Time in range:

A dive into new research, resources, and more.

TIME IN RANGE COALITION

Before we start…

Please keep this in mind. “Resistance” to care has foundational reasons. Indigenous peoples have gone through generations of trauma from outsiders. Patience, understanding, and a change is perspective is vital when introducing diabetes technology.

Taking care of yourself and your body is honoring those who have allowed you to be here. Diabetes care is a ceremony in itself.

TIME IN RANGE COALITION

CGM use in people with diabetes

In a recent survey of PCPs treating PWD, CGMs or CGM apps rank highest among diabetes tech when it comes to:

- improving clinical outcomes
- positively influencing patient diet behavior
- increasing patient compliance

For patients with T2D not on insulin, CGMs are considered the best at improving clinical outcomes

- CGMs allow patients to be more involved in their diabetes management by delivering actionable data and real-time feedback
- Despite its benefits, only 16% of patients with T2D are using a CGM. There is significant room for growth in CGM usage.

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CGM use in people with diabetes

PCP attitudes toward CGM and its metrics:

- PCPs consider insulin pumps (89%) and CGMs (88%) to be ‘effective’ or ‘extremely effective’ at increasing patient compliance with their prescribed treatment plan.
- 9 in 10 PCPs consider diabetes management software to be ‘effective’ or ‘extremely effective’ at facilitating more shared decision-making for them and their patients.
- Smartphone apps are most helpful at improving HbA1C, reducing worry about low BG, and keeping BG in the ideal range.

TIME IN RANGE COALITION

Time in Range

TIME COALITION IN RANGE

Standards of Care for Diabetes (ADA)

1. TIR is associated with the risk of microvascular complications and can be used for assessment of glycemic control.
2. Assess glycemic status using a 14-day CGM assessment of TIR and GMI or A1c for use in clinical management and followed remotely
3. CGM should be offered for anyone with diabetes.

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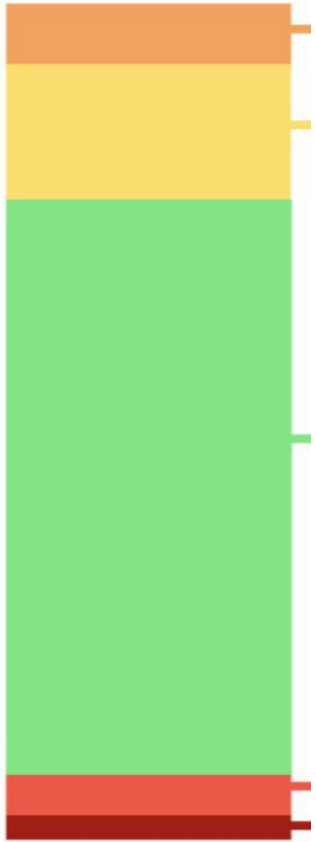
Time in Range

Time in Ranges



Very High (>250 mg/dL or 13.9 mmol/L)

High (181-250 mg/dL or 10.1-13.9 mmol/L)

Target Range
70-180 mg/dL
3.9 - 10mmol/L

Low (54-69 mg/dL or 3 - 3.8 mmol/L)

Very Low (< 54 mg/dL Or 3 mmol/L)

TIME COALITION IN RANGE

Time in Range vs. A1C

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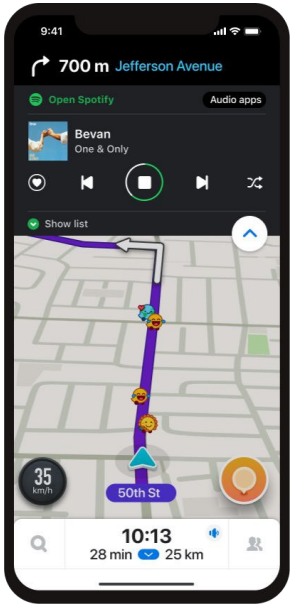
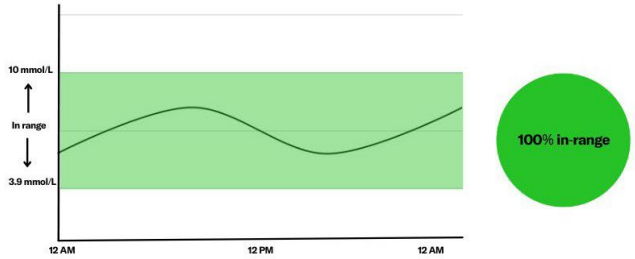
GPS vs. ….

