

# ***Safe Starts with Sensors: Pharmacists' Role in CGM Use***

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Pharmacy Forward: Advancing Practice for a Healthier Tomorrow!

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# Disclosure Statement

- Emily Eddy and Brittany Long have no relevant financial relationship(s) with ineligible companies to disclose.

*and*

- None of the planners for this activity have relevant financial relationships with ineligible companies to disclose.



# Abbreviated Learning Objectives

At the completion of this activity, the participant will be able to:

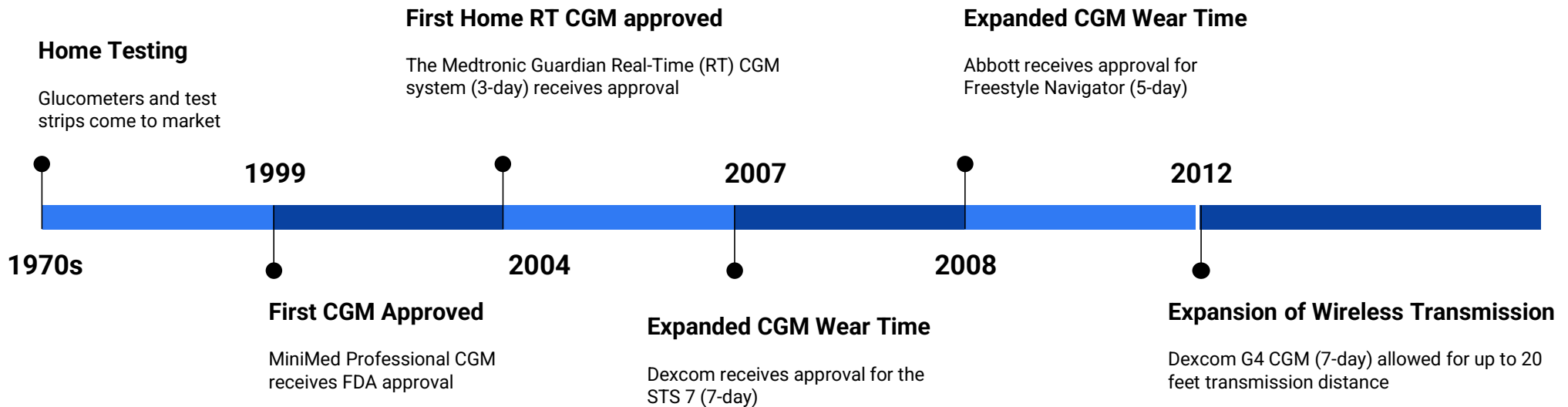
1. Describe the currently available continuous glucose monitoring (CGM) systems and their FDA-approved indications
1. Identify potential safety concerns and limitations associated with CGM use
1. Evaluate clinical scenarios in which pharmacists can promote safe and effective use of CGM devices
1. Apply strategies to integrate CGM into pharmacy practice workflows while ensuring patient safety, appropriate referral, and coordination of care



