Metabolic Health Matters

The evidence for continuous glucose monitoring outside of diabetes

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Contents

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Executive Summary

This report reviews current scientific evidence and expert perspectives on the emerging use of continuous glucose monitoring (CGM) outside of diabetes care. Originating from diabetes management, minimally invasive CGM sensors with linked smartphone apps provide near real-time glucose data that, when integrated with behavioural and physiological information, can reveal how diet, physical activity, stress and sleep influence glycaemic patterns and metabolic health.

Recent media articles have highlighted the use of CGM by health-conscious individuals and athletes, often questioning its health benefits in these populations. By contrast, scientific research appears increasingly focused on populations with obesity, insulin resistance and prediabetes – groups at heightened risk of type 2 diabetes and cardiovascular disease. As explored in this report, although evidence is preliminary and derived mainly from short-term studies, findings indicate that the visualisation of CGM data, combined with lifestyle education and personalised dietary guidance, may support positive behaviour change, reduce glycaemic variability and excursions, and improve metabolic health indicators. These effects appear to extend beyond those achieved through education-based approaches alone, particularly among at-risk individuals.

The availability of over-the-counter CGM systems has also enabled possibilities for large-scale research beyond traditional fasting glucose or HbA1c testing. As a result, CGM is being investigated to advance understanding of normoglycaemia and as a potential diagnostic adjunct for the early detection of insulin resistance and prediabetes. Further studies are exploring the value of CGM insights in contexts as diverse as cancer care, neonatal intensive care, sleep apnoea, menopause, dialysis and surgical care.

This research expansion comes at a time when disease prevention is a global public health priority. Even across OECD countries, nearly one-third of premature deaths before the age of 75 remain avoidable. Obesity-related diseases, such as type 2 diabetes and cardiovascular disease, contribute substantially to health and economic burdens, with annual healthcare costs reaching tens to hundreds of billions per country. Accordingly, the investigation of CGM as a tool to support disease prevention and remission is critical, alongside other emerging strategies. To this end, government funding priorities should encompass prospective, longitudinal CGM studies, currently lacking in the evidence base, to assess CGM-driven behavioural and physiological changes and their long-term effects on metabolic and cardiovascular outcomes.

Healthcare practitioners are encouraged not to dismiss CGM as a passing wearable trend but to anticipate its growing role in personalised and preventive health management. Increasingly, users of consumer CGM devices are likely to present to healthcare services seeking interpretation and guidance, similar to experiences following the adoption of ECG-enabled smartwatches. Some may have underlying eating disorders or health-related anxieties, highlighting the need for sensitive, evidence-informed clinical responses to avoid emotional and physical harm. Clinicians will therefore benefit from staying informed about CGM technology – its capabilities, limitations, applications and fast-evolving evidence base.

Recommendations

For governments and research funding bodies

1. **Fund RCTs on CGM for at-risk groups with long-term follow-up**
   Government funding bodies should prioritise robust longitudinal research on CGM in people at risk of diabetes to assess long-term health outcomes. Studies should examine the synergistic effects of combined CGM, dietary and lifestyle education versus education without CGM to provide clearer indications of causation.

2. **Fund research to establish clinical benchmarks for normative glucose patterns**
   There is an urgent need for benchmark CGM measurements for healthy/normative glucose through to dysglycaemia, according to age, sex, ethnicity and body composition metrics. Particular attention should be given to CGM benchmarks for insulin resistance and prediabetes to enhance clinical interpretation and decision-making.

For CGM providers

3. **Provide clear advice on CGM accuracy and interpretation for general users**
   CGM providers should include clear guidance cautioning against overinterpretation of CGM readings within what may be normal physiological variability. Transparent communication about accuracy and expected variation would mitigate misinterpretation and anxiety, particularly among vulnerable users.

4. **Introduce safeguards for vulnerable users**
   CGM companies are encouraged to create app-based and online pre-screening tools to assess user suitability. Simple digital questionnaires could flag potential vulnerabilities – such as eating disorders, obsessive tendencies or high health anxiety – and provide tailored cautionary advice or signposting to professional support. Such safeguards would promote responsible use and reassure clinicians concerned about unsupervised adoption.

5. **Aim for standardisation in CGM performance assessments**
   The clinical utility of CGMs can be significantly strengthened if manufacturers adopt common calibration standards, ensuring greater consistency and comparability of glucose readings within and between different devices.

For healthcare professionals

6. **Prepare for user support and guidance**
   Healthcare professionals (HCPs) are increasingly likely to encounter CGM use among the general public. They should maintain up-to-date knowledge of the technology and consumer use, understanding that glycaemic responses are influenced not just by diet but also sleep, stress, physical activity, sedentary behaviour and meal timing. HCPs should be alert to CGM use among vulnerable groups and the potential for misuse.

1. Introduction

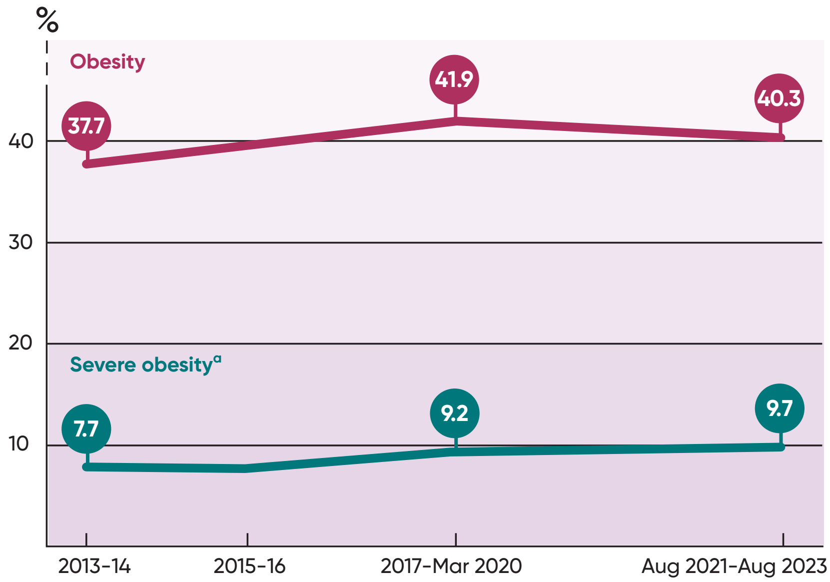
Growing interest among researchers, healthcare providers and policymakers in wearable health technologies is linked to the pressing public health challenge of disease burden and premature, avoidable death. Even in OECD countries, nearly one-third of deaths among individuals under the age of 75 are considered premature and avoidable. These are deaths that could have been prevented through more effective public health strategies and timely healthcare interventions (OECD 2023).

A significant proportion of chronic disease and premature mortality is linked to obesity, which increases risk of prediabetes (intermediate hyperglycemia), type 2 diabetes and cardiovascular events, and continues to rise in most countries worldwide (Di Angelantonio et al, 2016; Phelps et al., 2024). In England and Scotland, deaths attributed to obesity and excess body fat increased by 29% between 2003 and 2017 (Ho et al., 2021). In Europe more widely, the World Health Organization (WHO) reports that overweight and obesity are among the leading causes of disability and death, corresponding to more than 13% of total mortality (WHO 2022).

Unsurprisingly, the economic burden of obesity has been rising for individuals, health services and the wider economy. The annual cost of overweight and obesity to the UK's National Health Service (NHS) has been estimated at £19bn; the figure rises to around £35bn when factoring in wider societal costs, primarily productivity losses (Frontier Economics 2023).

