

How to Understand and Use Continuous Glucose Monitors (CGMs)



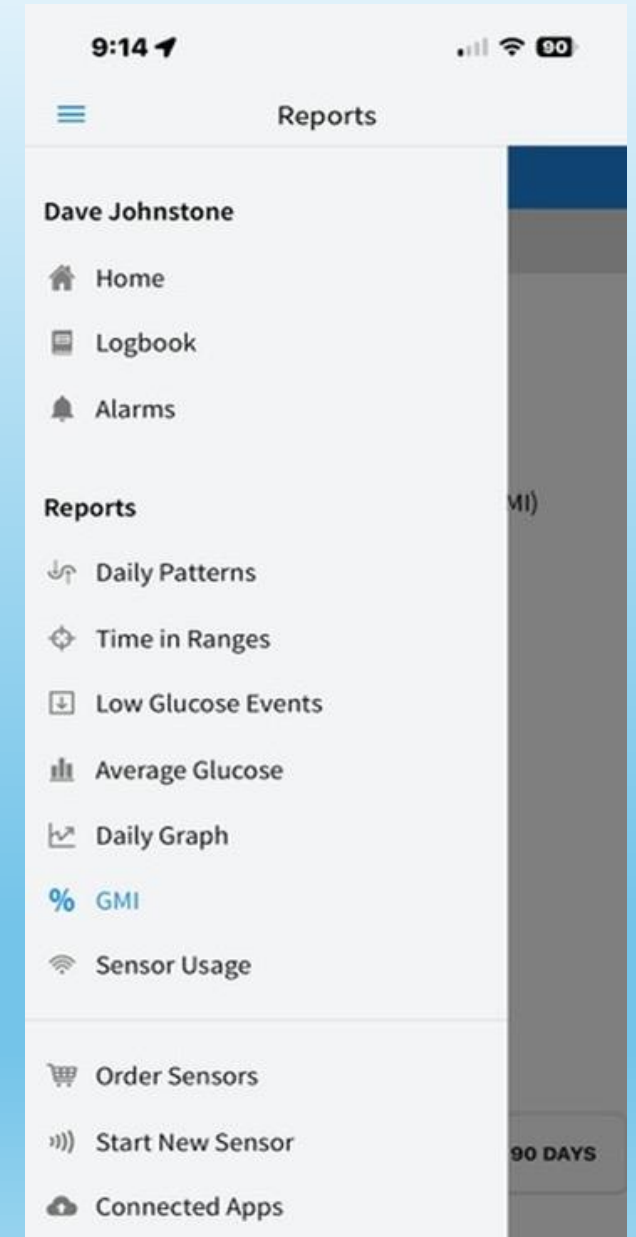
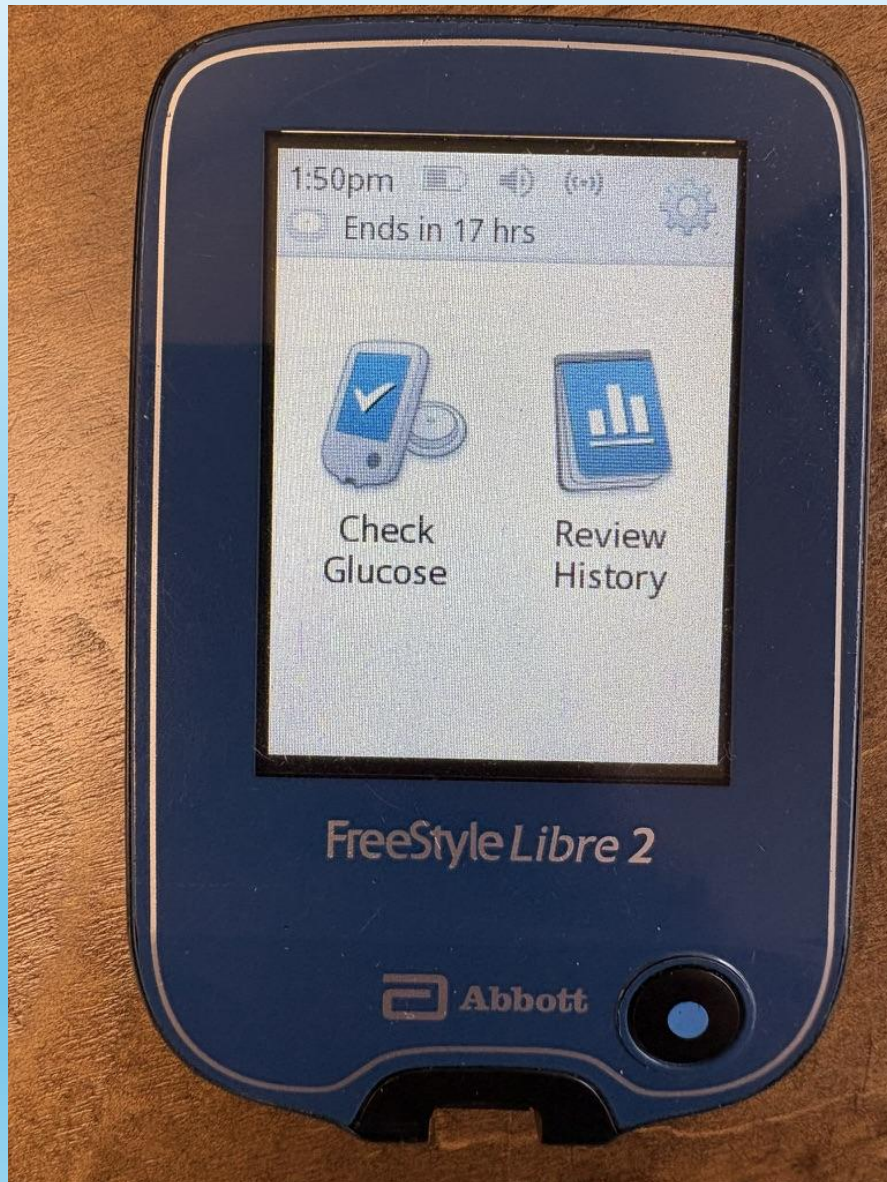
HDMH Grand Rounds
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- I have no conflicts of interest to disclose

What do you do when confronted with this?





Learning Objectives

- Describe how CGMs work and how they compare with other methods of measuring blood sugar control
- Describe how to access the data and how to interpret the information provided by the device
- Use the patterns provided by a CGM and consider what to change before changing the dose of insulin
- Demonstrate how to use a CGM to avoid hypoglycemia
- Describe how to titrate insulin using a CGM when starting patients on GLP1 based therapy.

How do CGMs compare to other measures of blood glucose control?