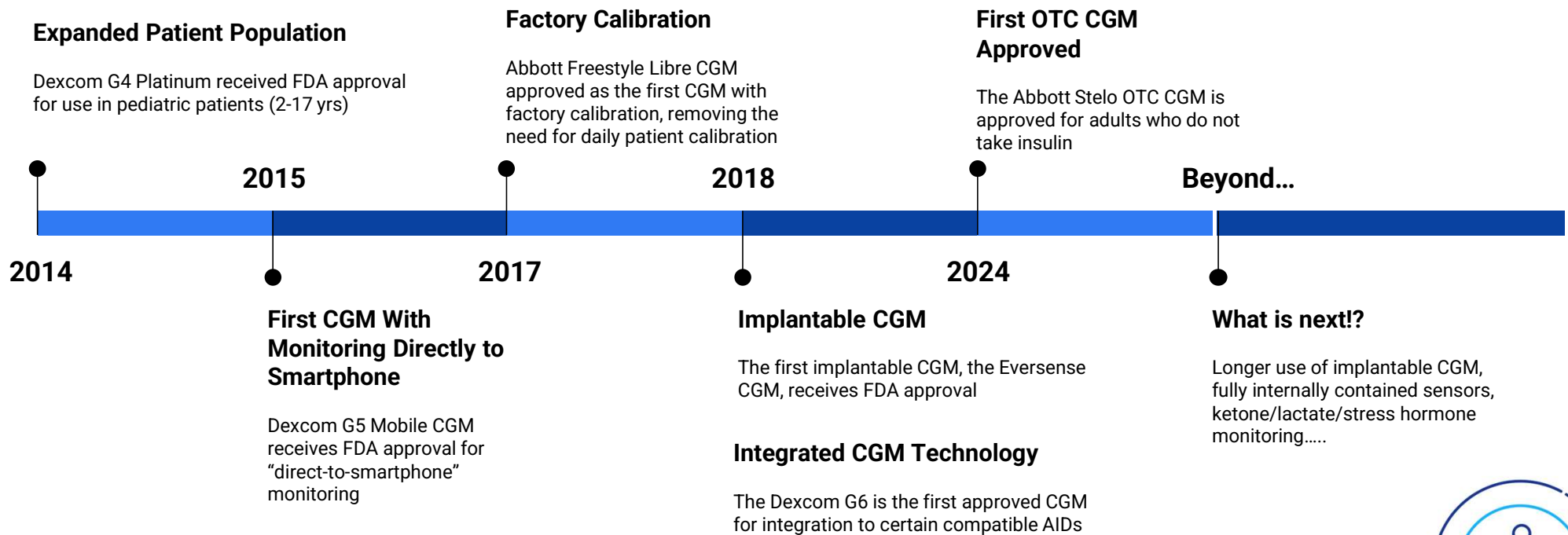
# Introduction to CGMs



# History of Glucose Monitoring

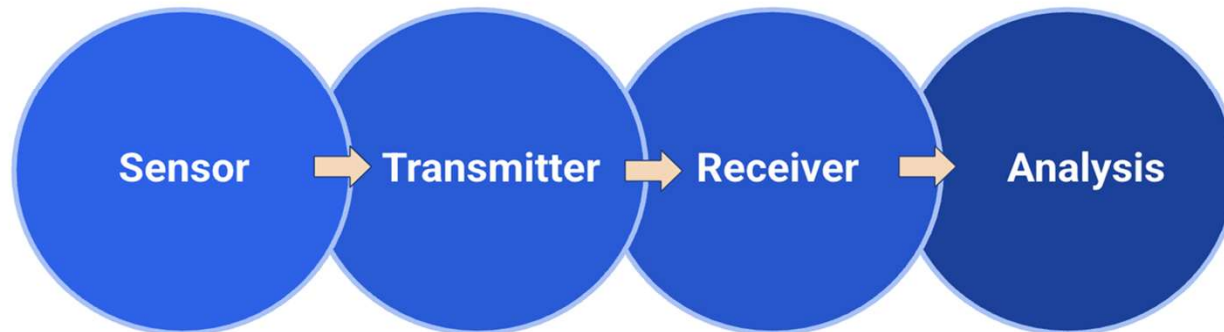
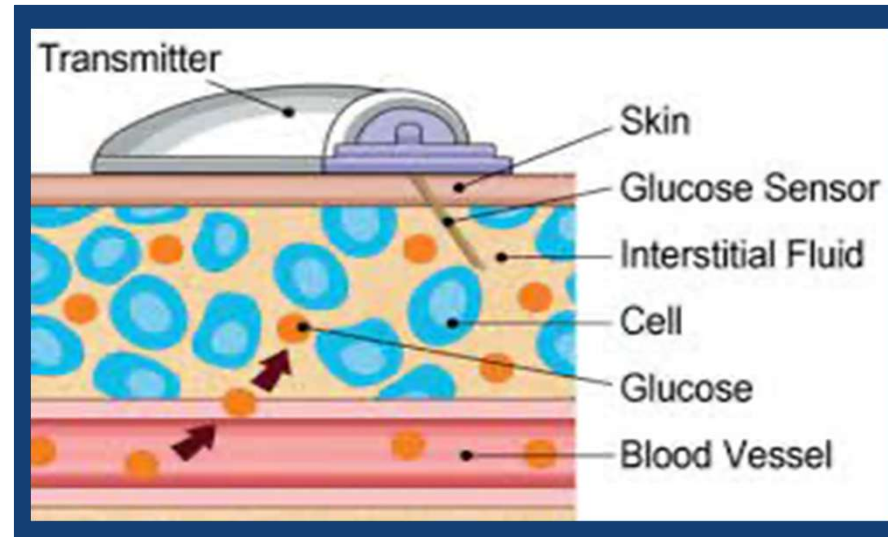


# History of Glucose Monitoring



Abbott [Press Release]. 2017.  
AJMC Staff. AJMC [Press Release]. 2015. ; Bender C, et al. Diabetology. 2025.  
Brown A. diaTribeLearn [Internet]. 2021. ; FDA [Press Release]. 2018.