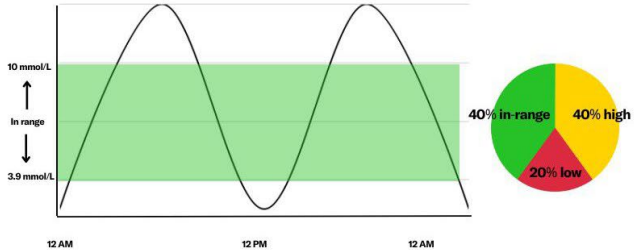


TIME COALITION IN RANGE

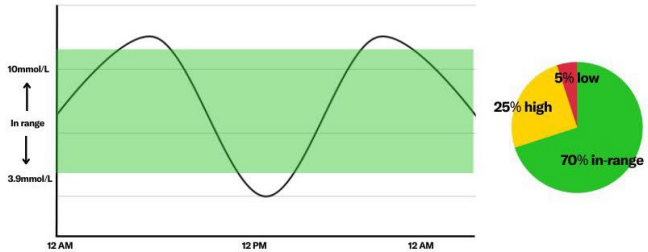
The many faces of a 7% A1c....



This person has a 7% A1c and stays in range 100% of the time...



This person has a 7% A1c and stays in range 40% of the time...



This person has a 7% A1c and stays in range 70% of the time...

IE COALITION RANGE

Other drawbacks to A1C

The measurement of A1C can be impacted by…

- Chronic kidney disease
- Pregnancy
- Genetically determined hemoglobin variants
- Thyroid disease
- Anemia
- Age
- Certain medications
- Some vitamin deficiencies or supplements
- Organ transplantation
- Living at a high altitude
- …and more

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Other drawbacks to A1C

A1C can be inaccurate for certain groups and medical conditions. An A1C test measures how much hemoglobin has sugar attached to it. Once a red blood cell becomes coated with sugar, the sugar stays there for 2-3 months. A1C results can be impacted because of the rate of red blood cell turnover.

- **People of color:**
  - There are genetic differences in hemoglobin in these racial/ethnic populations, namely hemoglobin S, C, D, and E. These variants can also cause hemoglobinopathies, a group of blood disorders and diseases that affect red blood cells—which can affect A1C results, as the A1C test does not account for these differences in hemoglobin.
- **People with kidney disease:**
  - Common CKD comorbidities and treatments, including anemia, blood transfusions, iron supplements, and erythropoiesis-stimulating agents, can result in a lower A1C, while metabolic acidosis can result in a higher A1C.
- **Pregnant Individuals**
  - Pregnancy is a factor in creating inconsistent and inaccurate A1C test results. Similarly to aging populations, pregnancy changes the life-cycle of the red blood cell, which can affect A1C. It's also been found that using A1C could provide false reassurance if it's used to measure glucose levels in mid- to-late gestation.

TIME IN RANGE COALITION

Measurable benefits of TIR

Time in range and diabetes complications:

- Research shows that TIR can be a more accurate indicator for risk of long-term diabetes complications[1,2]

Time in range and mental health:

- Preliminary evidence suggests increased TIR is associated with better mood; less anger and negative affect[3,4]

Time in range and quality of life:

- Studies show using CGM and it's metrics can help improve quality of life for people with diabetes[5,6]

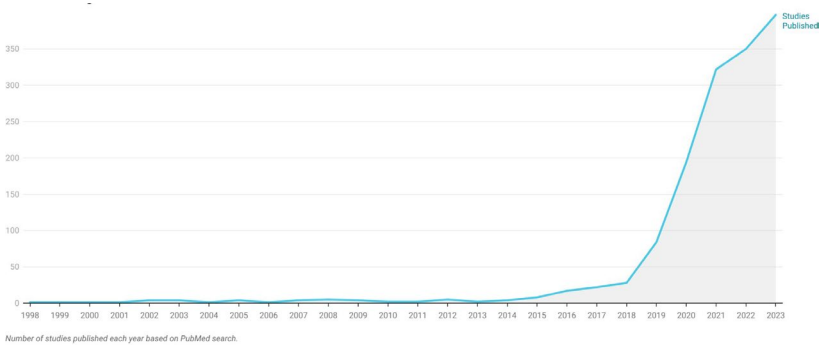
Time in range and glycemic control:

- Studies show that using a CGM and its metrics can actually lower A1C and improve glycemic control[7–9]

TIME COALITION IN RANGE

Growing Evidence Shows:

- TIR and A1C are closely correlated[1–9]
- TIR is associated with clinical outcomes[28–47]
  - Diabetes-related nephropathy[29,35,37,38,41,42]
  - Diabetes-related peripheral neuropathy[29,35,36,39,41,42,44,48]
  - Cardiovascular autonomic neuropathy[32,41,45]
  - Diabetes-related retinopathy[29,40–42,46]
  - Sudomotor dysfunction[33,34]
- TIR is associated with improved obstetric and neonatal outcomes[9,49–57]
- Independent correlation between TIR and complications after adjusting for A1C[34,36,40,43,45,58–60]



Number of studies published each year based on PubMed search.