In the US, the associated healthcare costs of overweight and obesity are estimated to be as high as $261bn (Cawley et al., 2021). The US total far exceeds the UK's proportionally, mainly due to higher costs of healthcare, but also due to population characteristics, with 40% of the population living with obesity (Emmerich et al., 2024), compared to 29% in the UK (NHS England, 2024). Moreover, an estimated 9.4% of US citizens live with severe obesity (BMI ≥ 40 kg/m2) (Emmerich et al., 2024), a rate more than twice that

Figure 1. Trends in age-adjusted obesity and severe obesity prevalence in adults age 20 and older: United States, 2013–2014 through August 2021–August 2023.



a: Significant linear trend ($p < 0.05$).
SOURCE: National Center for Health Statistics, National Health and Nutrition Examination Survey, 2013–2014 through August 2021–August 2023. In Emmerich et al., 2024.

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found in England, three times that in Germany, and more than four and five times that in Portugal and Spain, respectively (Williamson et al., 2019).

However, there is some evidence that the US may be seeing the beginnings of an obesity trend reversal (Figure 1). Reasons for this are not entirely clear, though some observers suggest the tide is turning due to the advent and roll-out of weight-loss injections such as Wegovy (containing semaglutide) and Mounjaro (tirzepatide), which have demonstrated effects of appetite regulation and craving reduction (Burn-Murdoch, 2024; McGowan et al., 2025).

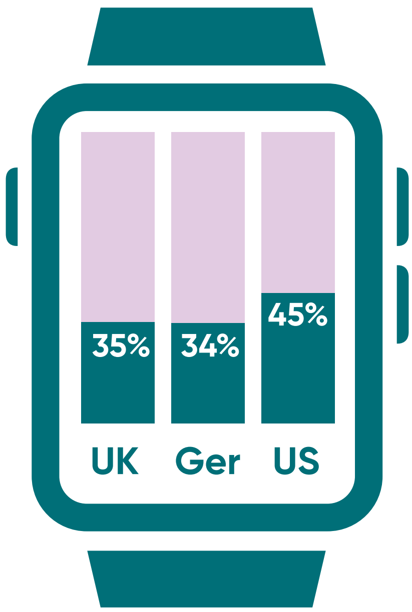
The WHO emphasises that weight-loss drugs are not the sole answer to "globesity" (e.g. Celletti et al., 2025). The drugs treat symptoms of those already living with obesity; they have no part to play in prevention and do nothing to disrupt the dangerous and costly journey towards obesity.

As discussed in previous 20/20health obesity research reports, it is not that citizens lack the willpower of earlier, leaner generations, but rather that we live in obesogenic environments that diminish our opportunities and capacities to make healthy lifestyle choices (James & Beer, 2014; Parkhurst, 2015; James et al., 2018). Highly processed foods have become a defining feature of these environments, contributing to nutritional deficiencies that are particularly pronounced among people living with obesity (Astrup & Bügel, 2019). Tackling systemic confounders is largely the role of government and policy implementers, but notwithstanding interventions such as taxation and stringent advertising restrictions on unhealthy foods, there are limits to governments' dismantling of such environments.

Health experts emphasise the importance of personalised care and disease prevention – strategies frequently highlighted in policy discussions but underutilised in practice, despite their relevance to health system sustainability. However, a convergence of these ambitions is being seen in wearable technology, as signalled in UK government plans to explore smartwatches and other wearables to drive personal health monitoring as part of a 10-year "prevention-first" strategy. This includes the potential roll-out of wearable technology to "millions of people with diabetes or high blood pressure, so they can monitor their own health at home" (Crerar & Campbell, 2024).

Systematic reviews and meta-analyses have indicated promising results from wearables in relation to activity increases and health-related outcomes for people both at risk of and living with chronic diseases (e.g. Franssen et al., 2020; Ringeval et al., 2020). What is particularly striking, however, is that widespread adoption of non-prescribed

Figure 2. Estimated adult ownership of smartwatches and fitness trackers.



SOURCE: YouGov, 2024; Hindelang et al., 2024; Nagappan et al., 2024

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wearable technologies over the past 15 years has been driven less by policy initiatives or public health strategies, and more by commercial advertising and individual health-seeking behaviours. Today, adult ownership of smartwatches and fitness trackers is estimated to be around 35% in the UK (YouGov, 2024), 34% in Germany (Hindelang et al., 2024) and 45% in the US (Nagappan et al., 2024).

Among the latest innovations in the wearables revolution are minimally invasive biowearables for continuous glucose monitoring (CGM). Based on technology originally developed for people living with diabetes, CGMs have been adapted to support both healthy and at-risk individuals in becoming more intentional about their dietary and lifestyle habits, with the aim of supporting the enhancement of metabolic health.

As explored in this report, the rationale behind CGMs for people not living with diabetes centres on evidence that glucose fluctuations, spikes and prolonged elevations may negatively impact both physical and mental health. Research has also identified high prevalence of insulin resistance among people without diabetes and the importance of targeted dietary modifications for maintaining good metabolic health (Freeman et al., 2023). Biowearables are therefore aiming to do for healthy eating and behaviour what fitness trackers appear to be doing for physical activity – creating continuous, real-time feedback to prompt and increase healthy lifestyle habits and choices. Patterns of use may differ, however, as CGMs may be used in a time-limited or periodic manner by people without diabetes.

Some clinicians and research teams remain sceptical of the broader use of wearable biosensors beyond diabetes care, arguing that data on glucose fluctuations in healthy individuals are not yet well enough understood to yield actionable insights. Concerns have also been raised about the potential adverse effects of CGMs on dietary behaviours among people with eating disorders.

This report explores both evidence and opinion in the field of biowearables. We begin with an overview of CGM technology and its intended applications, followed by an examination of the scientific rationale for expanding the use of biowearables beyond diabetes management. We then review academic research on CGM utility and reported outcomes, and present perspectives from healthcare professionals and researchers interviewed across different countries. In the concluding section, we consider evidence, limitations and opportunities to help inform next steps for healthcare researchers, practitioners and policymakers.

1. Introduction

Methodology

The research project ran for four months, from July to October 2025. Work began with a rapid literature review examining evidence on the use and efficacy of continuous glucose monitoring among people without diabetes. The primary focus was on CGM as a tool for behaviour change, particularly dietary and lifestyle modification. Secondary areas of investigation included CGM accuracy, its potential use in diagnostics, and broader applications in clinical contexts.

To complement the literature review, we conducted 13 interviews and consultations with international experts whose professional experience spanned Austria, China, France, Germany, India, Spain, Switzerland, the UK and the US. Most participants were practising medical doctors with expertise covering obesity, cardiometabolic disease prevention, diabetes, metabolic health and wellness, mental health, personalised nutrition, digital health and CGM. Several also held roles as national or international public health advisers. Interviews also included experts with direct research experience involving CGM, both within and beyond the context of diabetes management.

We are deeply grateful to the experts who generously shared their time and insights. We also thank our Advisory Board for its invaluable support throughout multiple stages of the project – from facilitating connections with prospective interviewees to providing thoughtful feedback on draft versions of this report. A list of interviewees and Advisory Board members is provided in Appendix A.