# Introduction to CGMs



# Types of CGMs



BGM

## Blood Glucose Meter

Single, snapshot reading

110 Glucose reading



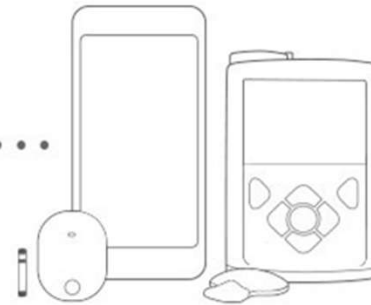
CGM

## Intermittent-Scan CGM (Class III)

User must physically scan sensor to see readings/trends

110 Glucose reading

↓ Trend arrows



RT-CGM CGM

## Real-Time CGM (Class III)

Alerts automatically warn users of impending highs/lows

110 Glucose reading

↓↓ Trend arrows

🔊 Proactive alerts



iCGM RT-CGM CGM

## Integrated CGM (Class II)

Must meet rigorous performance requirements

110 Glucose reading

↓↓ Trend arrows

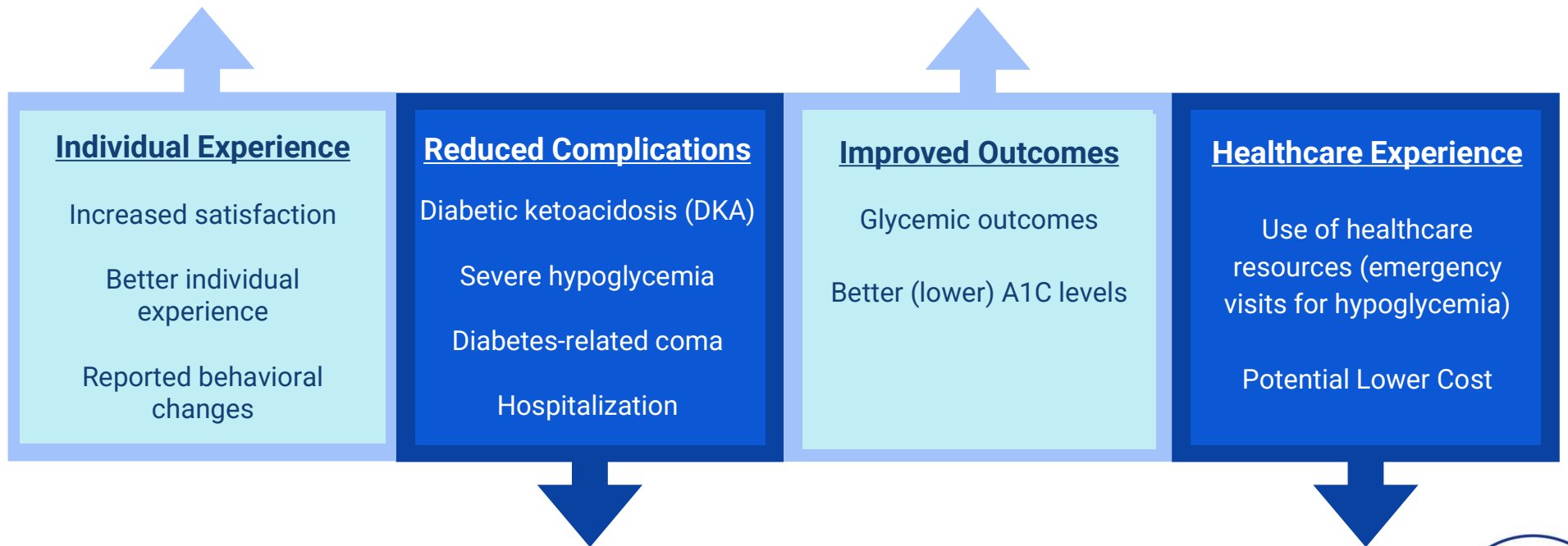
🔊 Proactive alerts

🔄 Interoperability

🏆 Required performance benchmarks



# Why CGMs?



Prahalad P et al. J Clin Endocrinol Metab 2022. ; Tanenbaum ML et al. Diabet Med 2021.  
Aronson R et al. Diabetes Obes Metab 2025. ; Vakharia M et al. Pediatr Qual Saf 2025.  
7. Diabetes Technology: Standards of Care in Diabetes—2026. ;  
Aleppo G et al Diabetes Care 2021. ; Addala A et al Pediatr Diabetes 2020.

# What Does the ADA Say?

7.8

Consider **early initiation** of CGM depending on a person's or caregiver's needs and preferences

7.15

**CGM use is recommended at diabetes onset and thereafter** for anyone with diabetes on **insulin, hypoglycemia-causing non-insulin therapies, or any diabetes treatment where CGM helps in management.**

The specific CGM device and method for use should be made based on the individual's circumstances, preferences, and needs.

7.16

In people **with diabetes on insulin therapy, CGM devices** should be used as close to **daily** as possible **for maximal benefit.**

People with diabetes **should have uninterrupted access to their supplies** to minimize gaps in CGM.

7.17

During **pregnancy** for individuals with **type 1 diabetes, CGM** can help **achieve glycemic and A1C goals** and may be beneficial for other types of diabetes in pregnancy.

7.18

In circumstances **when consistent use of CGM is not feasible**, consider **periodic use of personal or professional CGM** to adjust medication and/or lifestyle.



# Currently Approved Prescription CGM Products



# Prescription (Rx) CGMs

- Dexcom
  - Dexcom G6
  - Dexcom G6 Pro
  - Dexcom G7
  - **Dexcom G7 15 Day**
- Abbott
  - Freestyle Libre 2\*
  - Freestyle Libre 3
  - Freestyle Libre 2 Plus
  - **Freestyle Libre 3 Plus**
- Senseonics Holdings
  - Eversense 365#
- Use with MiniMed 780G System
  - Guardian 4 Sensor (7 day - Medtronic)
  - Simplera Sync (6 day - Medtronic)
  - Instinct Sensor (15 day - Abbott)

\* = *intermittent CGM*

# = *implantable*



# Prescription CGMs: Let's Focus In

G7 15 Day (December 2025)

FreeStyle 3 Plus (September 2024)



# G7 15 Day by Dexcom

## G7 15 Day CGM

- For patients  $\geq 18$  years for managing DMT1, DMT2, or GDM
- Provides trends, summaries, reactions, readings, alerts, etc.
- Log meals, activities, medication, fasting, notes
  - Photo capabilities ; “Smart Food” log
- Connects numerous platforms, apps, devices
- RCT: Patients with DMT1/DMT2 wore CGM ~15 days
  - 4 Clinic visits  $\rightarrow$  glucose analyzer readings paired to CGM data
  - Overall MARD = 8.0%
  - 94.3% of values within 20% of comparator values



Images from:  
<https://www.adces.org>  
<https://www.dexcom.com>



ADCES. danatech Diabetes Technology. 2024.

Dexcom [Internet]. 2026. ; Dexcom. G7 15 Day User Guide. 2025.

# G7 15 Day by Dexcom



## Dexcom G7

Continuous Glucose Monitoring

★★★★☆ 5.8K



## Dexcom Clarity

Medical

★★★★★ 12K

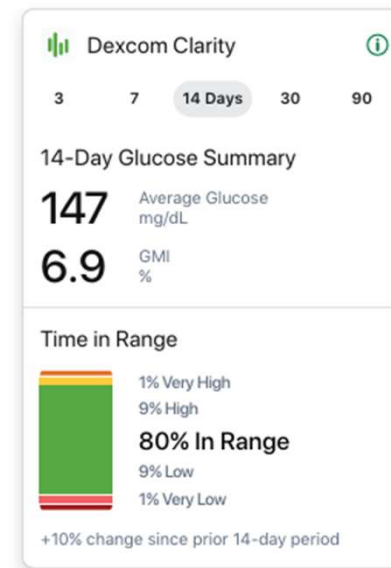
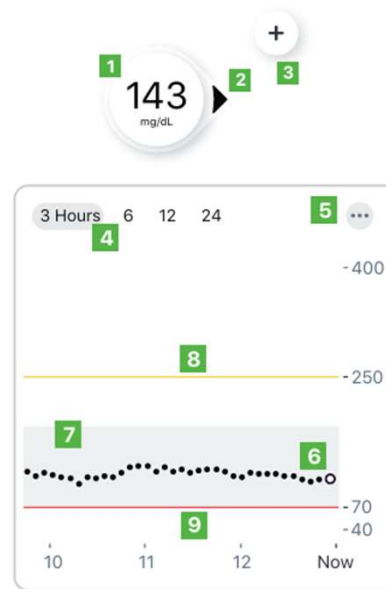


## Dexcom Follow

CGM Remote Monitoring

★★★★☆ 615

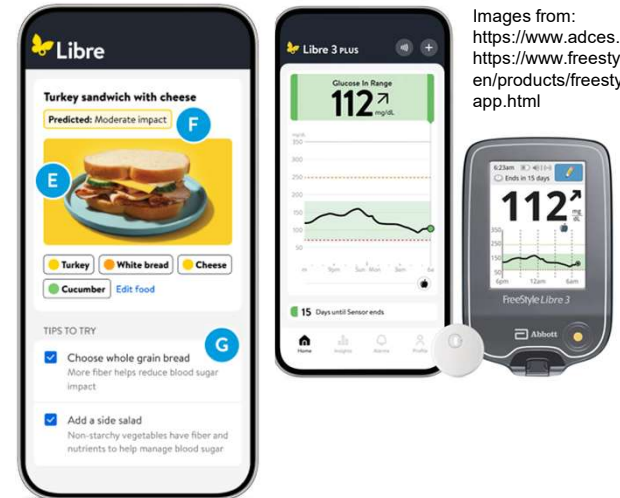
- Compatibility:
  - iOS (iOS 18.6.0 – 26.2)
  - Android (OS 13 – 16)