TIME IN RANGE COALITION

Time in range and complications

The major question: Is time in range as good as A1C in predicting diabetes-related complications? Here are 3 studies…

Dr. Roy Beck estimated time in range from fingerstick data collected during the DCCT trial. The results showed that time in range could potentially be an accurate predictor of microvascular complications.

In the DCCT, blood glucose concentrations were measured at a central laboratory from seven fingerstick samples collected during 1 day every 3 months. Retinopathy progression was assessed every 6 months and urinary microalbuminuria development every 12 months. **The hazard rate of development of retinopathy progression was increased by 64% (95% CI 51-78), and development of the microalbuminuria outcome was increased by 40% (95% CI 25-56), for each 10 percentage points lower TIR (P < 0.001 for each).**

TIME IN RANGE COALITION

Time in range and complications

Dr. Viral Shah designed a retrospective study to examine the relationship between CGM metrics and retinopathy. He included participants with incident diabetes-related retinopathy (those who were diagnosed with retinopathy during the study period but never had it before) and participants without diabetes-related retinopathy and collected their CGM data over 7 years before their retinopathy diagnosis. He found that time in range could be a significant predictor of incident diabetes-related retinopathy—after adjusting for age, diabetes duration, and CGM type, **every 5% decrease in time in range was associated with a 22% increase in odds of incident diabetes-related retinopathy**.

Dr. Kovatchev and his group simulated CGM data for DCCT participants using fingerstick data collected during the original study to evaluate the association between time in range and microvascular complications. Unsurprisingly, they found a similar association between time in range and diabetes-related microvascular complications among DCCT participants.

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Why Time in Range data gives you a full picture

TIR provides more timely and accurate information than A1C

- Captures glucose variability
- Informs more focused decisions
- Helps to individualize care
- A1C can be inaccurate in people of color, people with CKD, or people who are pregnant.

Time in range is not just for treatment decisions:

- 80% use it for educating patients
- 72% use it to motivate patients
- 70% use it to increase patient engagement in their own care

dQ&A®

*Research on this slide is from a survey conducted via an online, email-based survey platform and respondents were paid an honorarium for fully completing the survey. The survey was in field from August 28-September 10, 2021.

TIME COALITION IN RANGE

How can you take action with time in range?

Time in range allows you to see the totality of a person's diabetes management in one glance. You can see if they're running high or low, and then dive deeper to make changes needed.

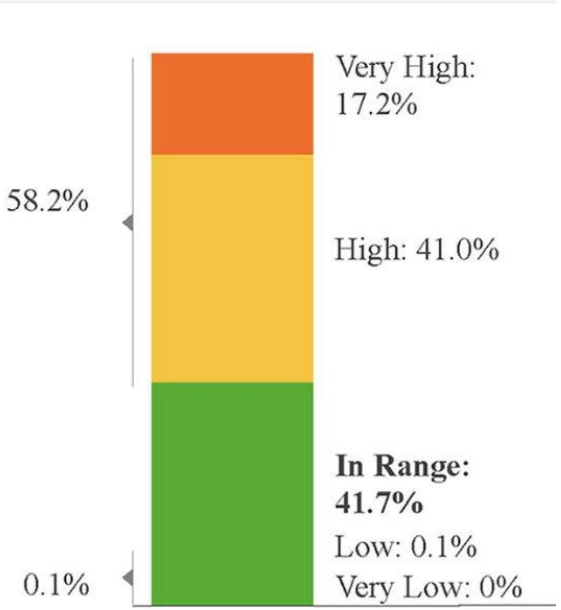
Utilizing time in range gives you a data-driven starting place, saving time during appointments and helping you and those in your care feel more empowered.

TIME IN RANGE COALITION

How can you take action with time in range?