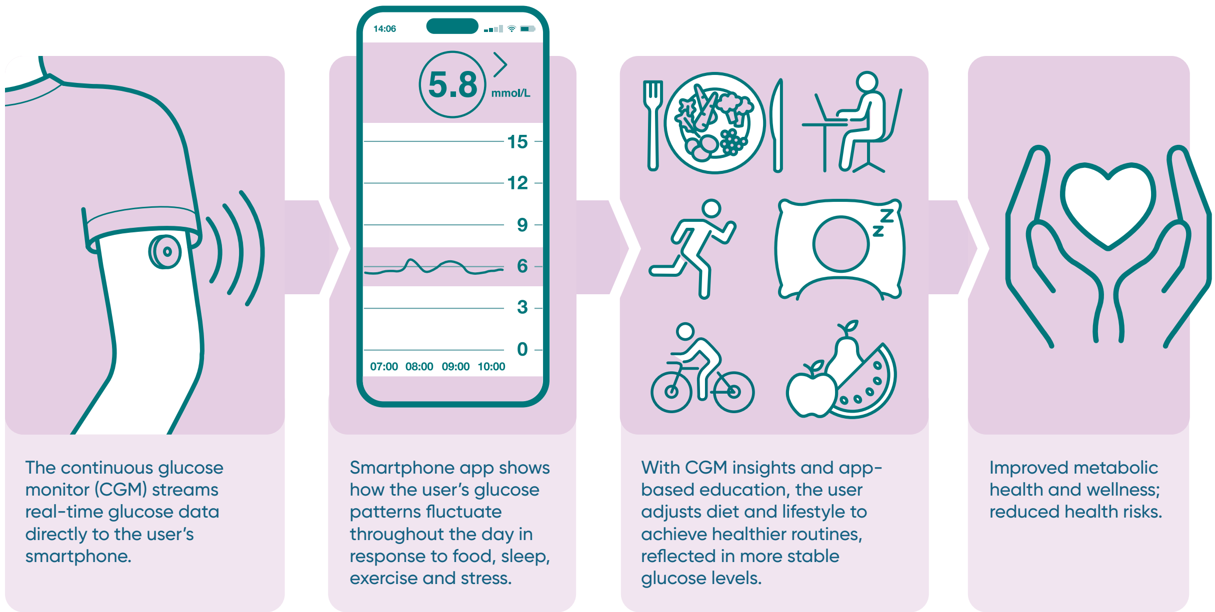
2. The Continuous Glucose Monitor (CGM)

Continuous glucose monitoring (CGM) biowearables were introduced for people with type 1 diabetes around 25 years ago, though in the earlier 'professional' CGM systems, data were blinded to the user and reviewed retrospectively at a meeting with a healthcare provider (Hirsch, 2018; Olczuk & Priefer, 2018).

Modern CGMs have greatly increased user autonomy. The system combines a minimally invasive biosensor, typically worn on the back of the upper arm, synced to a smartphone app to monitor glucose levels in interstitial fluid. For many people with type 1 diabetes, the CGM integrates with an insulin pump that automatically adjusts background (basal) insulin, while allowing users to manually administer fast-acting (bolus) doses for meals or glucose corrections. This technology eliminates the need for multiple daily finger-prick blood tests that are otherwise necessary for self-monitoring and guiding insulin injections. CGMs support better blood glucose management by delivering detailed, near real-time data on glucose levels, within-day glycaemic variation (e.g. from meals or exercise), time in target range and time in hypo- and hyperglycaemia (Chehregosha et al., 2019). As CGM records provide clinicians with insights not captured by periodic HbA1c data, the technology allows for a more personalised and targeted approach to diabetes care support (Chehregosha et al., 2019; Friedman et al., 2023).

Increasingly, CGMs are being used by people with type 2 diabetes (T2D), including those on long-acting insulin regimens or managing their condition through non-insulin medications (Ajjan et al., 2024). More recently, CGMs have gained traction among people not living with diabetes (PNLD), including individuals at metabolic risk and those aiming to improve general health or athletic performance (Battelino et al., 2025; Klonoff et al., 2023). In these cases, the principal aim of CGM is to provide the user with insights into how diet and lifestyle factors affect glycaemic patterns (Figure 3).

Figure 3. Aims of CGM use among people without diabetes



2. The Continuous Glucose Monitor (CGM)

Delivering a graphic representation of blood glucose levels on the user's smartphone, CGM technology aims to encourage dietary and lifestyle changes that help reduce glucose excursions and variability (spikes and dips).

Personalised nutrition coaching is a key component of CGM programmes. Guided by CGM insights, the user begins to learn about their metabolic responses to food types and meal composition. Programmes generally encourage prioritising fibre-rich vegetables, protein and healthy fats over (or before) high-glycaemic carbohydrates to support nutritional balance and gut health, while also attenuating postprandial glycaemic responses by slowing digestion and glucose absorption. User education additionally extends to lifestyle factors such as meal timing, exercise, sleep hygiene and stress levels, all of which (in combination with genetic factors) influence glycaemic responses, as we explore in Section 3.

2.1 The commercial availability of CGM for people without diabetes

On March 5, 2024, the US Food and Drug Administration (FDA) announced clearance of the first over-the-counter (OTC) CGM – the Dexcom Stelo Glucose Biosensor System – for "anyone 18 years and older who does not use insulin, such as individuals with diabetes treating their condition with oral medications, or those without diabetes who want to better understand how diet and exercise may impact blood sugar levels" (FDA, 2024). A second OTC biowearable technology for people not on insulin, Abbott's Lingo, received FDA clearance as a medical device in May 2024. The FDA and the manufacturers themselves have made clear that users should not make medical decisions based on the device's data without talking to their healthcare provider. Meanwhile, in many European countries, the same FDA-cleared biowearable technologies for PNLD are CE (Conformité Européenne) marked as consumer products – meeting high safety, health and environmental protection requirements, though not recognised as medical devices. CGMs aimed at PNLD cannot therefore be marketed beyond individual self-care and the promotion of healthy lifestyles.

2.2 Data privacy and consent

Through the collection of highly personal health data, CGMs have direct implications for privacy, autonomy and data protection rights. Explicit informed consent is essential to ensure users fully understand what data are collected, how they are used, and who has access to them, thereby preserving personal autonomy and protecting both bodily and informational integrity. Data from OTC CGMs generally fall under consumer privacy laws and company-specific policies, rather than health regulations such as the US Health Insurance Portability and Accountability Act (HIPAA). In these cases, consent serves as a contractual safeguard, limiting liability under consumer protection frameworks.

In addition to glucose data, providers may collect information such as height, weight, sex, age and location, as well as physical activity data obtained via third-party integrations. Users are typically informed that health data are used to tailor coaching programs, personalise recommendations and deliver educational content about diet, exercise, sleep

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and overall wellness. Data may also be used for scientific purposes, product development and business planning (e.g. Lingo, 2024; ZOE, 2025). The extent of data sharing and secondary use is governed by each company's privacy policy and, in the EU, protected under GDPR. Explicit informed consent has stronger statutory grounding under the GDPR, which classifies biometric and health data as "special category data." Processing such data requires clear, freely given, specific and informed consent. Failure to obtain such consent can lead to administrative fines and reputational harm.