# Libre Freestyle 3 Plus by Abbott

## Libre Freestyle 3 Plus

- For patients  $\geq 2$  years for managing diabetes
- Log meals, activities, medication, notes
  - Photo capabilities with “Libre Assist”
- Provides trends, readings, history, alerts
- NO direct connection to Apple Health® or Google Health Connect™
- RCT: 332 patients  $\geq 2$  yrs with DMT1 or DMT2 and Freestyle 2+
  - Up to 3 Clinic visits → venous BG readings paired to CGM readings
  - Adult MARD = 8.2%
  - Pediatric 6-17 years MARD = 8.1%
  - Pediatric 2-5 years MARD 11.2%
  - 94.2%, 94.0%, 86.6% of values within 20% of comparator values



Images from:  
<https://www.adces.org>  
<https://www.freestyle.abbott/us-en/products/freestyle-libre-app.html>



# Libre Freestyle 3 Plus by Abbott



## Libre by Abbott

Continuous Glucose Monitoring

★★★★★ 80K



## LibreLinkUp

Medical

★★★★★ 21K



- Compatibility:
  - iOS (iOS 16 – 18.6)
  - Android (OS 11 – 16)
  - watchOS (10+)
- LibreLinkUp → connect with others
- LibreView → connect with HCP



# Rx CGM Comparison

	G7 15 Day	Freestyle Libre 3 Plus
<b>Manufacturer</b>	Dexcom	Abbott
<b>FDA Indication</b>	≥ 18 years	≥ 2 years
<b>Lifespan</b>	15 days + 12 hour grace period	15 days
<b>Warmup Time</b>	60 minutes	60 minutes
<b>Glucose Range</b>	40 - 400 mg/dL	40 - 400 mg/dL
<b>Reporting</b>	Sends readings every 5 min	Seconds readings every 1 min
<b>Application Site</b>	Back of upper arm	Back of upper arm
<b>Customizable Alerts</b>	Yes	Yes

ADCES. danatech Diabetes Technology [Internet]. 2024.

Dexcom. G7 15 Day User Guide. 2025.

Freestyle Libre 3. App User's Manual. 2025.

# Rx CGM Comparison

	<b>G7 15 Day</b>	<b>Freestyle Libre 3 Plus</b>
<b>App</b>	“Dexcom G7”; “Dexcom Clarity”; “Dexcom Follow”	“Libre by Abbott”; “LibreLinkUp”
<b>Receiver</b>	Available; not required*	Available; not required
<b>Pump Compatible</b>	Yes	Yes
<b>Water</b>	Waterproof; Max 8 ft	Resistant; Max 3 ft x 30 mins
<b>Insurance Coverage</b>	Yes	Yes
<b>HSA/FSA Eligibility</b>	Yes	Possibly
<b>Affordability</b>	15 day free trial ; Coupons ; Patient Assistance Programs	15 day free trial ; Copay Card ; Veterans Program

# Currently Approved OTC CGM Products



# OTC CGMs: Let's Focus In

Stelo by Dexcom (March 2024)

Lingo by Libre (June 2024)

Libre Rio by Libre (June 2024)\*



# Stelo by Dexcom CGM

## Stelo

- For patients  $\geq 18$  years, not on insulin
- Can be used by individuals with prediabetes or DMT2
- Not for diabetes diagnosing
- Provides trends ; “Insights”; weekly spike report
- Patient education provided in “Learn Tab”
- Connects to Apple Health®, Google Health Connect™
- RCT: Patients with DMT1/DMT2 wore CGM ~15 days
  - 4 Clinic visits → readings taken by glucose analyzer and paired to CGM data
  - Overall MARD (mean absolute relative difference)= 8.3%
  - 93.1% of iCGM values were within 20% of comparator values



Images from:  
<https://www.stelo.com/buy>



# Stelo by Dexcom CGM

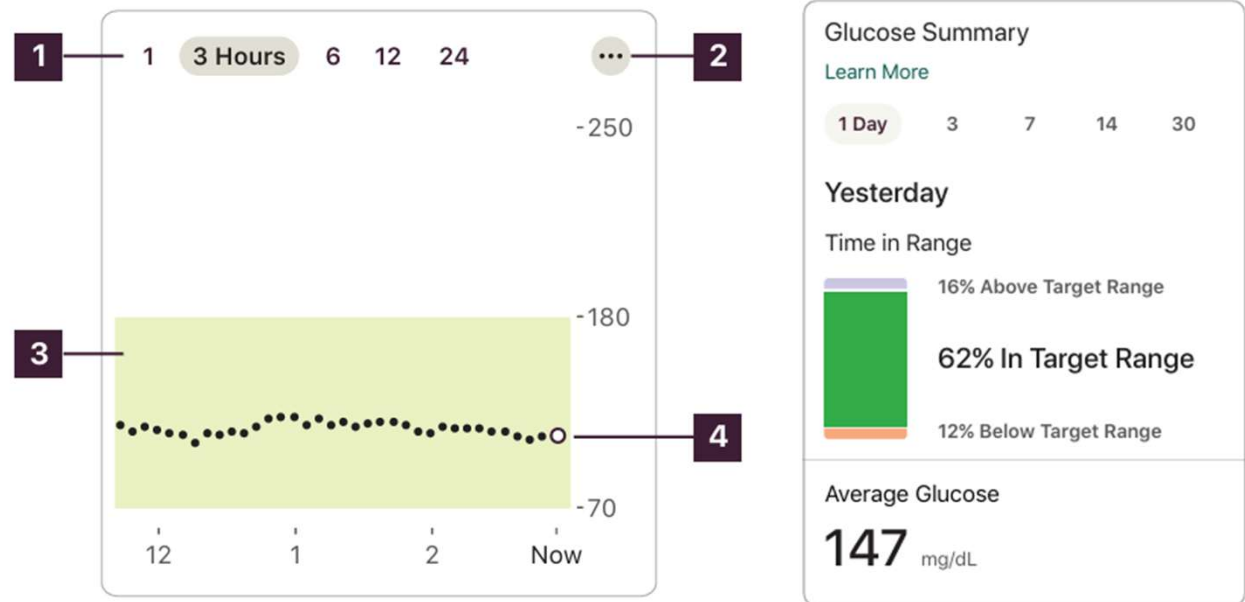


## Stelo by Dexcom

Health & Fitness

★★★★☆ 1.3K

- Compatibility:
  - iOS (iOS 18.6 – 26.0.1)
  - Android (OS 13 – 16)
- Stelo platform based on Dexcom G7 CGM technology



Images from: iPhone App Store; Dexcom. Stelo User Guide. 2025.