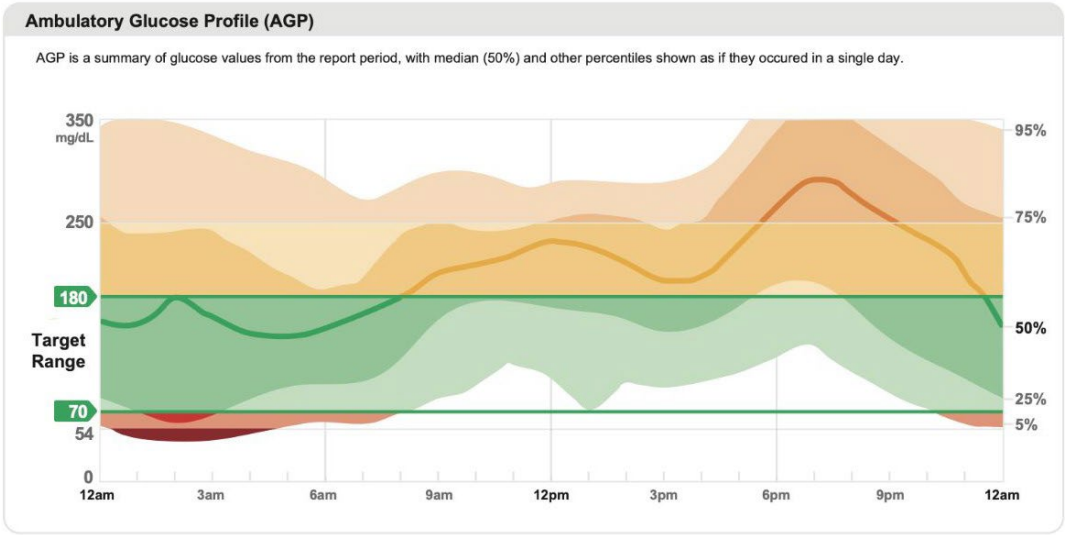
For example, you can see where someone is struggling. Is their TBR (time below range, hypoglycemia) or TAR (time above range, hyperglycemia) where they'd like it to be?

Looking at someone's time in range gives you a starting place to **dig deeper.**



TIME IN RANGE COALITION

Ambulatory Glucose Profile



TIME IN RANGE COALITION

How to read the AGP

- Solid line: the median of all the readings. Half of your glucose values are above the middle line, and half are below.
- Darker shading: 50% of your glucose values lie in this area
- Lighter shading: 90% of your glucose values lie in this area
- Green: this is the time spent in your target glucose range (usually between 70 and 180 mg/dL)
- Yellow: this is the time spent in a high glucose range (between 180 and 250 mg/dL)
- Orange: this area near the top of the graph is time spent in a very high glucose range (above 250 mg/dL)
- Red: this area near the bottom is time spent in a low glucose range (between 70 and 54 mg/dL)
- Dark red: this area at the bottom of the graph is time spent in a very low glucose range (below 54 mg/dL)

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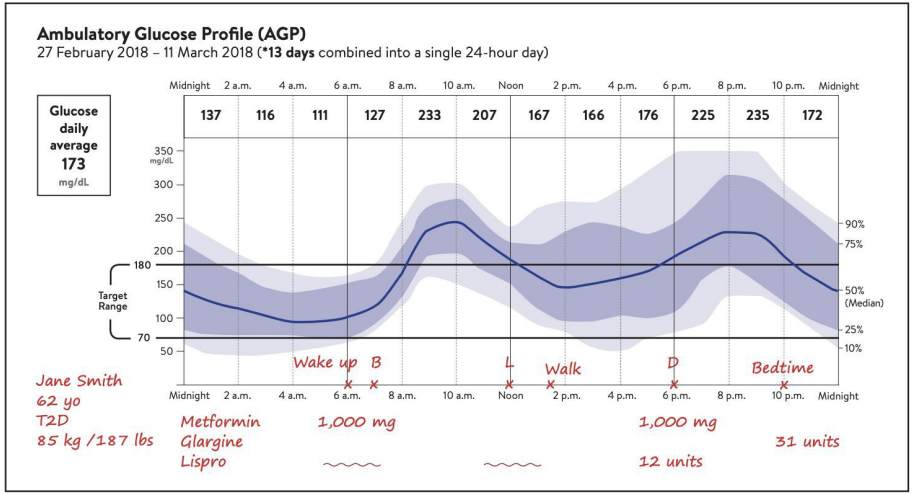
What can the AGP identify?

Patterns.

- Patterns of hypo- and hyperglycemia
- Glucose variability
- Factors that affect glucose



TIME IN RANGE COALITION

How can you take action with the AGP?

Review factors that affect AGP, look for patterns of low and high glucose levels on AGP, identity wide variability patterns, and use that data to make an action plan with those in your care.

For example, if we look back at Jane's data, we can see she has a higher spike than wanted after dinner. You can work to make changes to insulin, exercise, or diet based on this diet—everyone's management plan can be individualized based on their needs and what's realistic to them.