- HbA1C has limitations in certain contexts
- CGM is a reliable measure of recent glucose trends
- CGM is more useful for identifying hypoglycemia and titrating therapy compared to A1C
- How precise are CGMs? Difference is 8-12% cf. serum glucose (difference for POC glucometer is 5-6%)
- CGMs measure interstitial fluid – therefore time lag, inaccuracies

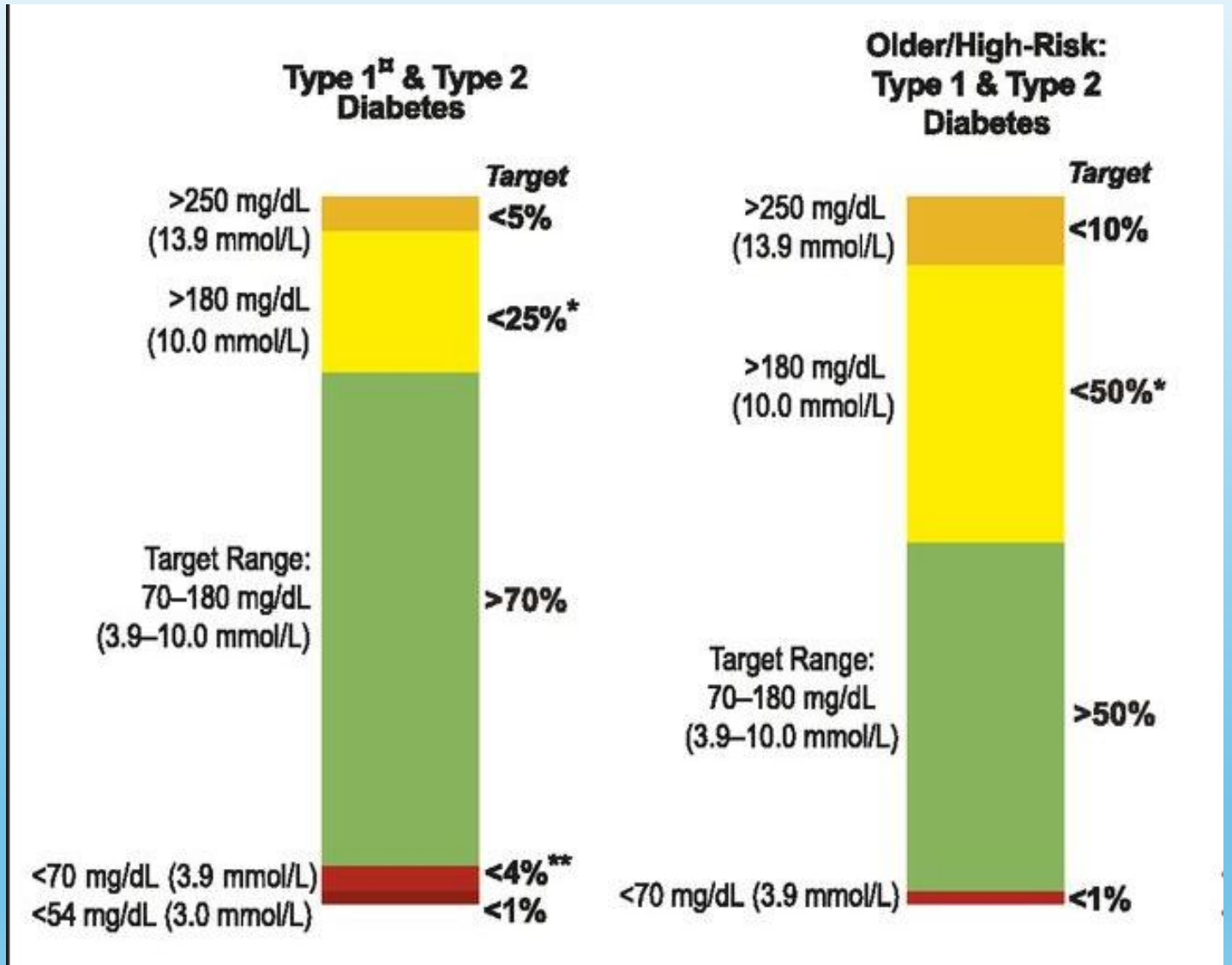
How do you access the data and what does it mean?