3. The science behind CGM for people without diabetes

Several fields of research have motivated the consideration of continuous glucose monitoring (CGM) technology as a behaviour-change tool for people not living with diabetes (PNLD). Key domains of research include understanding individual glycaemic responses, the factors that influence those responses, the role of personalised nutrition, and the influence of metabolic health on wellbeing, healthspan and disease prevention. This section summarises key findings from these domains to provide a framework for evaluating the potential role of CGM in supporting lifestyle modifications.

3.1 Glycaemic responses: research overview

Glycaemic responses to different food types have been studied for several decades. The glycaemic index (GI) was first proposed in the early 1980s as a model to rank foods containing carbohydrates from 0 to 100, based on their postprandial blood glucose response (Jenkins et al., 1981; Peres et al., 2023). The purpose of the GI is to indicate how rapidly a food raises blood glucose levels after consumption, compared to pure glucose, which has a GI set at 100. The concept of glycaemic load (GL) was introduced a little later to provide a better, though still limited, application of GI, with GL taking into account not only the GI value but also carbohydrate portion size (Peres et al., 2023).

Understanding the relationship between GI/GL, eating habits and metabolic health has been a major focus of research ever since. Whereas low-GI foods are generally those associated with a modest rise in blood glucose concentration that declines gradually, high-GI foods can elicit sharp spikes in blood glucose and insulin levels soon after consumption, followed by a fast drop in blood sugar resulting from an exaggerated insulin response (Augustin et al., 2015). Consuming low-GI foods may help individuals feel fuller for longer, while high-GI foods can lead to an earlier return of hunger, often prompting additional food intake to restore satiety (Cai et al., 2021).

The real-world application of GI/GL is complicated by the fact that fibre, protein and fat contained within a meal alter (lower) the glycaemic response to carbohydrates and therefore blood glucose levels (Hätönen et al., 2011; Sun et al., 2014). Further research has revealed an even more nuanced picture, finding that glycaemic responses to identical meals in identical quantities can vary significantly between individuals. Among influencing factors are genetics (Wang et al., 2025), epigenetics (Paro et al., 2021), sleep quality (Tsereteli et al., 2022), body composition, gut microbiome, physical activity (Zeevi et al., 2015), meal timing (Kessler & Pivovarova-Ramich, 2019) and stress levels (Song et al., 2025). Studies indeed suggest that the same individual can exhibit different metabolic responses to identical meals due to factors such as sleep quality (Tsereteli et al., 2022), exercise (Francois et al., 2014) and meal timing (Timmer et al., 2020). Evidence of both inter-individual and intra-individual variation has been a key driver in the rise of personalised nutrition in recent years (Hinojosa-Nogueira et al., 2024).

3.2 Personalised nutrition

Personalised nutrition (PN) is an approach of tailored dietary guidance that integrates health, lifestyle and behavioural data to improve individual health outcomes (Donovan et al., 2025). The term ‘precision nutrition’ is sometimes a preferred term, with stronger emphasis on biological and environmental factors that can guide effective nutrition recommendations (Xu & Shi, 2022). It is an approach being explored in depth by the US National Institutes of Health (NIH) 'Nutrition for Precision Health' program, launched in 2023, which is using artificial intelligence (AI) to study how "a range of factors, including genes, lifestyle, health history, the gut microbiome and social determinants of health, influence a person's response to diet" (NIH, 2023).

Many questions remain about the role that individual components of PN, such as genetics (Singar et al., 2024) or the gut microbiome (Song & Shin, 2022), play in people's metabolic responses to food intake. At the same time, it has been suggested that a better understanding of interactions between behavioural and biological factors will be the key to tailored nutritional solutions that help maintain health and prevent disease (Biesiekierski et al., 2019). For example, studies examining the effects of dietary guidance based on multiple combined PN factors have demonstrated improved postprandial responses accompanied by gut microbiota alterations (Guizar-Heredia et al., 2023; Zeevi et al., 2015). Other studies adopting RCT methods have suggested improved body weight, waist circumference, HbA1c and diet quality as a result of a PN approach, as compared with general dietary advice (Bermingham et al., 2024; Karvela et al., 2024). However, whilst findings appear promising, PN approaches and results are not consistent across studies and causality is difficult to prove, illustrating both the limitations of current knowledge and the complexities of PN research.

It is of note that the UK's Food Standards Agency expects glucose monitoring and gut microbiome analysis to become the science trends that will most likely shape the PN sector in the next few years (FSA, 2023, p.74). Potential new frontiers in PN include incorporating a better understanding of epigenetic markers and the associations of food and environmental factors with the modulation of gene expression (Lorenzo et al., 2022).

3.3 The links between metabolic health and wellness

Metabolic health refers to how the body regulates energy, processes nutrients and maintains homeostasis (Zinn, 2023). Both within and beyond the field of personalised nutrition, the investigation of metabolic health – particularly the relationship between metabolic impairment and disease onset – holds substantial relevance to CGM, given its aim to inform lifestyle and dietary behaviour changes.

Research suggests a positive feedback loop between healthy lifestyle habits and metabolic health. Maintaining a nutritious, balanced diet, good sleep hygiene and regular physical activity has been associated with better metabolic functions (Dunlop et al., 2025; Fernández-Verdejo et al., 2020) and reduced risk of metabolic syndrome (Deng et al., 2025). In turn, improvements in metabolic health appear to support not just physical and cognitive functioning (Angoff et al., 2022), but also stress management (Gonzalez & Miranda-Massari, 2014) and sleep hygiene (Godos et al., 2021).

3. The science behind CGM for people without diabetes

Conversely, poor lifestyle behaviours may trigger a negative feedback loop with poor metabolic health (Figure 4). The influence of negative lifestyle factors – including excessive alcohol consumption, physical inactivity, poor diet and poor sleep quality – on metabolic health is well documented (e.g. Deng et al., 2025; Park et al., 2022; Rogers et al., 2023). In turn, metabolic dysfunction is associated with sleep apnoea, atherosclerosis, cardiovascular events and lower quality of life in general, notably in individuals with metabolic syndrome (e.g. Blaak et al., 2012; Kim et al., 2021; Lin et al., 2021; Saboya et al., 2016).

Figure 4. Vicious cycle of metabolic decline with bidirectional risks

Metabolic syndrome (MetS) is recognised as the simultaneous occurrence of health problems that include obesity (specifically central obesity), insulin resistance, hypertension and dyslipidaemia. In Europe, around a quarter of the general population is estimated to have MetS (Scuteri et al., 2015), while in the adult US population, prevalence is estimated at 41.8% (Liang et al., 2023).

Among the key clinical concerns within MetS is insulin resistance (IR) – and resulting hyperinsulinemia – characterised by an impaired biological response to insulin primarily within muscle, fat and liver cells. Abdominal obesity is a major risk factor for IR, as visceral fat releases excess fatty acids and inflammatory cytokines that can promote fat accumulation in the liver, muscle and pancreas, thereby impairing insulin signalling (Ahmed et al., 2021; Wu & Ballantyne, 2020). Studies indicate that in some people, IR precedes the development of T2D by 10 to 15 years (Freeman et al., 2023), though IR is not always associated with a body mass index (BMI) in the obese range. Findings from a US study examining cross-sectional data of adults without diabetes, aged 18 to 44 years, suggested that while approximately 40% were insulin-resistant, nearly half with IR were non-obese (Parcha et al., 2022). However, among this population are individuals with “normal-weight obesity”, characterised by a normal BMI but elevated body fat percentage. This condition is often associated with increased intra-abdominal adipose tissue and hepatic fat, which contribute to higher cardiometabolic risk (Oliveros et al., 2014; Thomas et al., 2012).