TIME IN RANGE COALITION

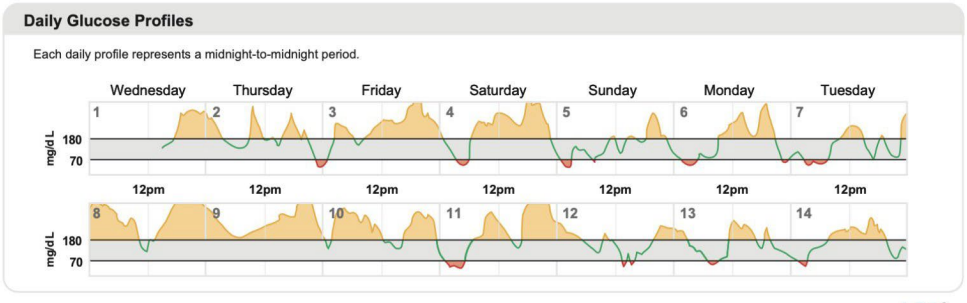
Other AGP data:

Average glucose: All glucose values added together, divided by number of readings

GMI (glucose management indicator): Calculated from average glucose for at least 12 days of data; is not the same as A1c, but can help estimate your future lab A1c

Glucose Variability: How far apart (wide) glucose values are; ideally a low number equal to or less than 36% [percent coefficient of variation]

Daily Glucose Profiles: Each box is a single day's glucose pattern



TIME IN RANGE COALITION

How to engage PWD in time in range

TIME IN RANGE COALITION

A1C: The scarlet letter

How would you feel if you had to wear a sticker for 3 months straight that said “I did a bad job”?

That’s what A1C can feel like to people with diabetes.

When talking to people with diabetes about CGM and time in range, it’s important to keep this thought in mind. A combination of intentional language, a focus on the positive, accessible resources, and supportive staff can help you empower those in your care to thrive with time in range. And most importantly—**leave your assumptions at the door**.

TIME IN RANGE COALITION

Language Matters

Language around diabetes management to **avoid**:

- Discipline
- Regiment
- “Good” or “Bad”
- Compliance
- Control(led)
- Alarming
- Lifestyle change

Language around diabetes management to **include**:

- Active, specific language (checking glucose, taking insulin)
- Management
- Above/below your range
- Personalization
- Optimizing/adjusting
- Choices/decisions

Check out dStigmatize’s language guide here.

TIME IN RANGE COALITION

Talking points

- Time in range is for anyone with diabetes—no matter what type you have, no matter if you're on insulin or not. Millions of people are using it.
- Time in range gives you the entire picture—A1C can't tell you how different foods, hormones, emotions, or even travel affects you.
- Time in range can give you data to better *understand* your glucose—it can provide less frustration and confusion.
- Increasing time in range can improve sleep, decrease complications, and help you feel better **now**.
- A1C has actually shown to be less accurate for people of color with diabetes