- Reader
- Smart phone App
- Website

Ambulatory Glucose Profile

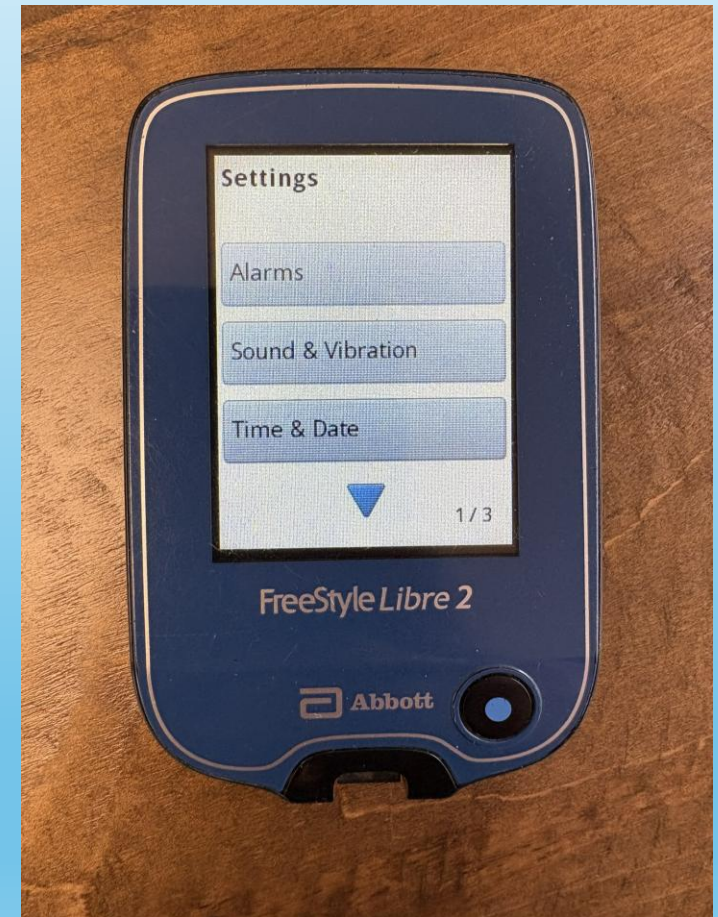
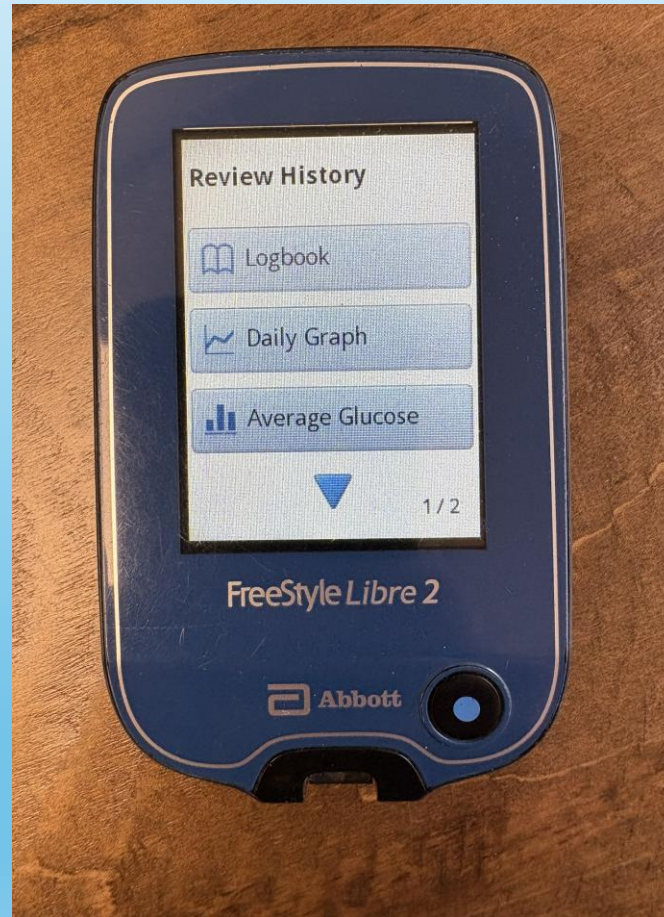
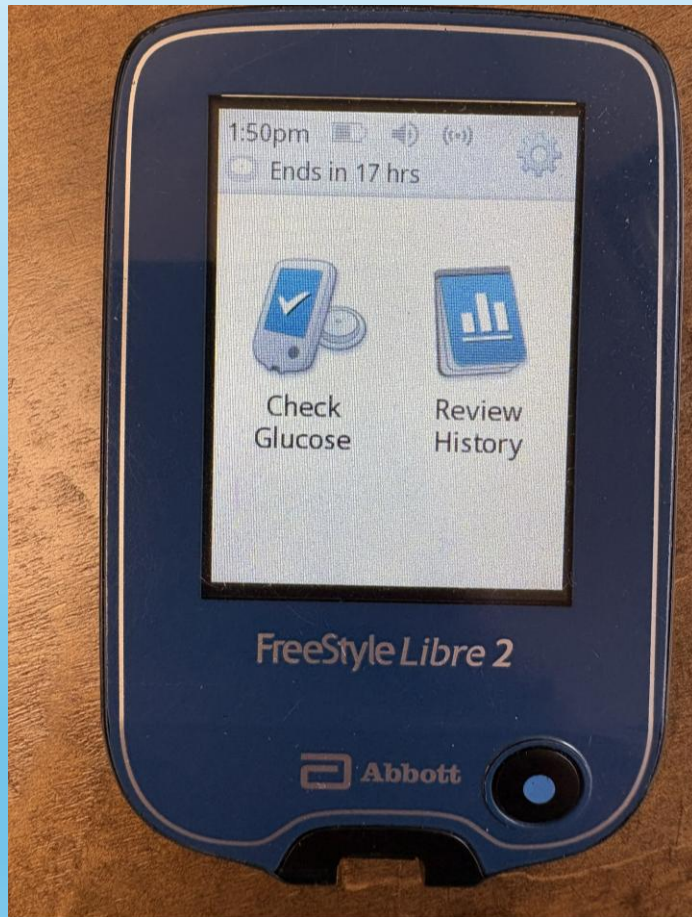
- **Time in Range (TIR)** – time between 3.9 and 10.0
- Responds faster than A1c, not affected by physiologic factors that affect A1C
- Goal is >70%, corresponds to A1C ~7%
- Goal is 50-70% for older adults to avoid hypoglycemia
- Goal below range should be <4%