3. The science behind CGM for people without diabetes

Long-term implications of glycaemic variability, glycaemic exposure and MetS
Research suggests that glycaemic variability and exposure over time have negative long-term health implications. For example, a US study examining the progression of participants aged between 18 and 30 years into middle age found that higher intraindividual fasting glucose (FG) variability during young adulthood, below the threshold of diabetes, was associated with poorer processing speed, memory and language fluency in midlife, independent of FG levels (Bancks et al., 2018). Glycaemic variability has also been associated with the development of coronary atherosclerosis and may predict cardiovascular (CV) events and type 2 diabetes (Hjort et al., 2024). The body of research examining average glycaemic exposure over time in PNLD is more extensive and generally demonstrates stronger associations between elevated glycated haemoglobin (HbA1c) levels and the development of T2D and CV events (e.g. Adams et al., 2009; Anand et al., 2012; Butalia et al., 2024; Marco et al., 2022).

The impacts of metabolic syndrome are clearly evidenced. The clustering of cardiometabolic abnormalities associated with metabolic syndrome, including hyperinsulinemia, is unequivocally linked to an increased risk of type 2 diabetes and cardiovascular disease (Fazio et al., 2024; Pigeot & Ahrens, 2025; Roberts et al., 2013). Recent research in the UK has also linked MetS to increased risk of dementia in later life (Qureshi et al., 2024).

3.4 The potential role of CGM for populations without diabetes

Given the breadth of research activity across the scientific domains outlined above, it is unsurprising that both researchers and industry have envisioned applications for CGM beyond diabetes management. As a personal technology capable of detecting glucose exposure and variability, providing insights into metabolic functioning and for personalised nutrition, CGM may have been considered a potentially effective tool to support healthier behavioural choices among individuals without diabetes. Moreover, timely feedback from CGM may have been perceived as offering advantages over education-only approaches to health management, aligning with motivational and foundational principles of behaviourist learning theory (e.g. Daumiller & Meyer, 2025).

A number of studies have discussed and explored the potential role of CGM in supporting metabolic function in both healthy individuals and people with overweight and obesity (e.g. Hall et al., 2018; Jospe et al., 2020; Hegadus et al., 2021). Writing several years before the advent of commercially available, over-the-counter (OTC) CGM, Soliman et al. (2014) speculated that CGMs might in time be used in the "diagnosis of early dysglycemia (prediabetes)." Similarly, Hall et al. (2018) speculated that with "greater adoption of CGM technology, glucotype assessment may become an important tool in early identification of those at risk for type 2 diabetes and/or cardiovascular disease." Kim et al. (2023) envision that "in future, blood glucose, sleep, and stress data will be integrated to predict appropriate lifestyle levels for blood glucose management." The degree to which the existing literature on CGM substantiates these applications, particularly within the contexts of behaviour change and the promotion of healthy lifestyles, is examined in the following section.

4. The evidence for CGM outside of diabetes

Continuous glucose monitoring (CGM) as a potential behaviour change tool to improve metabolic health among individuals without diabetes is a rapidly growing area of research. However, such use of CGMs has been studied in only a small number of randomised clinical trials (RCTs), and longitudinal data – until recently entirely lacking (Jospe et al., 2024) – have only just begun to emerge (Ma et al., 2025). This is perhaps not surprising, given the recent conceptualisation and market availability of CGMs beyond diabetes management.

Given the important potential of CGM technology, emerging evidence from RCTs and other types of study warrants careful consideration. As a starting point, the literature identifies four distinct user scenarios for CGM-linked behaviour modification in people without diabetes. Adapting a framework outlined in a review by Klonoff et al. (2023), these user groups can be summarised as follows:

1. **individuals with metabolic diseases related to diabetes involving insulin–glucose dysregulation**
2. **individuals with metabolic diseases not related to insulin–glucose dysregulation**
3. **individuals interested in health and wellness**
4. **elite athletes**

In this section, we focus on scientific literature concerning the first three groups, as evidence from these populations is most directly relevant to questions of CGM-driven health maintenance, disease prevention and the potential reversal or remission of prediabetes and metabolic syndrome. We also summarise evidence on the accuracy of CGM in people not living with diabetes (PNLD) and briefly discuss the implications of recent findings for the real-world use of CGM in clinical and consumer contexts.

4.1 CGM as a tool for behaviour modification and metabolic health enhancement

Most studies in the literature that explore CGM as a tool for behaviour change prioritise individuals with diabetes and have a predominant focus on glycaemic control (Jospe et al., 2024). Reviews have provided strong evidence that CGM technologies can improve glycaemic control in people with diabetes who are insulin dependent (e.g. Alfadli et al., 2025; Janapala et al., 2019). A smaller body of research has extended this enquiry to examine other behavioural outcomes, suggesting that CGM insights may support positive lifestyle modifications among people living with either type 1 or type 2 diabetes (e.g. Battelino et al., 2025; Ehrhardt & Al Zaghal, 2020; Oser et al., 2022; Taylor et al. 2018). However, it would be inappropriate to assume that the effects reported in these contexts are directly applicable to CGM use by people without diabetes, particularly among populations who do not identify as living with any disease.

4. The evidence for CGM outside of diabetes

4.1.1 Primary research

Research over the last few years has been investigating whether and how CGM-based approaches may positively influence dietary behaviours, lifestyle changes and metabolic outcomes in people not living with diabetes (PNLD). The strength of evidence in this body of research varies, particularly where study designs lack control groups, limiting causal inference. The following studies are summarised as illustrative examples. (A list of these and additional relevant studies, with summary data, is provided in Appendix B.)

Exploring the feasibility and acceptability of CGM among people with prediabetes, a single-arm study found largely positive satisfaction among 32 participants who wore the sensor for one month (Lee et al., 2023). The majority (81%) of participants reported that wearing the sensors reminded them to stay healthy on a daily basis, with some reporting lifestyle modifications such as gym attendance and reduced snacking. In another feasibility study, involving 40 adults with obesity, researchers found that glucose monitoring, whether through CGM or finger-prick testing, appeared to enhance adherence to a hunger-training intervention (Jospe et al., 2020). The researchers found similar amounts of weight loss (~4 kg) among both the CGM and finger-prick groups at the end of the six-month study period, suggesting that regular blood glucose monitoring, regardless of method, may support improvements in dietary behaviours.

Exploring the effects of CGM insights on glycaemic stability and weight management, a 'real-world' retrospective cohort study involving 944 users found improvements in time-in-range (TIR) glucose levels for healthy individuals, people with prediabetes and T2D – most notably among those with higher engagement of the synced AI-supported mobile app (Veluvali et al., 2025). Results included reduced hyperglycaemic events among the prediabetes cohort and decreased hypoglycaemic events across all cohorts, accompanied by modest weight reduction over the 33-day period. A further study combined CGM, food and activity tracking, and an AI/machine learning model to create personalised insights (via smartphone app) for participants whose glucose levels spanned normal (n = 746), prediabetes (n = 206) and T2D ranges (n = 94) (Dehghani Zahedani et al., 2023). After 28 days, researchers found decreases in hyperglycaemia, glucose variability and hypoglycaemia among individuals without diabetes. Dietary improvements (reduced carbohydrate-to-calorie ratio and increased intake of protein, fibre and healthy fats) were also recorded, alongside weight loss across all groups, particularly among those with overweight and obesity. However, in the absence of a control group without glucose monitoring, specific causation could not be established.