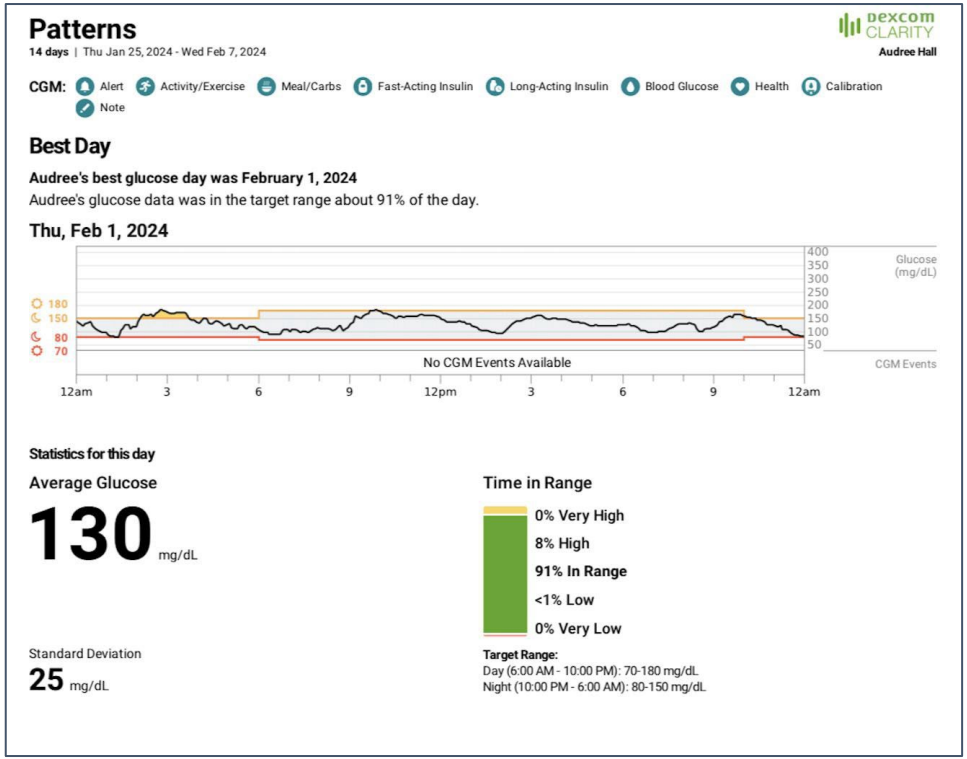
TIME IN RANGE COALITION

Patterns and Positivity

Time in range can identify patterns and help give a more positive outlook to people living with diabetes through more data—but the thought of constantly being monitored can be stressful for people with diabetes. Here's how you can frame some of the positives on time in range!

TIME IN RANGE COALITION

Patterns and Positivity



Patterns

14 days | Thu Jan 25, 2024 - Wed Feb 7, 2024

dexcom CLARITY

Audree Hall

CGM: Alert · Activity/Exercise · Meal/Carbs · Fast-Acting Insulin · Long-Acting Insulin · Blood Glucose · Health · Calibration · Note

Best Day

Audree's best glucose day was February 1, 2024

Audree's glucose data was in the target range about 91% of the day.

Thu, Feb 1, 2024

Statistics for this day

Average Glucose

130 mg/dL

Standard Deviation

25 mg/dL

Time in Range

- 0% Very High
- 8% High
- **91% In Range**
- <1% Low
- 0% Very Low

Target Range:
Day (6:00 AM - 10:00 PM): 70-180 mg/dL
Night (10:00 PM - 6:00 AM): 80-150 mg/dL

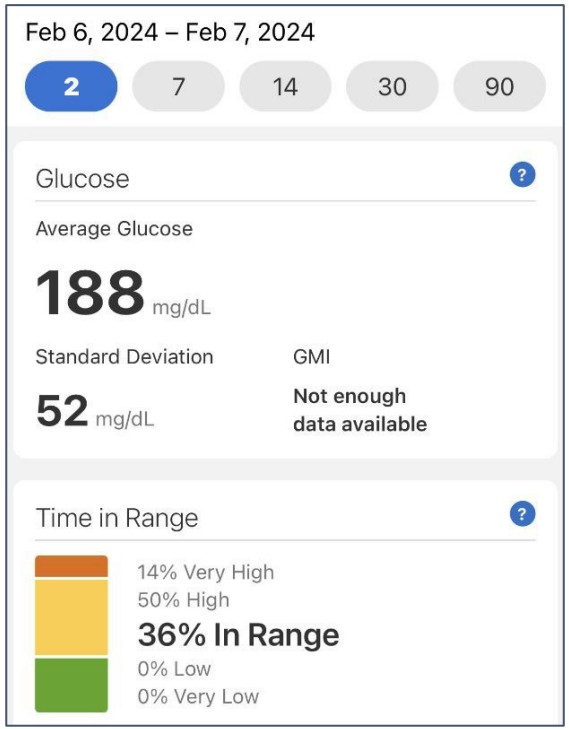
TIME COALITION IN RANGE

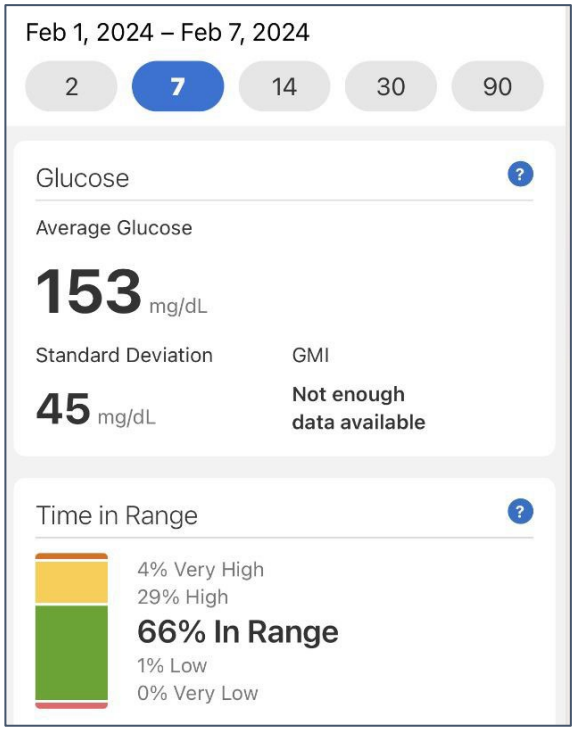
Patterns and Positivity

The target range can differ depending on the person with diabetes.