Time in Range Goals

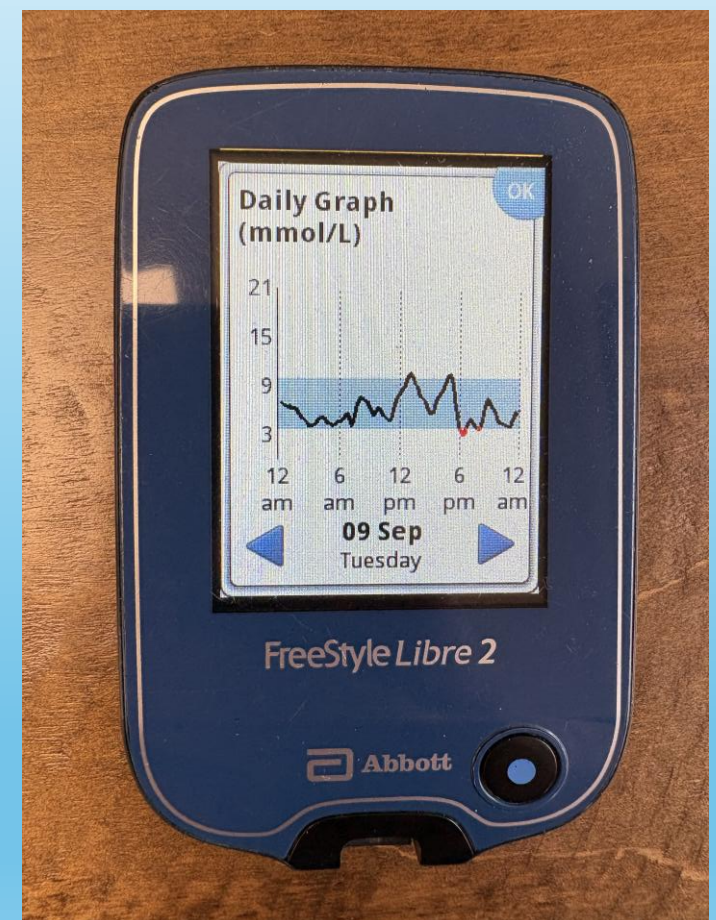
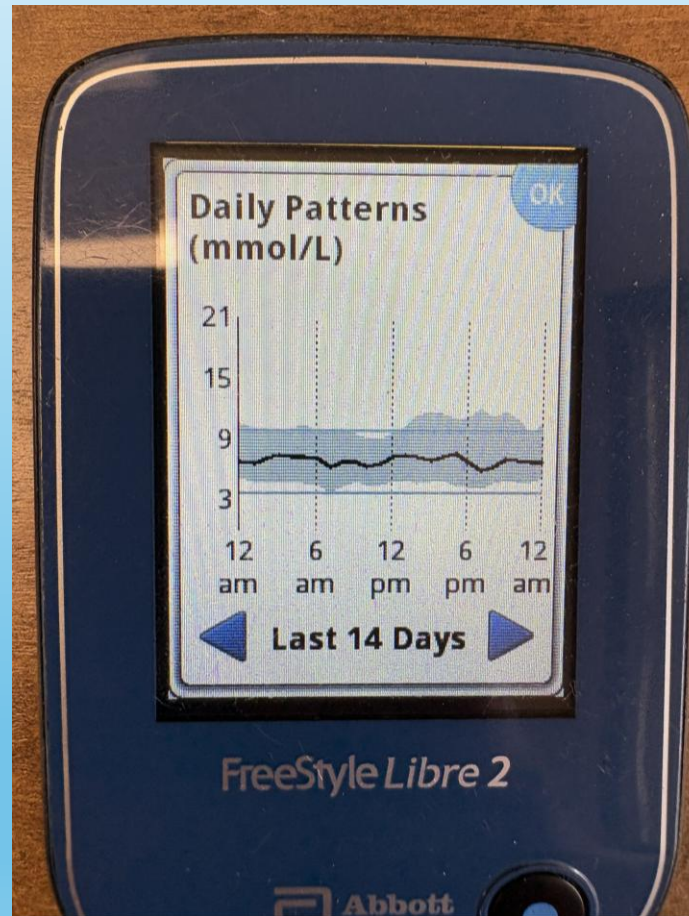
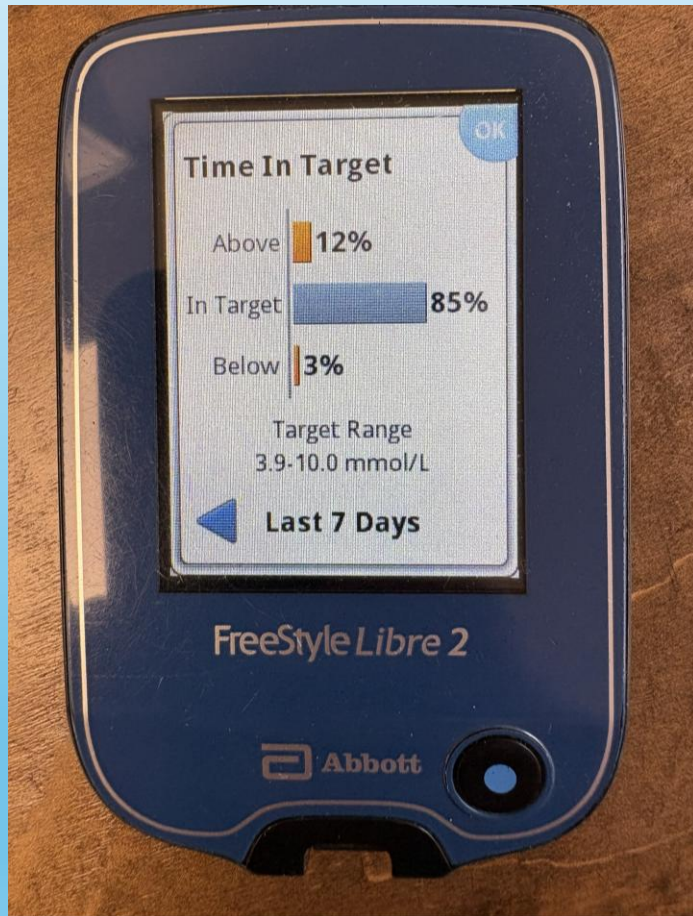


- **Glucose Management Index (GMI)** is est. A1C based on 14 days
- **Ambulatory Glucose Profile/Daily Patterns** – trends onto single 24 hour timeline – helps identify consistent patterns
- **Daily Glucose Profile/Daily Graph** – displays daily glucose profiles – helps identify patterns in a granular way

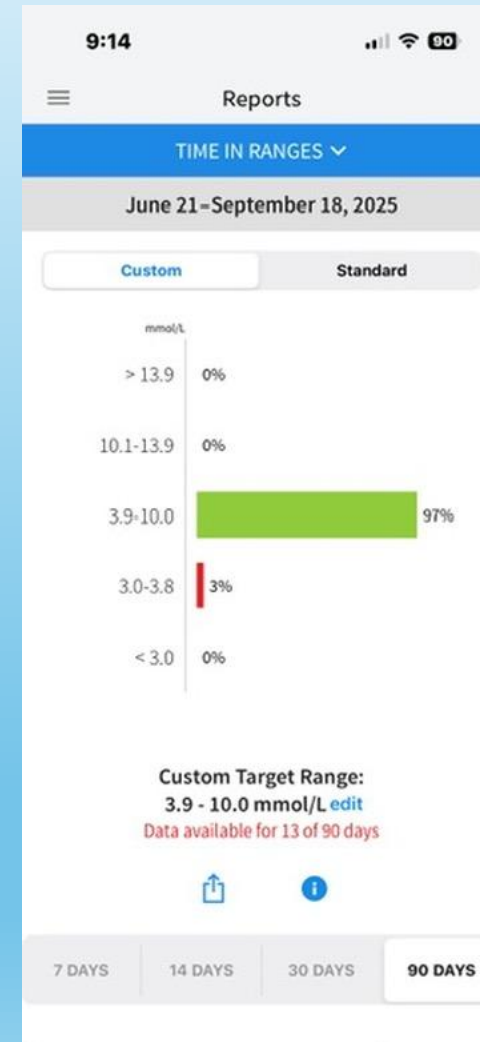
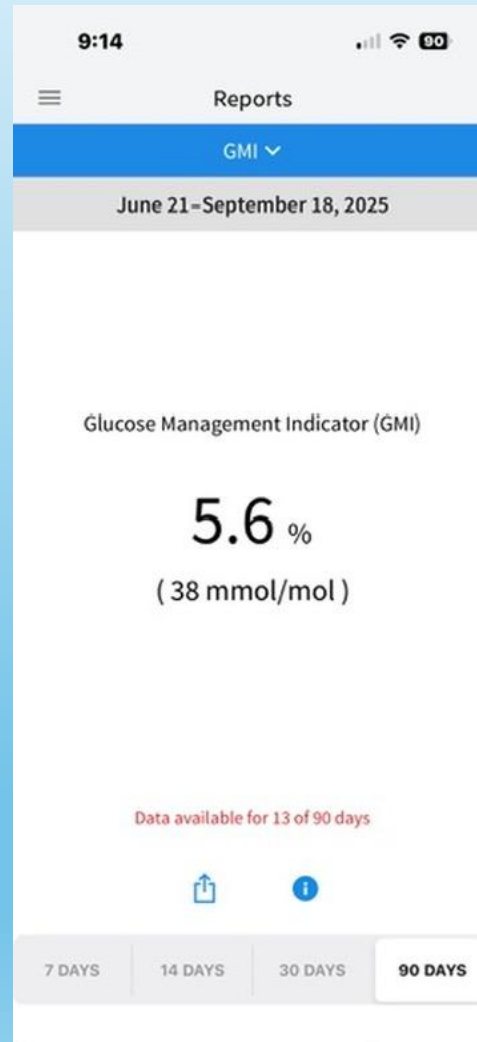
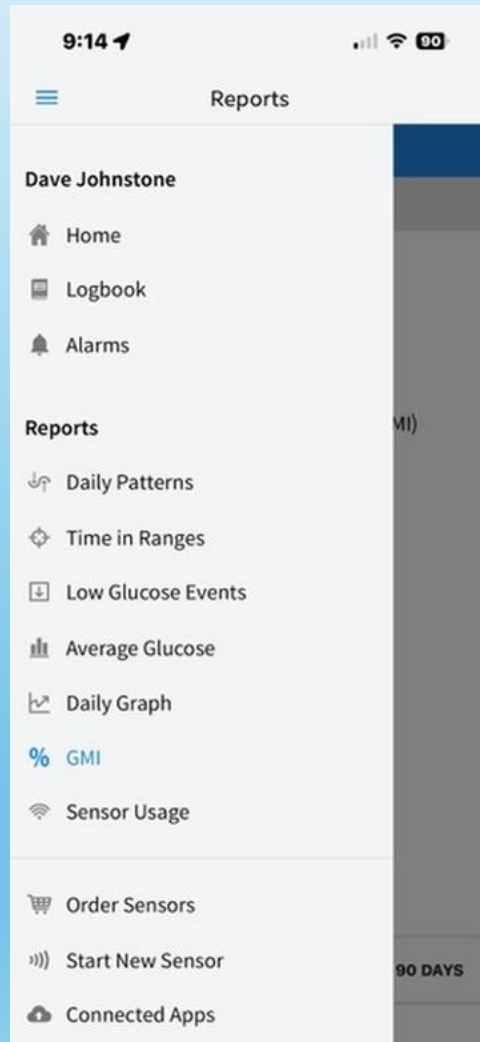
Freestyle Libre 2