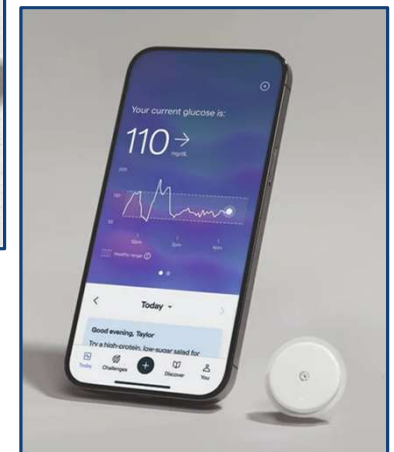
# Lingo by Libre CGM

## Lingo by Libre

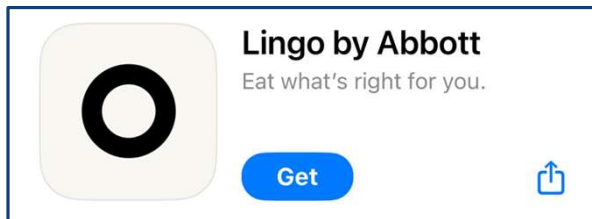
- For patients  $\geq 18$  years, not on insulin
- Not for diabetes (or other) diagnosing
- Daily, weekly, monthly snapshots
- Coaching program
- Connects to Apple Health<sup>®</sup> , Google Health Connect<sup>™</sup>
- RCT: compared participants +/- a CGM
  - CGM group had better cholesterol, FBG, A1C, weight, body fat, BMI



Images from:  
<https://www.hellolingo.com/products>



# Lingo by Libre CGM



- Compatibility:
  - iOS (iOS 15.2 – 18.7)
  - Android (OS 12 – 16)
- Platform is based on FreeStyle Libre technology



# Libre Rio by Libre CGM

## Libre Rio

- For patients:
  - $\geq 18$  years
  - With DMT2
  - Not on insulin
- Geared towards patients who use lifestyle modifications (diet/exercise) for diabetes management
- Platform is based on FreeStyle Libre technology
- Release date and cost unknown
- Lifespan of 14 days and expected to integrate to management app
- Glucose range is 40 - 400 mg/dL



# OTC CGMs Comparison

	Stelo	Lingo
<b>Manufacturer</b>	Dexcom	Abbott
<b>FDA Indication</b>	≥ 18 years; not on insulin	≥ 18 years; not on insulin
<b>Lifespan</b>	15 days	14 days
<b>Warmup Time</b>	30 minutes	60 minutes
<b>Displayed Range</b>	70 to 250 mg/dL*	55 to 200 mg/dL
<b>Reporting</b>	Measured every 5 min; Sent every 15 min	Bluetooth continuous streaming
<b>Application Site</b>	Back of upper arm	Back of upper arm
<b>Customizable Alerts</b>	No	No

Abbott. Lingo [Internet]. 2025.  
Abbott. Lingo User Guide. 2025.

FDA. 510(k) Lingo Decision Summary. 2024.  
FDA. 510(k) Stelo Decision Summary. 2024.

ADCES. danatech Diabetes Technology [Internet]. 2024.  
Dexcom. Stelo User Guide. 2025.

# OTC CGMs Comparison

	Stelo	Lingo
<b>App</b>	“Stelo by Dexcom”	“Lingo by Abbott”
<b>Pump Compatible</b>	No	No
<b>Water</b>	Waterproof; Max 8 ft x 24 hrs	Resistant; Max 3 ft x 30 mins
<b>Insurance Coverage</b>	No	No
<b>HSA/FSA Eligibility</b>	Yes	Yes
<b>Cost</b>	\$55 / 2 week + 1 sensor \$99 / 4 week + 2 sensors* \$252 / 12 week + 6 sensors	\$49 / 2 week + 1 sensor \$89 / 4 week + 2 sensors \$249 / 12 week + 6 sensors

Abbott. Lingo [Internet]. 2025.  
Abbott. Lingo User Guide. 2025.

FDA. 510(k) Lingo Decision Summary. 2024.  
FDA. 510(k) Stelo Decision Summary. 2024.

ADCES. danatech Diabetes Technology [Internet]. 2024.  
Dexcom. Stelo User Guide. 2025.

## For More Information

- There are great free resources available online for clinicians to utilize to compare, contrast, and learn about currently available CGM and sensor products.
- American Association of Clinical Endocrinology (AACE)
  - <https://pro.aace.com/cgm/toolkit/cgm-device-comparison>
- Danatech, powered by the Association of Diabetes Care & Education Specialists (ADCES)
  - [https://www.adces.org/education/danatech/glucose-monitoring/continuous-glucose-monitors-\(cgm\)/view-compare-cgms](https://www.adces.org/education/danatech/glucose-monitoring/continuous-glucose-monitors-(cgm)/view-compare-cgms)