TIME COALITION IN RANGE

Patterns and Positivity cont.





1 day (or 2 days..or a week) doesn't define you!

TIME IN RANGE COALITION

Time in range goals

While the suggested TIR goal is 70%, the beauty of time in range is its ability to be individualized to every person with diabetes. If a numerical goal isn't empowering to someone in your care, try thinking about goals in a different way. It could look like…

- Using time in range to figure out what food makes me spike or drop
- Using time in range to figure out what time of day it's best for me exercise
- Using time in range to figure out how I should manage my diabetes while I'm on my period
- Using time in range to help me feel more confident while I'm traveling
- Using time in range to help me feel less stressed about where my glucose is going

TIME IN RANGE COALITION

CGM tips + tricks

TIME IN RANGE COALITION

Compression lows

Compression lows, which lead to false low readings, can occur when sleeping in certain positions. When lying on the sensor, this pressure reduces the volume of interstitial fluid from which blood glucose is measured. Less volume can translate to less glucose, then incorrect low readings and alerts.

What can you do to help?

TIME IN RANGE COALITION

Compression lows

Identifying compression lows

- Compression lows will often look like a dramatic dip in a CGM graph. If you believe someone in experiencing compression lows, encourage them to:
  - Check in with their body. Are they feeling low symptoms?
  - Look at their CGM graph. Was there a line trending down over an hour, or was this a dramatic dip?
  - Use a glucometer to test their blood sugar and compare to their CGM
  - If they suspect it's a compression low, sit up for 5-10 minutes and see if the CGM corrects itself

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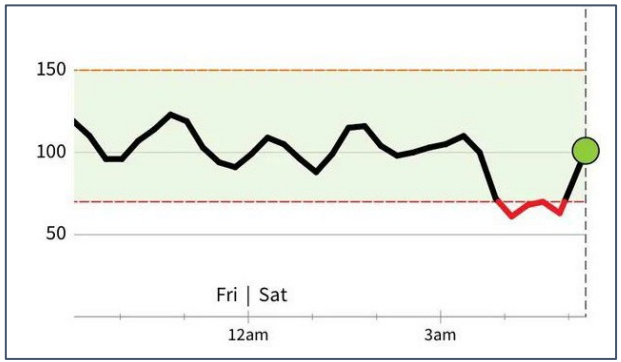
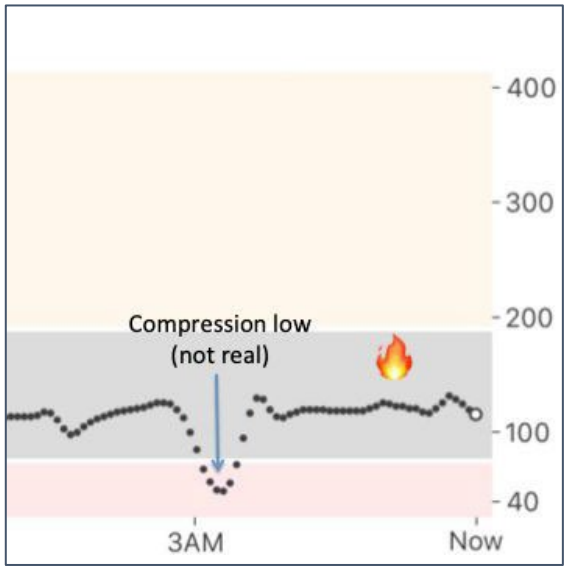
Compression lows





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Compression lows

Avoiding compression lows

- Changing placement on the body
  - Try stomach, different places on the arm, even on the front of a leg!
    - If someone is dealing with a lot of compression lows, have them record where they put their sensor and how many compression lows they get during the placement duration. This can help them find the best place for them.
  - Add an arm band or patch
  - Change sleeping positions

TIME IN RANGE COALITION

Mental health + burnout

While CGM and its metrics are shown to provide incredible psychosocial benefits, the risk of diabetes tech burnout is a reality for many. Having to interact with large amounts of personal health data, combined with burdensome alarms and alerts and the many demands of self-managing diabetes can increase a person's risk for experiencing diabetes distress—which can lead to burnout.