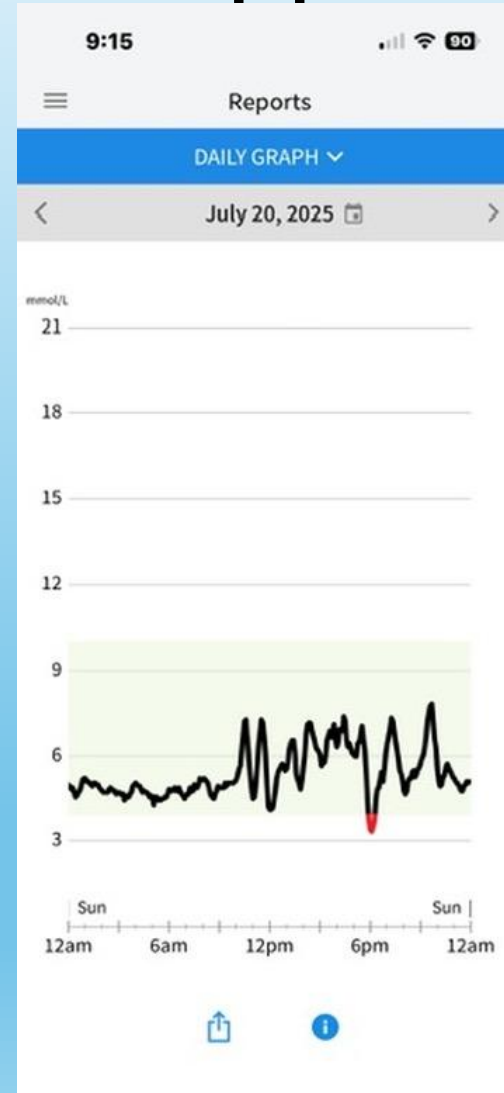
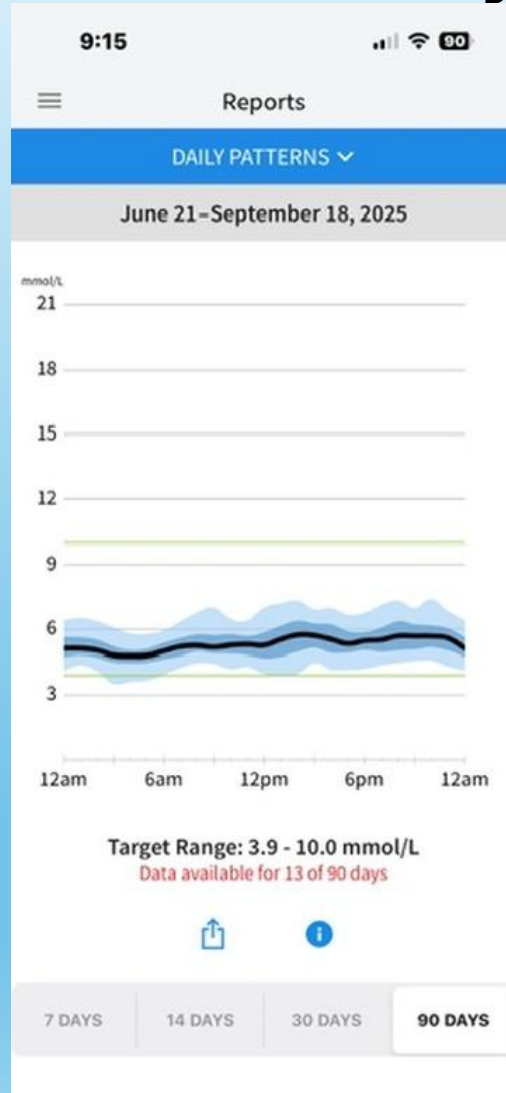
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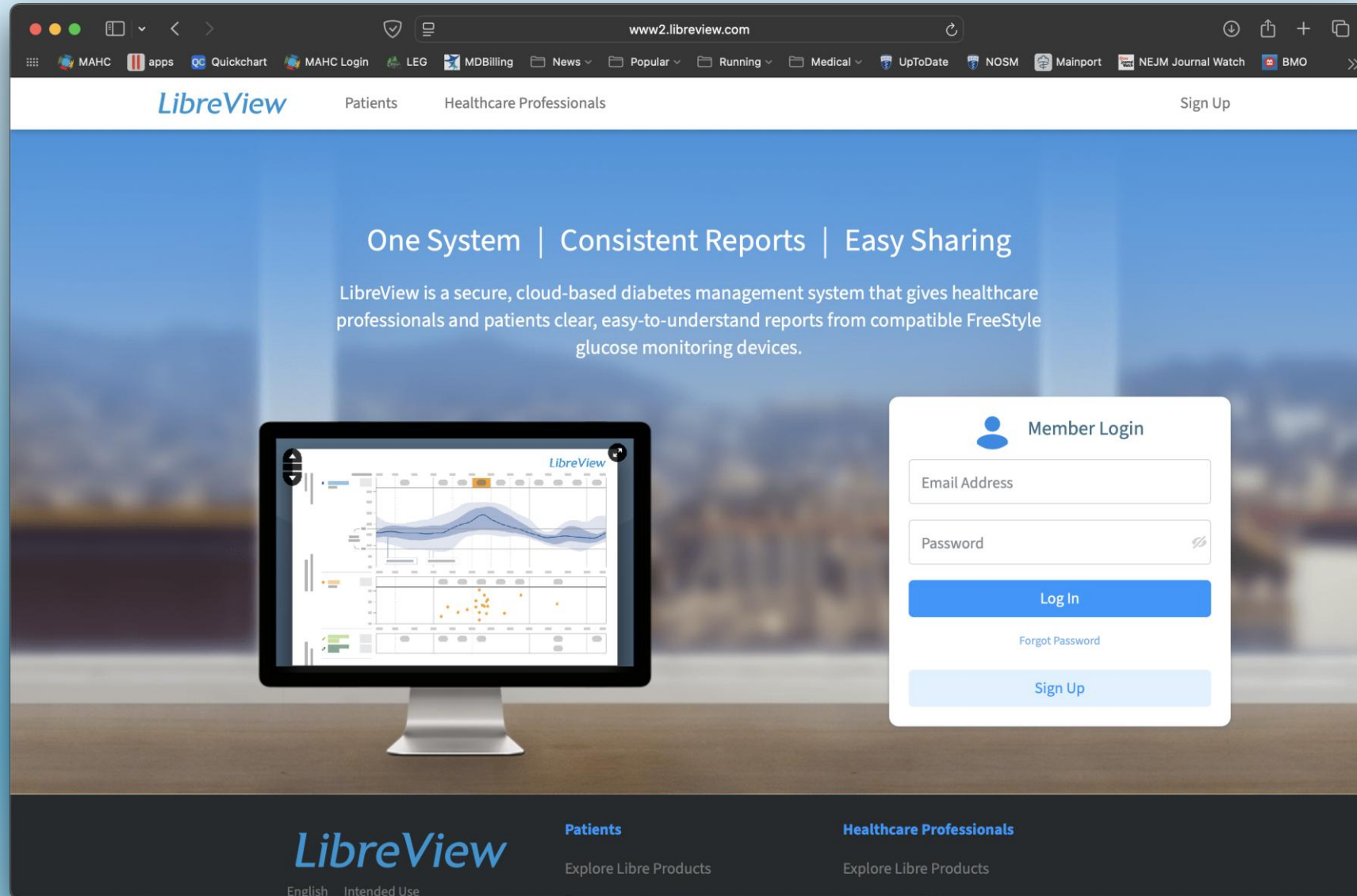