To isolate the effects of CGM, Chekima et al. (2022) conducted an eight-week RCT with participants with overweight and moderate obesity and instructed them to maintain their usual activity levels throughout the study period, thereby enabling clearer assessment of CGM-related dietary and physical health outcomes. Both the intervention group (CGM plus nutritional guidance) and the control group (nutritional guidance only) reported similar reductions in energy intake. However, the intervention (CGM) group showed greater reductions in body weight, BMI and fat mass, leading the authors to infer greater under-reporting of energy intake in the control group. The intervention group also showed lower levels of fasting plasma glucose. While HbA1c and low-density lipoprotein (LDL) cholesterol decreased in both groups, between-group differences were not statistically significant.

The implication in Chekima et al. that the visualisation of CGM data in combination with education may elicit stronger behavioural change than education-only approaches aligns with findings from two recent RCTs in individuals with prediabetes. Basiri and Cheskin (2024) found that participants receiving CGM combined with individualised nutrition therapy (INT) achieved statistically significant increases in time in range (70–140 mg/dL; 3.9–7.8 mmol/L) over 30 days, whereas changes in the INT-only control group were not significant. In a longer-term trial, Ma et al. (2025) found that, following a 14-day intensive education programme, participants in a CGM plus energy-balance arm exhibited lower average HbA1c levels at 12- and 24-months follow-up compared to an energy-balance-only group. In addition, LDL cholesterol levels were significantly lower in the CGM group compared to the energy balance group at 24 months.

4.1.2 Literature reviews

Several literature reviews have examined potential CGM-driven behaviour change across populations with and without diabetes. In these reviews the evidence is strongly weighted toward people with diabetes, reflecting the larger pool of relevant studies, and with a predominant focus on blood glucose control.

Among the most recent is a review of 25 RCTs focused on CGM as a behaviour change tool, which suggested modest improvements in glycaemic control from CGM-based feedback in adults both with and without diabetes (Richardson et al., 2024). The review found that only a minority of RCTs explored the association of CGM with weight and BMI, concluding overall non-significant effects. A review of a much broader range of studies published the following year examined CGM use among people with obesity, intermediate hyperglycaemia and T2D (Battelino et al., 2025). The authors concluded that the use of CGMs can enhance early detection of dysglycaemia in at-risk populations, supporting earlier intervention. The review's discussion of weight-loss outcomes was based primarily on CGM studies involving participants with T2D, showing promising short-term results. Evidence for at-risk groups was limited, however, prompting the authors' call for further prospective studies.

A narrative review focusing exclusively on CGM studies involving people not living with diabetes (PNLD) examined several fields of relevant research to explore evidence relating to the real-world usage of CGM, as promoted by commercial companies (Oganesova et al., 2024). The findings highlighted a lack of clear clinical benchmarks for PNLD and raised questions about the accuracy of CGM across different BMI categories. The review also considered several studies, most with very short timeframes, investigating behaviour change aimed at metabolic health improvement, concluding that current evidence was insufficient to support claims that CGM-derived insights can reliably lead to sustained improvements in metabolic health.

4. The evidence for CGM outside of diabetes

A more optimistic outlook on current evidence is offered by Wilczek et al. (2025) in a systematic review examining studies relevant to cardiovascular disease prevention in PNLD. With a focus on CGM's potential to detect cardiovascular risk factors such as glycaemic variability and post-meal hyperglycaemia, the authors concur with Battelino et al. (2025) that CGM can enable early identification of metabolic abnormalities. Moreover, as a possible tool for personalised diet adjustments and increased motivation for physical activity, CGM "may offer significant potential benefits for cardiovascular prevention in healthy individuals."

(See Appendix B for a list of recent reviews on CGM and behaviour change, with summary findings.)

4.1.3 Discussion

The existing literature on the use of CGM in PNLD encompasses studies employing heterogeneous methodological approaches and targeting diverse populations, ranging from healthy individuals to those with severe obesity and prediabetes (also termed intermediate hyperglycaemia). This diversity is, on the one hand, illustrative of the disparate groups of people who may conceivably benefit from CGM insights. However, these factors complicate cross-study comparisons and make it difficult to determine the specific drivers of reported behavioural and health improvements, let alone how findings may translate to real-world contexts. This issue is emphasised in people who are not insulin resistant, whose glucose excursions lie in a much narrower range.

Significant research is seeking to understand CGM-derived glucose metrics for normoglycaemia through to prediabetes (e.g. Cichosz et al., 2025; Keshet et al., 2023; Marco et al., 2022; Shah et al., 2019; Spartano et al., 2025a). However, there is currently no consensus on the use of CGM metrics – such as time in range (TIR), time above range (TAR), and mean amplitude of glucose excursion (MAGE) – for diagnosing insulin resistance and prediabetes. The interpretation of measurements is complicated by interindividual variability in 'normal' glucose patterns, which can differ by age, sex, ethnicity and body composition. Further studies are therefore warranted to establish clinical benchmarks for the various subgroups of PNLD, so that CGM can serve as a practical tool to support timely clinical recognition of metabolic disorders.

Establishing diagnostic thresholds for CGM metrics is not necessarily essential to the technology's utility in supporting meaningful changes to diet and lifestyle. However, as consistently noted in the literature, longitudinal RCTs are needed to assess whether the behavioural effects of CGM in PNLD are sustained in the longer term. For the time being, evidence indicates that when combined with dietary and lifestyle education, CGM insights may facilitate short-term positive behaviour change in both nominally healthy and at-risk individuals. Among the most emphasised findings in recent RCTs and reviews is the potential of CGM insights to enhance glycaemic control in at-risk individuals; if demonstrated as sustained, this could be of significant relevance to strategies aimed at disease prevention.

4. The evidence for CGM outside of diabetes

4.2 A question of CGM accuracy in PNLD

Continuous glucose monitors measure glucose levels in subcutaneous interstitial fluid, providing a close approximation of blood glucose. While capillary (finger-prick) blood glucose testing is currently more accurate for single-point measurements, studies suggest that CGM is more accurate for the assessment of glycaemic profiles (Umpierrez et al., 2025). Notably, evidence strongly indicates that CGM use by people with type 1 and type 2 diabetes results in superior glycaemic control and long-term safety, yielding greater reductions in HbA1c compared with capillary testing alone – as noted earlier (see also Williams et al., 2025). There are good reasons why this may be the case, not least because individuals reliant on capillary testing may test less frequently to avoid pain, resulting in poor diabetes management.

If the benefits of CGM outweigh accuracy-related concerns in individuals with diabetes, this conclusion cannot be directly extrapolated to PNLD seeking to optimise their metabolic health. For example, if CGMs overestimate glycaemic responses in PNLD, individuals may unnecessarily restrict certain foods based on misleading information. There is some suggestion of this in the literature (Guess, 2023), but no indication of whether this issue is rare or widespread among CGM users.