# CGM Safety Concerns and Considerations



# Safety Concerns with CGMs: Let's Focus In

**Data Accuracy and Interpretation**

**Mental Health Concerns**

**Inappropriate Self Management**



# The Data: When the Data is “Wrong”



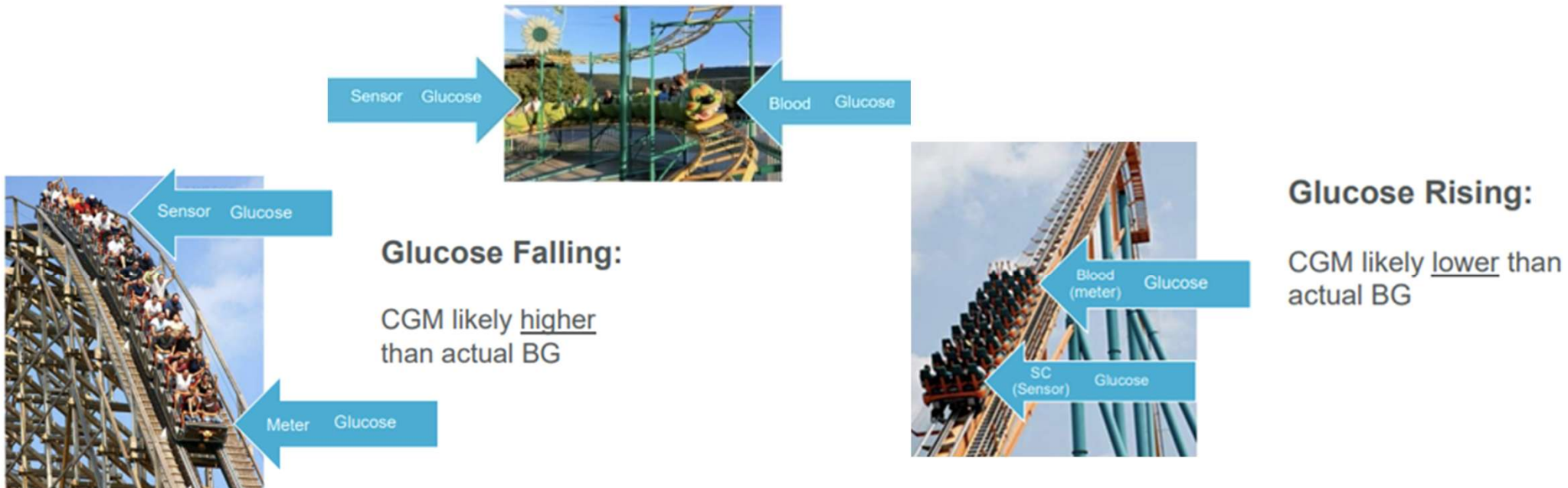
# The Data: When the Data is “Wrong”



## Differences between interstitial glucose and blood glucose: **Lag Time**

**Glucose Stable:**

CGM in equilibrium with BG



# The Data: When the Data is “Wrong”



## Interfering substances

Medication	Dose	Systems Affected	Effect
Acetaminophen	> 4 g/day	Dexcom G6, Dexcom G7, Stelo	Higher sensor readings than actual glucose
	Any dose	Medtronic Guardian 4	
Ascorbic Acid (Vit C)	> 500 mg/day	Freestyle Libre 2, Freestyle Libre 3	
	> 1000 mg/day	Freestyle Libre 2 plus, Freestyle Libre 3 plus, Lingo	
Hydroxyurea	Any dose	Dexcom G6, Dexcom G7, Medtronic Guardian 4, Stelo	
Mannitol (IV or as peritoneal dialysis solution)	Any dose	Senseonics Eversense 365	
Sorbitol (IV or as peritoneal dialysis solution)	Any dose	Senseonics Eversense 365	

# The Data: When the Data is “Wrong”



## Compression Lows:

**Pressure  
on the  
sensor**



**Reduced volume  
of interstitial  
fluid from which  
glucose is  
measured**



**Can translate to less  
glucose and incorrect  
low readings**

# The Data: When the Data is “Wrong”



## Technology Malfunction



### Glucose Monitor Sensor Recall: Abbott Diabetes Care Removes Certain FreeStyle Libre 3 and FreeStyle Libre 3 Plus Sensors

*This **recall** involves removing certain devices from where they are used or sold. The FDA has identified this recall as the most serious type. This device may cause serious injury or death if you continue to use it. The affected products have not changed, but the “Full list of affected lots” has been modified for clarity. The recommendations for what to do with the devices below have not changed. The reason for recall has been clarified and updated with current information.*