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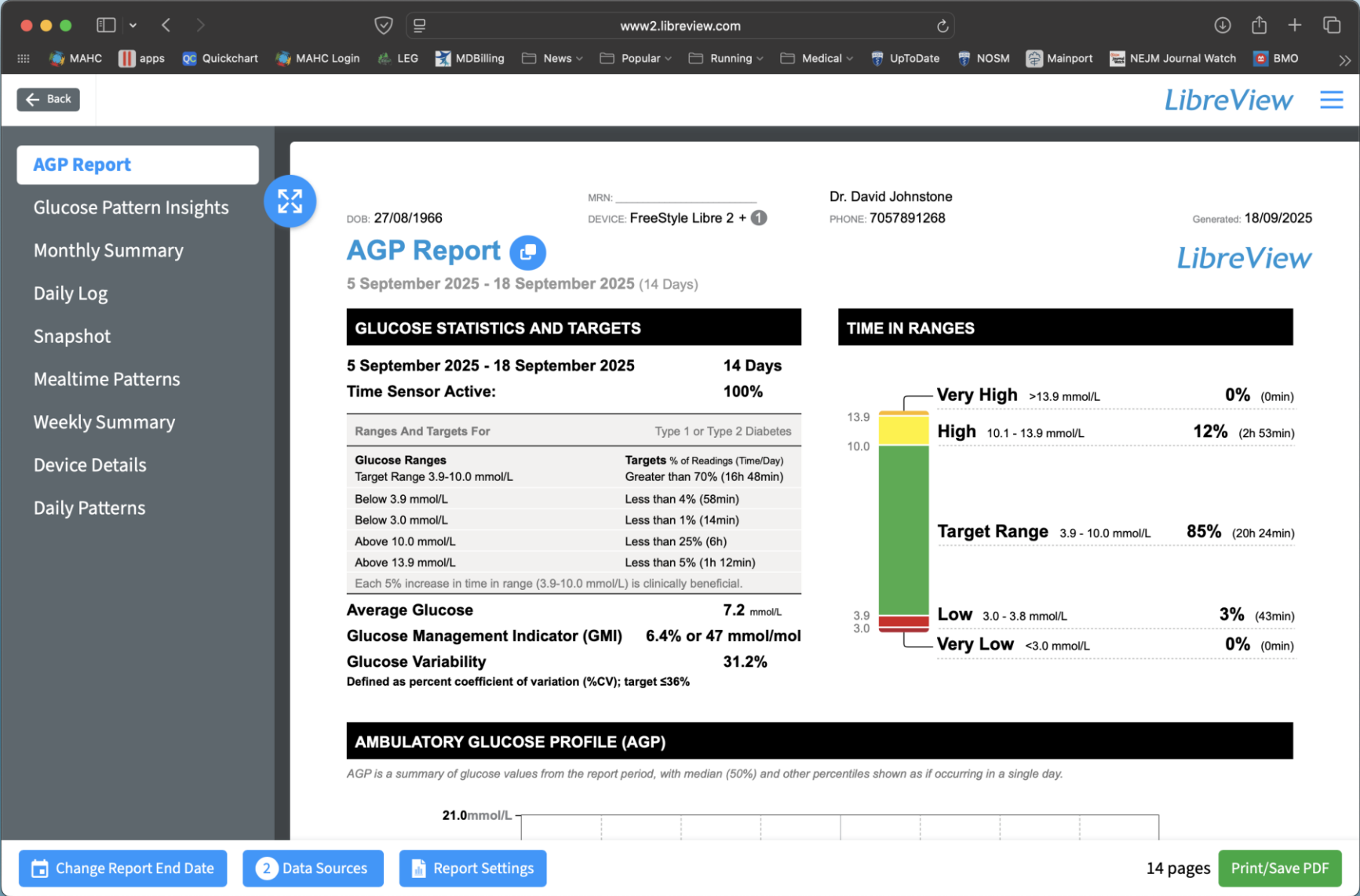
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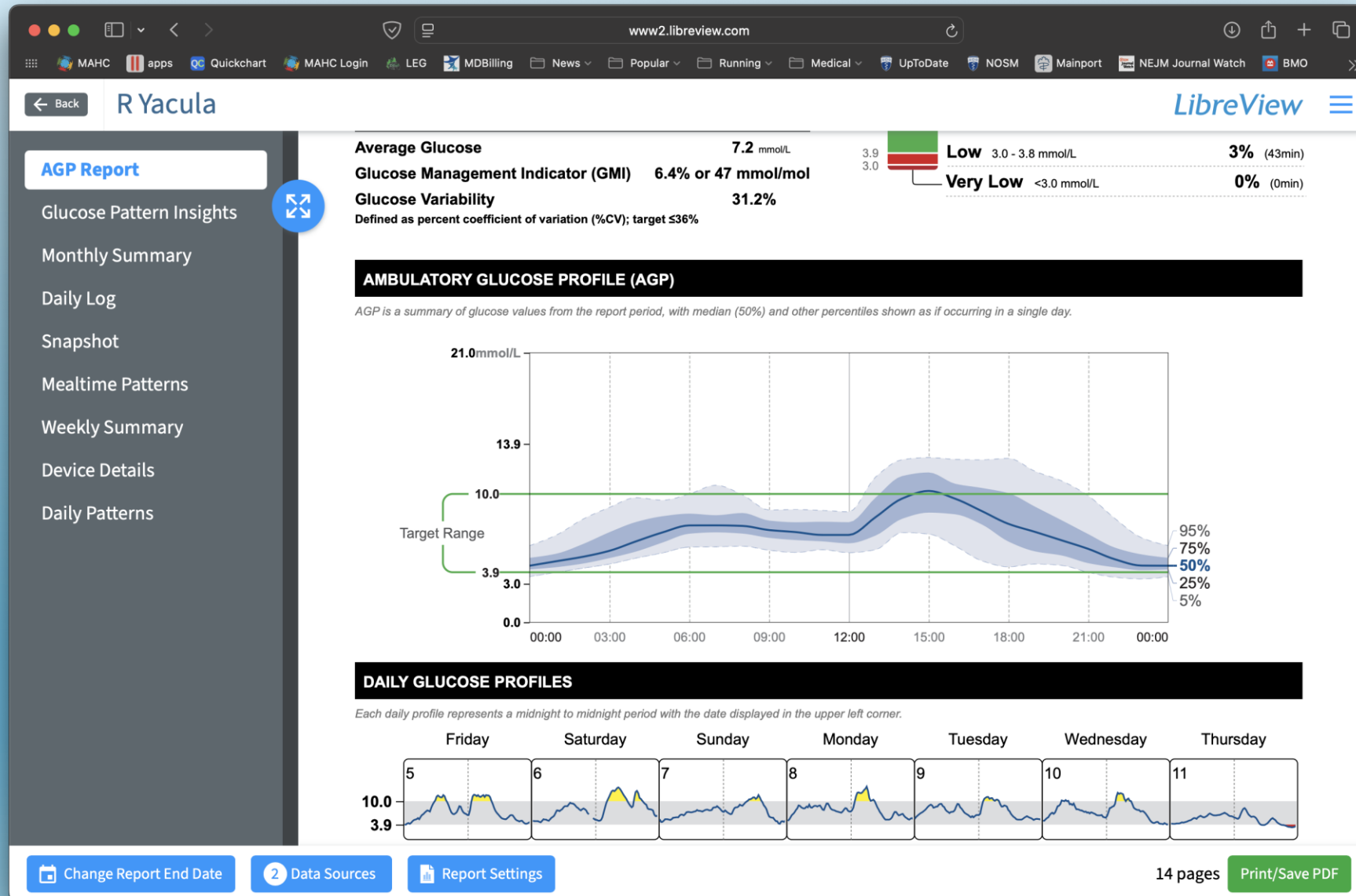
Libreview Website



