requests. Among the total 475 requests, 39 (just over 8%) were based on Type 1 diabetes. All 39 candidates with diabetes were approved for *some* accommodation, though not always exactly what they had requested.

TOTAL ACCOMMODATIONS REQUESTS RELATED TO DIABETES	REQUESTED 50%ET in addition to other things	REQUESTED EXTRA BREAKS	REQUESTED DIABETES TESTING AND MANAGEMENT SUPPLIES ONLY (NO ET)
39	13	6	20
	33.3%	15.4%	51.3%

A slight majority of candidates with diabetes did not request *any* amount of additional time or extra breaks to manage their medical condition. Instead, their requests focused on diabetes testing supplies, such as glucose monitors, insulin pumps, snacks, and in some cases, a private room. In our study, 100% of these requests were approved by the test sponsor.

A small number of candidates specifically requested extra breaks (or a small amount of extra time to compensate for unscheduled breaks) to manage their condition-- in addition to the usual medical testing and management supplies. Again, in our survey, all these requests were approved by the test sponsor.

Fully one-third of requests related to diabetes included a request for at least 50% extra time on the exam. That is, these candidates were asking for approximately *two additional hours* on a four-hour exam to manage their diabetes. Importantly, none of these candidates provided medical documentation that would suggest that their condition was unusually fragile or difficult to manage. None of these requests were approved by the test sponsor. Instead, all these

candidates were offered extra time for breaks (e.g., 30 minutes on a four-hour exam), in addition to diabetes testing and management supplies.

Candidates with diabetes who requested extra time had various explanations. Some indicated that they would need extra time if their blood sugar dropped excessively, such that they became light-headed, and they needed extra time to recover. However, the experts on our panel agreed that this should be rare, particularly since most candidates with Type 1 diabetes also requested use of newer glucose monitoring devices that show trending information to help prevent (but not necessarily eliminate) such occurrences.

Other candidates with diabetes indicated that multiple additional hours of test time were needed in case they lost consciousness during the exam. However, as is the case with any serious medical event that occurs during testing, test-center staff and proctors are instructed to call 911. In these cases, accommodations such as extra time are moot, as any candidate who experiences a serious medical event during testing will need to cancel their exam and reschedule at a later date. It should be noted that a serious medical event could potentially happen to *any* candidate during the exam—a heart attack, a fall, an asthma attack, and so on. The purpose of accommodations is not to prevent or cope with all possible eventualities.

Other test-takers with diabetes who requested extra time had unique justifications, which typically were not supported by medical or other objective evidence. For example, several candidates with diabetes suggested that their blood sugar might be more unpredictable during "high stress" situations. While this might theoretically be true, when asked, these candidates could not offer any examples of other "high-stress" situations in which their medical condition was difficult to manage, and these candidates did not present such explanations from their health care provider.

When the authors and contributors met with medical experts and diabetes care and education specialists in April 2023, there was consensus that accommodations such as 50% or 100% extra time would generally <u>not</u> be appropriate as an accommodation to manage diabetes in an adult test-taking population, although we allow for the possibility of a unique situation to arise.

In terms of "best practices" regarding accommodations for high-stakes testing, the authors have indicated that it is generally reasonable to allow candidates with diabetes to have access to their preferred diabetes testing and management supplies—even smartphones, with the caveats and guidelines outlined above. It is also reasonable to permit a beverage, such as fruit juice in a spill-proof container, and glucose tablets or hard candy (which will not leave a mess on the keyboard). In terms of extra time, the authors and the participants on the panel agreed that a small amount of extra time—perhaps 5-10 minutes per hour—or "stop-the-clock" breaks (if available)—is reasonable to compensate for the time needed to manage diabetes during the

test. As noted above, unless specifically supported by objective medical documentation, accommodations such as 50% or 100% extra time are usually not appropriate.

RESOURCES

Diabetes technology for healthcare professionals (adces.org)

ADA Consumer Guide (diabetes.org)

Diabetes Basics (https://www.cdc.gov/diabetes/basics/diabetes.html)

Diabetes Care & Education (adces.org)

Personal Medical Item list

https://home.pearsonvue.com/Test-takers/Accommodations/Pearson-VUE-Comfort-Aid-List-PDF.aspx#:~:text=Auto%2DInjector%2C%20such%20as%20EpiPen,items%20that%20cannot%20be%20removed.&text=Cough%20Drops%20%2D%20must%20be%20unwrapped,not%20in%20a%20bottle%2Fcontainer.

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