#### Affected Product

---

**Content current**

**as of:**

02/05/2026

**Regulated**

**Product(s)**

Medical Devices

# The Data: When the Data isn't Interpreted Correctly








<https://www.questionpro.com/blog/data-interpretation/>



# The Data: When the Data is Interpreted Incorrectly



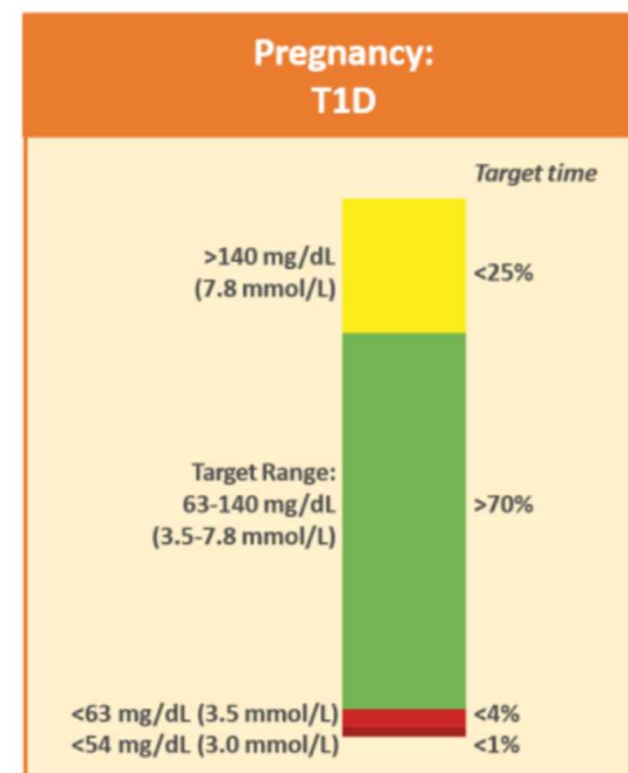
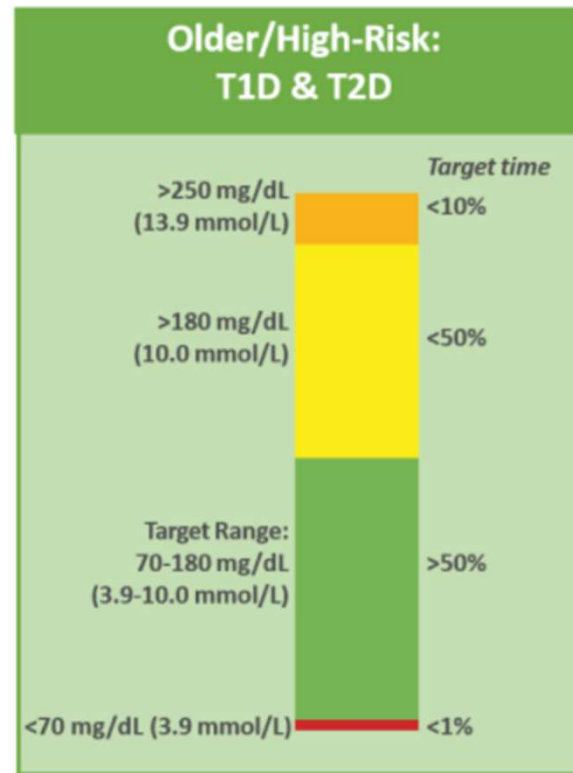
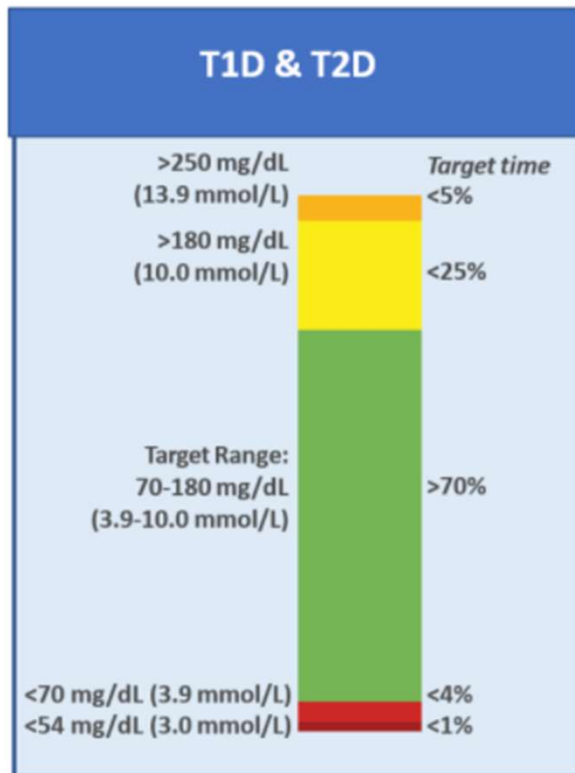
## Understanding CGM metrics: Trend Arrows

Arrow	Interpretation
	<b>Glucose is rising quickly</b> (more than 2 mg/dL per min) * changing more than 3 mg/dL each min
	<b>Glucose is rising</b> (between 1 and 2 mg/dL per min)
	<b>Glucose is changing slowly</b> (less than 1 mg/dL per min)
	<b>Glucose is falling</b> (between 1 and 2 mg/dL per min)
	<b>Glucose is falling quickly</b> (more than 2 mg/dL per min) * changing more than 3 mg/dL each min

# The Data: When the Data is Interpreted Incorrectly



## Understanding CGM metrics: Time in Range and Goals

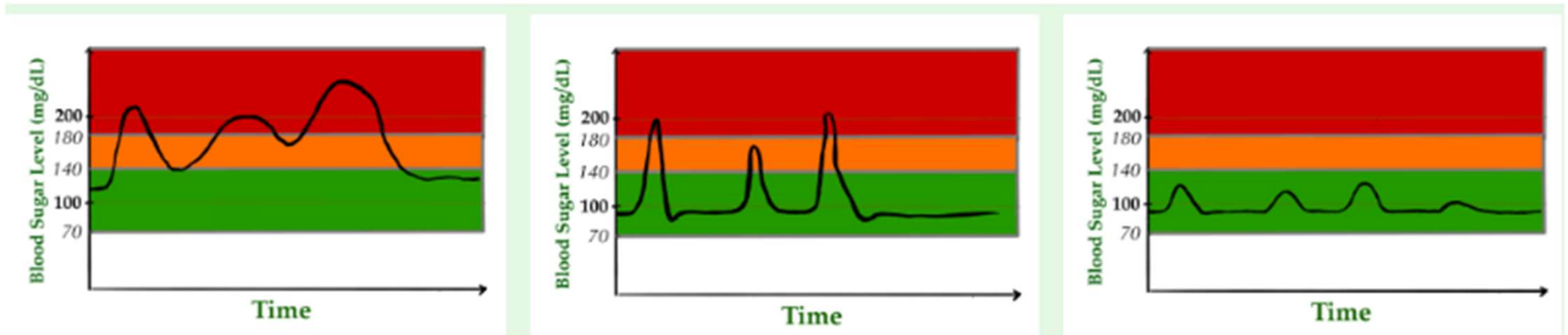


<https://www.managedcarecgm.com/clinical-targets-for-continuous-glucose-monitoring-data-interpretation-recommendations-from-the-international-consensus-on-time-in-range/>

# The Data: When the Data is Interpreted Incorrectly



## Postprandial spikes and “normal” variability



# The Mental Health Concern



[https://drtrust.in/ta/blogs/life-health-drtrust/how-diabetes-impacts-mental-health-relationships-strategies-for-risk-reduction-and-minimizing-silent-struggles?srsId=AfmBOorO3UC-9pZGcMf-AOtC3cYtLUG\\_hT53tt30NkiSWJDzs3U1VZ3q](https://drtrust.in/ta/blogs/life-health-drtrust/how-diabetes-impacts-mental-health-relationships-strategies-for-risk-reduction-and-minimizing-silent-struggles?srsId=AfmBOorO3UC-9pZGcMf-AOtC3cYtLUG_hT53tt30NkiSWJDzs3U1VZ3q)



# The Mental Health Concern: Diabetes Distress

## Ask About Diabetes Distress at Each Visit



- “What is the most difficult part of living with diabetes for you?”
- “What are your greatest concerns about your diabetes?”
- “How is your diabetes affecting other things in your life right now?”