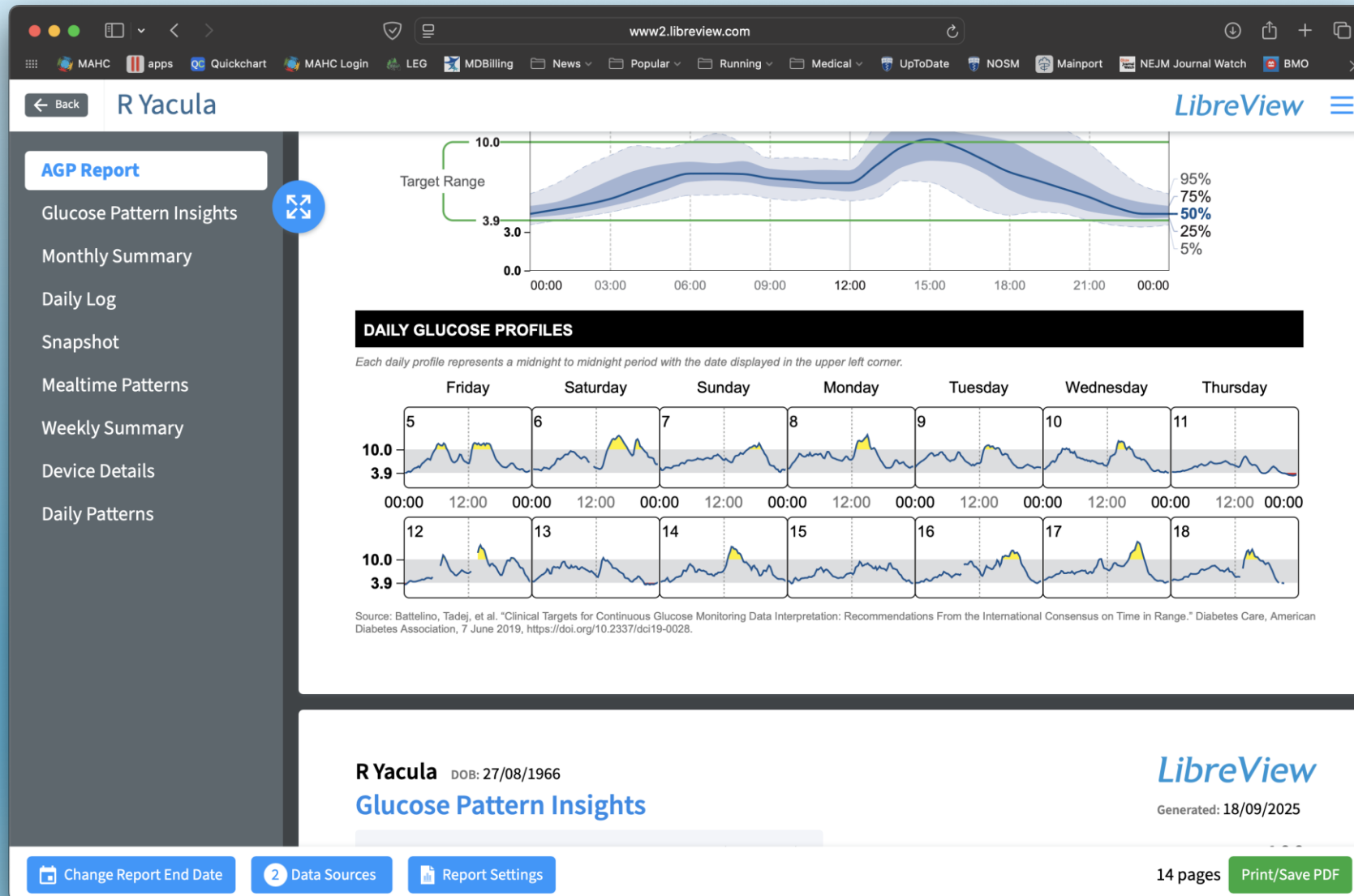
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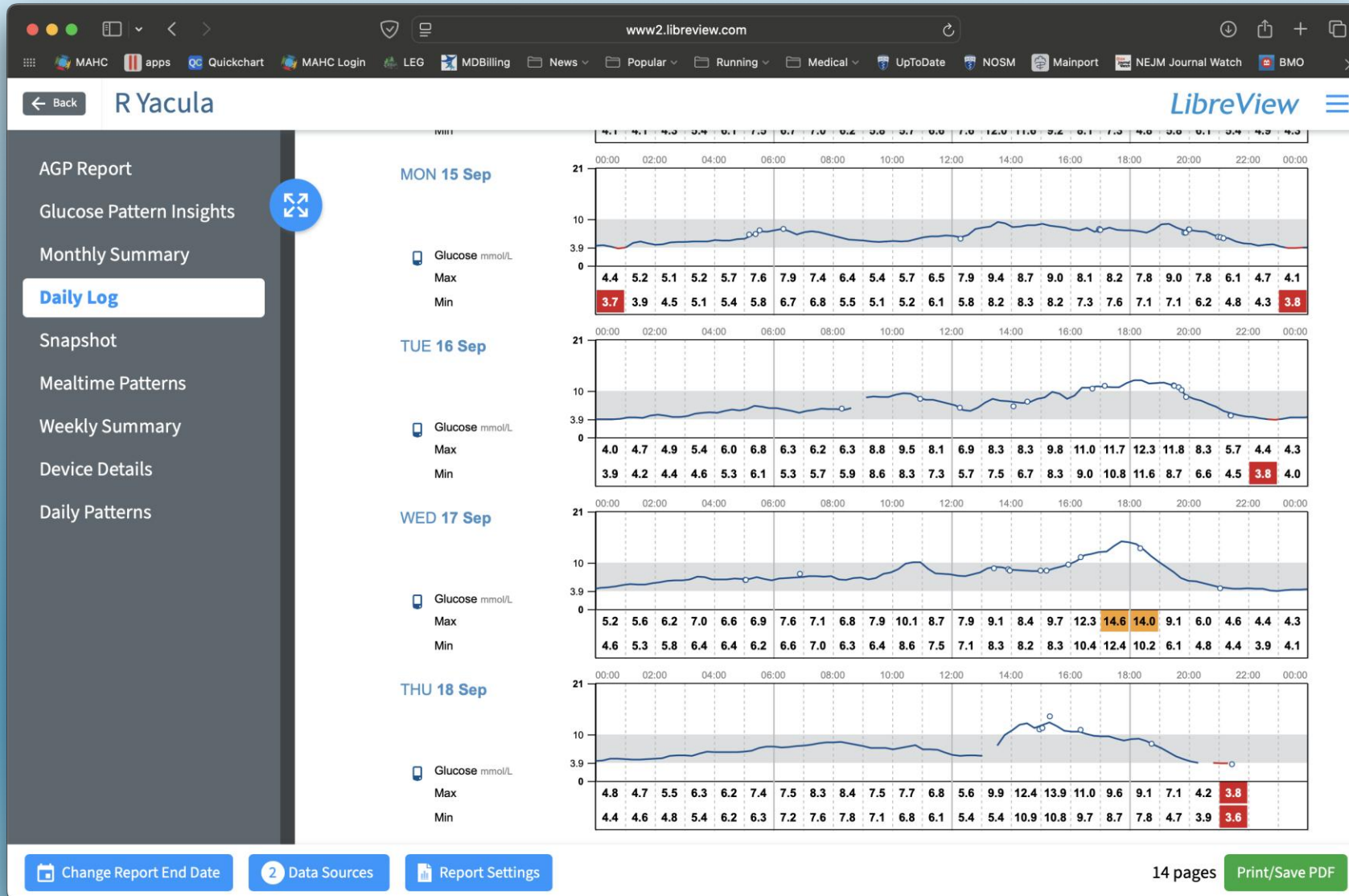
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Libreview Website



