HbA1c has long been the established measure of diabetes management. But with recent advances in technology, isn’t it about time we look beyond HbA1c? New research presented at this year’s American Diabetes Association (ADA) congress strengthens previous data that support Time in Range as a valid clinical metric for assessing glucose levels. Time in Range – also known as TIR – expresses the percentage of time a person with diabetes spends within their target glycaemic range. Offering complementary insights to HbA1c, does Time in Range have the potential to take a more prominent place as a measure of glucose levels and transform the way we think about diabetes management?

Addressing an unmet need for people with diabetes
For many people, diabetes can be managed effectively through self-monitoring of blood glucose, alongside positive lifestyle changes such as food choices, exercise and treatments. HbA1c has been widely used as a measure of glucose control, a diagnostic tool, a predictor of risk for developing diabetes-related complications and an indicator of response to diabetes medications. Yet, research shows that approximately one out of two people with diabetes are not achieving internationally recommended HbA1c targets when using HbA1c as the only measure of diabetes management. HbA1c has its limitations: it reflects a person’s average blood glucose levels over the previous two to three months but does not reflect daily fluctuations, nor does it capture the variable occurrence of hypoglycaemia (potentially dangerous low-blood sugar levels) and hyperglycaemia (potentially dangerous high-blood sugar level). In fact, two people with the same HbA1c results could have very different glucose profiles.
This is where Time in Range comes in. The Time in Range metric harnesses the data captured by continuous glucose monitoring (CGM) technology. The meaningful, real-time, CGM data provides insights about a person’s blood glucose levels and sends them directly to a smartphone app or reader. This level of granularity has the potential to reveal patterns of hypoglycaemia and hyperglycaemia throughout the day and night and empowers people with diabetes to actively manage their diabetes and adopt positive lifestyle adjustments to improve glucose control. Increasing time spent in range is critical for optimising glucose control, reducing the risk of hypoglycaemia and hyperglycaemia, and has been shown to inversely correlate with the risk of onset or progression of diabetes-related complications.

Increasing support of Time in Range from professional associations
There is growing recognition among the diabetes community that Time in Range tells a more complete story about glucose levels than HbA1c alone. In 2019, an International Consensus Report on Time in Range was published, endorsed by eight international professional associations. The guidance recommended that most people with type 1 or type 2 diabetes should spend at least 70% of the day (around 17 hours) in the target glycaemic range of 70 to 180 mg/dL (3.9 to 10 mmol/L). This corresponds to the recommended HbA1c target of approximately 7% (53 mmol/mol). Clinical guidance was also established for additional CGM.

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* The International Consensus Report was endorsed following the 2019 ATTD congress by: American Diabetes Association, American Association of Clinical Endocrinologists, American Association of Diabetes Educators, European Association for the Study of Diabetes, Foundation of European Nurses in Diabetes, International Society for Pediatric and Adolescent Diabetes, JDRF and Pediatric Endocrine Society.

† For older and/or high-risk people with diabetes, the TIR target is lowered to >50% and TBR reduced to <1% at <70 mg/dL (<3.9 mmol/L).
metrics including Time Below Range (TBR), indicating hypoglycaemia, and Time Above Range (TAR), indicating hyperglycaemia. Guidance also recommends spending less than 4% of the day (one hour) below range (70 mg/dL [3.9 mmol/L]), and less than 25% of the day (six hours) above range (180 mg/dL [10.0 mmol/L]).

The American Diabetes Association (ADA) Standards of Medical Care in Diabetes now include Time in Range as an important metric for people to assess glucose levels using CGM.

Increased Time in Range correlates with improvement in HbA$_{1c}$, according to new research sponsored by Novo Nordisk

Two post hoc analyses of the SWITCH PRO trial, sponsored by Novo Nordisk and presented at the 81st Scientific Sessions of the ADA 2021 virtual meeting, confirm Time in Range as an important complementary metric to HbA$_{1c}$ in diabetes management.

SWITCH PRO is a randomised, crossover trial that compared the effect of insulins degludec and glargine on glucose levels in people with type 2 diabetes. Time in Range measured by CGM was the primary endpoint, with HbA$_{1c}$ as a secondary endpoint. The two post hoc analyses reviewed the correlation between Time in Range and HbA$_{1c}$ in type 2 diabetes patients treated with basal insulin. The results across both studies demonstrated a linear correlation between change in Time in Range and change in HbA$_{1c}$ in this study population, with closer association at higher baseline HbA$_{1c}$. Importantly, improvement in Time in Range could be translated to lower HbA$_{1c}$ levels.

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‡ <1% of this time should be spent in the “very low” TBR of <54 mg/dL (3.0 mmol/L).
§ <5% of this time should be spent in the “very high” TAR of >250 mg/dL (13.9 mmol/L).
Bringing Time in Range into clinical practice

Time in Range is being increasingly welcomed into clinical practice as a complementary metric to HbA1c.\(^4,15\)

The more complete picture of glucose levels captured by CGM provides healthcare professionals with the information to build personalised and effective action plans based on individual data-lead insights to improve glucose control.\(^4\) The metrics of Time Below Range, Time Above Range and Time in Range that CGM measures, provide an opportunity to identify drivers behind glucose fluctuations.\(^4\) This empowers people with diabetes to actively manage their diabetes by adopting positive lifestyle changes such as food choices and exercise to increase their Time in Range, as well as allowing healthcare professionals to have meaningful conversations about what may have led to out-of-range readings.\(^4\)

“When my glucose levels are unstable, I get scared about how it may impact my future,” says Lasse, a 32-year-old Jazz musician from Denmark living with type 1 diabetes. “[Time in Range] makes it easier to understand what I can do to live a healthy life with diabetes.”

Lasse, living with type 1 diabetes, uses Time in Range to manage his glucose levels.
Advancing towards better diabetes care
Intractable problems require innovative solutions. People with diabetes have long struggled to achieve glucose control.\textsuperscript{10,11} There is growing evidence and recognition that employing the Time in Range metric, both in clinical trials and in day-to-day diabetes management, can make a meaningful difference.\textsuperscript{4,15} Novo Nordisk, a leader in diabetes care for nearly a century, is committed to addressing unmet medical needs for people with diabetes. In the months and years ahead, Novo Nordisk will continue to research and raise awareness of how Time in Range - a simple yet effective new clinical metric can benefit the daily lives of people with diabetes.