4.2.1 Evidence

The literature provides limited insights into the accuracy of CGM technologies in PNLD, as studies are relatively few in number and often lack clarity and rigour (Pemberton & Brown, 2025). Studies that have concluded 'highly variable' intraindividual CGM responses for identical meals have disclosed important limitations, such as unrecorded snacks between meals (Hengist et al., 2025), and a lack of reference tests to improve the precision of the estimate for the glycaemic response to a reference food (Hutchins et al., 2025). Studies have also noted differences in CGM readings according to the body location of the sensor (Kim et al., 2020; Kawakatsu et al., 2022), a factor that can complicate the comparison of different CGM devices worn simultaneously. Studies comparing CGM accuracy with finger-prick testing variously report both positive and negative findings; one, for example, describes CGM as a "convenient and reliable tool for monitoring blood glucose in healthy adults" (Fellinger et al., 2024), while another notes "suboptimal accuracy" due to a tendency to overestimate glucose levels (Jin et al., 2023). A key limitation in such studies can be a lack of researcher knowledge about the physiological and sensor-specific technological time lag (of up to 15 minutes) in CGM data when comparing to the real-time data provided by finger-prick tests.

4.2.2 Implications for CGM studies and real-world usage

Despite ongoing uncertainties regarding the accuracy of CGM in PNLD, clinical researchers are exploring its diagnostic and therapeutic utility across a range of settings. Studies have examined CGM for the early detection of glucose dysregulation and prediabetes (e.g. Bakhshi et al., 2025; Metwally et al., 2024; Rodriguez-Segade et al., 2018), and its potential benefits in gestational diabetes (Burk et al., 2025; Chai et al.,

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2025). Further investigations have extended to sleep apnoea (Gouveri et al., 2025), menopause (Bermingham et al., 2022), dialysis (Mayeda et al., 2023), chemotherapy for early-stage breast cancer (Ulene et al., 2025), surgical care (Carlier et al., 2025) and intensive care settings (Shang et al., 2025). Collectively, such studies indicate that CGM may hold important clinical value even if tending to overestimate glucose levels or not delivering the point-in-time accuracy of capillary testing. In these cases, researchers and clinicians may regard concerns about CGM accuracy as substantially less critical than the potential risks of missing indications of disease or complications, or opportunities to enhance routine and acute clinical care.

However, further research is vital for achieving consensus on how CGM should be used for early detection of dysglycaemia and for diagnostic purposes, with agreed criteria or thresholds. To this end, the International Federation of Clinical Chemistry (IFCC) Working Group on Continuous Glucose Monitoring recommends the standardisation of CGM performance assessments to ensure better alignment of CGM-derived metrics between different systems (Pleus et al., 2024). Such harmonisation will significantly enhance the ability to create clinical guidelines and regulations for the use of CGM outside of diabetes in public healthcare.

For now, it is important to acknowledge that issues of CGM accuracy and the potential for misinterpretation may be consequential in real-world settings among individuals with eating disorders or mental health vulnerabilities, where confusion over readings may cause unintended harm. This underscores the need for clear provider guidance on the interpretation of CGM data, with explicit caution regarding margins of error, and broader understanding of CGM among healthcare professionals who may encounter such users within public healthcare settings.

5. Opportunities and challenges – Expert opinions

Interviews were conducted with international experts to gain insights into current clinical, public health and research perspectives on the potential role of continuous glucose monitoring (CGM) for people not living with diabetes (PNLD). Most participants were medical doctors whose expertise variously covered obesity, cardiometabolic disease prevention, diabetes, metabolic health and wellness, mental health, personalised nutrition, digital health and CGM. Some participants had further roles as national or international public health advisors. The interviews also involved experts with direct research experience involving CGM, both within and beyond the context of diabetes management.

The interview guide was developed based on themes emerging from the project's literature review. In most cases, interviewees provided consent for their views to be attributed. Initials are used throughout this section to identify specific positions and opinions to which they contributed. In three cases, however, interviewees asked for their responses and views to be reported anonymously. Interviewees are listed in Appendix A of this report.

5.1 The use of CGM by the general public

Views on the use of CGM by the general public, outside of clinical care, revealed a balance between enthusiasm for its potential and caution about its limitations. Several respondents emphasised the lack of established standards for 'normal' metabolic health and that the accuracy and interpretation of CGM data in healthy individuals remain uncertain (RW, NS, EMG, RK). As one respondent commented, it is a challenge "to discern what is signal and what is noise."

At the same time, some participants – including those with experience of CGM in private practice – stated that CGM can be an empowering tool for personal health education, self-awareness and potential behaviour change, particularly in promoting better dietary and lifestyle choices (GE, AR, Anon, Anon). It was suggested that CGM insights can complement holistic approaches to personalised nutrition and exercise, helping people to visualise the effects of food and activity on glucose levels. One participant remarked, "I've never had a patient who began using CGM who did not change their diet – it's been empowering." The right to access and understand one's own metabolic data was noted, but with guidance on diet and lifestyle essential. However, caution was expressed about the potential rise in the "worried well in an already overstretched [healthcare] system." As one US participant noted, "we don't want to medicalise normal glucose variation in healthy people and make them feel unhealthy." Education was noted as an essential component to help users grasp metabolic profiles and the implications of glucose data.

5. Opportunities and challenges – Expert opinions

5.2 Target groups for CGM beyond diabetes

Participants were asked to share their personal views on which groups, if any, they believed might benefit most from the use of CGM. Several participants emphasised CGM's potential value in prevention and early detection, particularly for people at risk of metabolic syndrome, insulin resistance or prediabetes (GE, RW, MC, LS, RK, Anon). Some respondents stated that CGM could play a role in identifying early metabolic changes, offering valuable data for both personal health management and clinical research in conditions such as cardiovascular disease, obesity and inflammatory disorders. Several respondents highlighted specific clinical contexts where CGM might offer benefits, such as post-surgery recovery (where glucose regulation affects healing outcomes), for people with cystic fibrosis, those undergoing COPD corticosteroid treatment, and also for gestational diabetes, where supporting evidence in the literature is already emerging.

Some respondents returned to the theme of health optimisation and performance, where CGM is seen as a tool for people aiming to enhance metabolic efficiency, physical fitness or cognitive performance (GE, AR, LS, Anon, Anon). Among suggested beneficiaries were fitness-driven individuals, shift workers, military personnel and pilots. It was reported that CGM use among health-conscious populations is growing, particularly in the US. Some respondents linked CGM use to broader public health benefits, such as better management of treatment-related glucose effects and the promotion of "health span" through education and self-awareness (Anon, Anon). A public health expert from Austria, discussing CGM in combination with other modalities, reported that "many governments are looking to this as the next wave to improve global health."

5.3 Potential risks associated with consumer use of CGM

A recurring response to the question of risk in CGM programmes, particularly outside of clinical supervision, concerned possible impacts on vulnerable groups, such as those with eating disorders, obsessive tendencies or high levels of health anxiety. Several participants warned that CGM could exacerbate restrictive behaviours, encourage undereating, or trigger obsessive monitoring of glucose spikes (RW, GE, PC, AR, EMG, RK, EB, Anon). This concern was framed in different ways: the possibility of individuals going to unhealthy lengths to keep glucose levels as flat as possible (worsening anxiety when failing to do so), or being drawn into unsafe patterns of behaviour under the influence of over-ambitious providers or medically untrained coaches. Three participants suggested the need for clear guidelines and suitability screening checks before recommending a CGM in clinical contexts, to mitigate risks (AR, EMG, Anon).

Participants did not suggest that CGM would be a likely, specific cause of eating disorders, and several felt the degree of risk of CGMs was low overall (RW, GE, MC, Anon). For example, one participant pointed out that as long as nutritional balance is maintained, any mistaken avoidance of one particular type of carbohydrate due to misinterpreted CGM data was not a cause for concern. A further respondent contrasted the comparatively low risks of CGM with the high risks of over-the-counter medications such as aspirin, paracetamol and anti-inflammatories, which when overconsumed can lead to serious illness and even death.