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Questions to ask before titrating insulin

- Walk through insulin administration steps – how, where, when
- Diet and physical activity
- Acute illness
- What is happening at times of hyper/hypoglycemia
- Alcohol intake
- The CGM can be a powerful learning tool to understand what works well and what doesn't work well!

Titration of Insulin with Hypoglycemia

- Goal is to keep hypos <3-4% of the time
- CGMS have alarms that can be changed
- Stop sulfonylureas if you see hypoglycemia
- If on insulin, look when hypoglycemia is happening
- If nocturnal hypoglycemia, decrease basal insulin 10-20%
- If specific time of the day, reduce prandial insulin by 10-15%
- If both night and day, reduce both basal and bolus doses

Titrating insulin using CGMs when starting GLP-1 agonists

- If TIR<70% in type 2 DM, first step may be to initiate a GLP-1 agonist
- GLP-1 agonists treat obesity, OSA, NAFLD, CV protection
- Risks adding to insulin – increased insulin sensitivity, reduced glucagon production, significant changes in appetite and intake
- If A1C < 8% or TIR>50%, reduce total insulin dose by 20%
- If A1C>8% or TIR<50%, no need to change insulin

When patient cannot start GLP-1 Agonist

- If not on insulin, consider starting basal insulin 0.1 units/kg daily and titrate until TIR is >70%
- If on basal insulin only, consider adding prandial insulin – consider 4 units or 10% of basal insulin dose
- If on basal-bolus insulin, consider increasing total daily dose by 10% divided between basal and bolus
- After titration of insulin or addition/up-titration of GLP-1 agonist, revisit AGP after about 2 weeks to assess impact

- CGM provides actionable trends, even if absolute precision has some variability, and can be important to alerting patients of hypoglycemia