## Assess Diabetes Distress with Validated Questionnaires



- PAID (Problem Areas in Diabetes) questionnaire
- DDS-17 (Diabetes Distress Scale)



# The Mental Health Concern: CGM Distress and Disordered Eating



## Participants

### Patients:

- 56 total pts
- No DM (46.4%)
- Prediabetes (3.6%)
- Type 2 DM (50%)
- Mean Age: 39.7

## Outcomes

Statement	Results
<i>"Seeing high glucose levels made me feel afraid about the risk of type 2 DM"</i>	68% of participants agreed or strongly agreed with statement  Correlated with a higher score on EDE-QS score ( <i>disordered eating scale</i> )
<i>"Using CGM makes me think about my blood sugar too much"</i>	62% of participants agreed or strongly agreed with statement
<i>"Using a CGM made me feel like I have more control over my blood sugar"</i>	Those with depression more strongly disagreed with the statement.

## Key Point

CGM has healthy lifestyle benefits but it also may contribute to distress particularly among younger and those with obesity, high agreeableness and eatings disorder symptoms.

# The Mental Health Concern: Alarm Fatigue

## What is alarm fatigue?

- Repeated or non-actionable alerts leading to desensitization or alarm disabling

## Why does it matter for safety?

- Missed hypoglycemia or hyperglycemia alerts
- Delayed response to clinically significant glucose events

## What are common contributors?

- Overly tight alert thresholds
- Inappropriate action to alarms



# Inappropriate Self Management



<https://www.iowadiabetes.com/2022/01/03/diabetes-self-management-education-and-support-dsmes/>



# Inappropriate Self-Management Behaviors

Unsupervised or unnecessary dietary or lifestyle changes based solely on CGM data

Self-adjustment of prescription or OTC medications without guidance

False reassurance or delayed medical evaluation due to perceived “normal” readings

Use of OTC CGM in populations for which it was not intended (e.g., insulin users)

Over reliance on technology



# Pharmacist Role in Risk Mitigation

- Educate on alarms and help prevent alarm fatigue
- Set expectations and clarify device limitations
- Identify red flags requiring further evaluation
- Educate on when CGM data should *not* solely guide self-management decisions
- Monitor for mental health concerns related to CGM use



# Patient Scenario



# ML (55 yo WF) Presents to her Community Pharmacy

## Setting the Scene:

- ML is picking up refills of her metformin and insulin prescriptions
- You ask if she has been having any issues or concerns regarding these medications, her CGM, or diabetes
- She reveals the below symptoms and related history

## Symptoms/History:

- She wears her Libre Freestyle 3 Plus and reports frequent hypoglycemia overnight and mid-afternoon
- She is very nervous about her CGM monitor and it working correctly
- Reports over the last month she has noticed some irritation on her skin on day 1 of wearing her sensor
- She knows her A1C readings are also above goal and she doesn't know how to better manage her diabetes

## Past Medical History:

- T2DM x 12 years
- HTN x 10 years
- HLD x 10 years
- Depression x 20 years

## Medications:

- *metformin* 1000 mg BID
- *insulin glargine* 24 units daily
- *insulin lispro* 6-10 units with meals
- *lisinopril* 20 mg daily
- *atorvastatin* 20 mg daily
- *sertraline* 50 mg daily
- **Libre 3 Plus** as directed

## Labs Provided by ML:

- A1C is 8.6%



## **ML (55 yo WF) Presents to her Community Pharmacy**

**What questions do you want to ask ML?**

**What are Patient Safety Issues  
You Can Identified Relating to  
her CGM use?**

**What are Recommendations,  
Education, or Counseling to  
Provide ML?**

## **ML (55 yo WF) Presents to her Community Pharmacy**

**What would change if ML was using an OTC CGM?**

**What are Patient Safety Issues  
You Can Identified Relating to  
her OTC CGM use?**

**What are Recommendations,  
Education, or Counseling to  
Provide ML?**

# Integrating Services



# Practice Workflow Considerations

- **CGM Candidate Identification**

- Incorporate patient screenings into care visits to identify optimal patients for CGM use
- Consider when and how often will you evaluate this for each patient

- **Device Selection**

- Match individual patients with the optimal device based on known features, differences, availability, and access
  - Indication for use?
  - Rx vs. OTC?
  - Does patient have insurance?
  - Individual preferences (size, water resistance, days of wear, app platform, etc...)



# Practice Workflow Considerations

- **Ensure Access**
  - Can the pharmacist or provider access the app / platforms?
    - Ensure this at time of set up with patient
  - Can the patient access the app and have the ability to interpret the data provided to them
- **Patient Education**
  - Identify who is expected or responsible for providing patient education
  - Determine if the patient has received the appropriate level of education
  - Create education “checklists” to ensure that all key topics are covered
    - Ex: How to set up apps, alarms, set expectations about data delay/troubleshooting
  - Potentially train interns/technician on devices as part of your workflow



# Practice Workflow Considerations

- **Follow up and Monitoring**

- Establish cadence for CGM review:
- Initial follow-up (1–2 weeks after start)
- Ongoing (monthly or quarterly)

- **Documentation and Billing**

- Build templates for CGM Patient Data Review
- Document Time spent reviewing CGM reports
- Clinical recommendations
- CGM teaching and interpretation codes (95249, 95251, incident-to billing)



# Practice Workflow Considerations

- Application strategies may vary depending on your clinical practice setting
  - **Community Pharmacy**
    - Ensure that standard procedure at a dispensing of CGM devices includes opportunities to sit down and provide detailed patient education
  - **Ambulatory Care Clinic Setting**
    - Sufficient appointment time dedicated to reviewing the CGM device, smartphone applications or readers, and clinic platforms
  - **Inpatient Setting**
    - Less likely to see “new” CGM starts, but can determine patient knowledge and comfortability at discharge and either provide counseling or set up a follow up appointment with patients PCP



# Conclusions

- Advancement in CGM technology has grown exponentially since the 1970s, and we will continue to see innovation in this area as use of **CGMs becomes the standard of care**.
- CGMs are crucial diabetes technology that have **significantly improved patient management of diabetes** as well as increased understanding of how diet and exercise can impact glucose levels for those without diabetes.
- Although CGMs bring numerous benefits, they are not without potential **patient safety risks** if sufficient education is not provided.
- Healthcare professionals, including **pharmacists** are crucial players in ensuring that patients receive sufficient demonstration, education, monitoring, and follow-up regarding CGM use.



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