If someone is struggling with diabetes distress, you can have them take the Diabetes Distress Assessment Survey. **If someone in your care is struggling with diabetes distress you can provide tips and tricks to help them feel better, faster with our free mental health toolkit for people with diabetes. Download it for free by clicking here.**

TIME IN RANGE COALITION

Mental health + burnout

Ways to avoid or treat CGM burnout:

- Changing perspectives from problems to possibilities
- Changing alarm sounds and ranges for highs and lows
- Take a tech break

If someone is struggling with diabetes distress, you can have them take the Diabetes Distress Assessment Survey. **If someone in your care is struggling with diabetes distress you can provide tips and tricks to help them feel better, faster with our free mental health toolkit for people with diabetes. Download it for free by clicking here.**

TIME IN RANGE COALITION

New guides

- Time in Range in the 2025 ADA Standards of Care (HCP-focused)
- Decreasing diabetes complications with time in range (HCP-focused)
- The psychosocial impacts of CGM and its metrics (HCP-focused)
- Inaccuracies of A1C testing—and what can be done about them (HCP-focused)
- 3 questions to help you uncover diabetes pain points (HCP-focused)
- Overcoming stigma in diabetes management (HCP-focused)
- Did you know your A1C might be inaccurate? (PWD-focused)
- 6 ways to increase your time in range (PWD-focused)
- Decreasing diabetes complications with time in range (PWD-focused)
- Overcoming the stigma of an A1C (PWD-focused)

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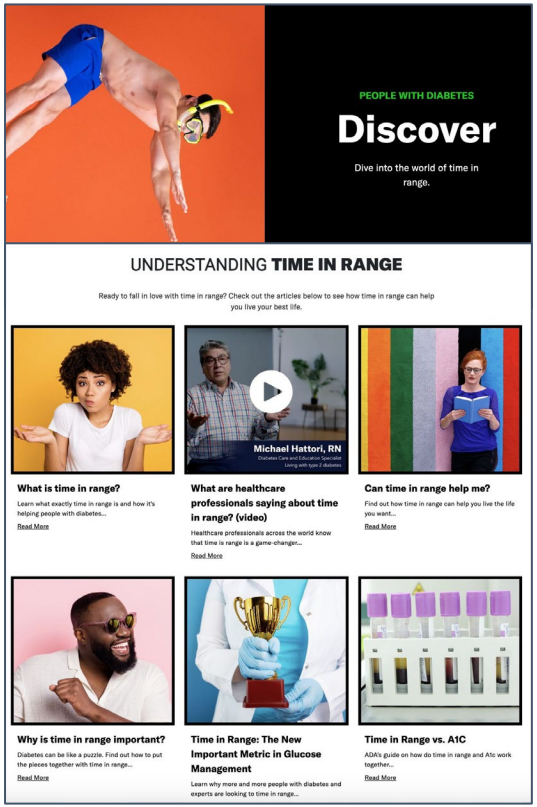

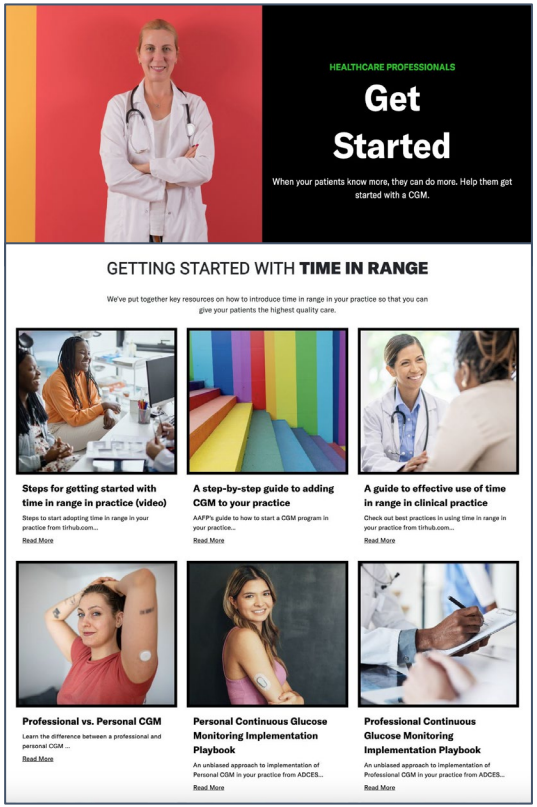

Timeinrange.org

Resources for people with diabetes and healthcare professionals—including step by steps on how to integrate CGM into practice and workflow, latest research, and more.

TIME IN RANGE COALITION

How can timeinrange.org help?

Timeinrange.org was created for people with diabetes by people with diabetes to help navigate each person's individual time in range journey. Resources include:

- Time in range basics
- Video and text testimonials from people living with diabetes
- Resources on how to get started—from CGM guides and FAQs to time in range app guides, it provides accessible , step-by-step guides
- Information on how time in range helps your overall health (kidney, mental health, etc.)
- Information for people who already use time in range—like how to increase your time in range, CGM tips and tricks, and more

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Q+A

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Thank you!

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