Taken together, the responses reflected a consensus that the unintended consequences of CGM use are low risk for the majority of users. However, specific psychological and behavioural vulnerabilities, especially around eating and anxiety disorders, warrant caution, particularly in the absence of clinical oversight.

5.4 Reviewing CGM data for PNLD in clinical practice

While general users of CGMs are typically interested in metabolic health insights and guidance on dietary and lifestyle modifications, individuals may seek clinical advice within public health systems regarding perceived anomalous glucose readings (as noted above). Additional clinical considerations arise in private practice, currently, where CGMs may be specifically employed to support behaviour change among clients or patients. Accordingly, participants were asked whether CGMs, when encountered or used in clinical contexts, should be managed only by clinicians with specific training and expertise.

Respondents generally felt that most doctors could offer advice and guidance, but a significant level of expertise would be required to clinically interpret CGM data, certainly for medical decision-making. There was variation in views on who should provide this expertise and how the service might evolve. Some respondents felt that as a supplementary modality, CGMs required experienced doctors or clinicians with specialist training (RW, AR, LS, EB, Anon). One highlighted that many healthcare professionals lack knowledge in personalised nutrition and precision medicine, especially for vulnerable groups, and would not feel confident in interpreting CGM data. Another similarly emphasised that oversight by an experienced physician was crucial because of the subtle complexities and holistic impacts on patient care. Two other participants argued that ideally a doctor with a background in endocrinology, internal medicine or related specialities would be necessary, given the need to be able to integrate technical, emotional and medical dimensions.

Others suggested a wider range of clinicians could manage CGM data and medical decision-making, given appropriate training (GE, EMG, PC, RK, MC, Anon). It was emphasised that clinical assessments would never consider CGM data in isolation (in the case of anomalous readings), and that other tests and measurements would be undertaken as a matter of routine. One respondent proposed that while doctors or nurse specialists should manage CGMs initially, the role could in time be expanded to include pharmacists and dietitians, with appropriate training. Another commented that CGM was "within the sphere of experienced clinicians' scope of practice" and that "any doctor could do this with a reasonably short clinical course."

5. Opportunities and challenges – Expert opinions

Overall, the consensus was that CGM expertise would be essential only for medical decision-making and long-term management. However, clinical decisions would not be based on CGM data alone – a point consistent with a recent study that found high variability among clinicians already familiar with CGM when interpreting potentially challenging CGM reports for PNLD (Spartano et al., 2025b). Participants diverged on whether such decision-making should remain the domain of physicians and specialists or whether it could broaden to include other healthcare professionals with relevant training and collaboration. There was recognition of both the risks associated with undertrained staff and the opportunity to build capacity beyond specialist doctors through structured training and integrated care models.

5.5 Looking ahead: opinion on wider CGM adoption

Responses to several questions highlighted both opportunities and challenges associated with the broader adoption of CGM across healthcare and insurance contexts internationally.

Identified drivers of adoption included government interest in wearable technologies for disease prevention and interest among US insurers in CGM as a behaviour change tool in people with T2D. One respondent suggested that insurers and corporate wellness programmes may promote CGMs much like they have with fitness trackers (Vitality Insurance and Fitbit were mentioned), potentially incentivising usage through rewards. In the event of clear evidence for CGM in PNLD, reliable information from a public health perspective would be needed "to ensure that individuals [are] able to be self-supportive and obtain the best from CGM."

Barriers to wider implementation were often mentioned. These included the lack of robust longitudinal data and clinically validated benchmarks for CGM outside of diabetes. One participant commented that wider professional opinion is very mixed about CGM: while some healthcare practitioners are enthusiastic and engaged, others question the value of CGM data for PNLD or might want to resist the burden of yet more patient data. Another respondent said that because CGM held greatest promise for people at-risk of T2D and cardiovascular events, healthy and fit people "should not be the ones promoting this."

The potential for CGM to exacerbate health inequalities was noted, particularly due to the associated costs. One respondent qualified this, however, explaining that CGM use was often short-term, for a few weeks only, to guide informed dietary or behavioural changes. Concerns were also raised about the potential misuse of CGM data by third parties, such as insurers or mortgage providers, a risk previously noted with ECG-enabled wearables. Although data privacy was anticipated to emerge as a major theme, few participants emphasised it. This may reflect the current demographic of CGM users. As one respondent observed, "Young people are less concerned about data privacy because they've never had it." Older generations, on the other hand, tend to be more cautious about sharing health-related information.

5. Opportunities and challenges – Expert opinions

5.6 Summary

The interviews reflected a mix of optimism and caution around the use of CGM among people without diabetes. The preventive potential of CGM for at-risk groups was widely discussed, and with further possible applications across a wide range of clinical contexts. However, most respondents stressed the need for more research to establish the clinical validity of CGM, both as a cost-effective tool for sustained behaviour change and for the understanding of healthy and unhealthy glucose patterns in PNLD, aiding the diagnosis of conditions such as prediabetes.

Those with direct clinical experience of CGM tended to express greater confidence in the ability of CGM to guide healthier behaviours, though these and other experts warned against over-medicalising normal glucose variation or increasing anxiety among the "worried well." Broader adoption in public health systems was likely to begin with people living with prediabetes, though this would require clinician training, regulatory frameworks and assurances of equitable access.

6. Conclusions & Recommendations

The exploration of continuous glucose monitoring (CGM) beyond diabetes management is attracting growing interest from researchers, clinicians and government funding bodies. Although research remains early stage, emerging evidence suggests that integrating CGM insights into diet and lifestyle education programmes may enhance glycaemic control, support behaviour change and enable earlier intervention among individuals at risk of developing type 2 diabetes (T2D) and cardiovascular disease (Battelino et al., 2025; Wilczek et al., 2025). Concurrently, research is seeking to establish benchmark CGM metrics for people not living with diabetes (PNLD), with particular focus on identifying insulin resistance and prediabetes (e.g. Chaudry et al., 2024; Zahalka et al., 2025). In addition, CGM-derived glycaemic data are being investigated to improve pathophysiological understanding and clinical management across diverse contexts, including menopause (Bermingham et al., 2022), surgical care (Carlier et al., 2025), intensive care settings (Shang et al., 2025), cancer care (Ulene et al., 2025) and gestational diabetes management (Burk et al., 2025).

6.1 Governments: research funding and new directions

There appears to be growing interest among government health departments and public research agencies in the use of CGM beyond diabetes care. This is reflected in the funding of studies exploring the potential of CGM in diagnostics, individual behaviour change, neonatal clinical care and broader scoping exercises to assess its wider applications.

In the US, government-supported studies include the Framingham Heart Study, which has examined the impact of diet on CGM measures of glycaemic variability (Bakhshi et al., 2024) and advanced understanding of physiological CGM ranges among individuals without diabetes (Spartano et al., 2025a). The Glucose Everyday Matters (GEM) programme has also received government funding to investigate whether CGM insights can improve glycaemic control and support disease remission in individuals with T2D through a focus on behavioural modification and glycaemic regulation, rather than weight loss (University of Virginia, 2023). Researchers are considering the programme's application to people with prediabetes (Calderon et al., 2025), since in its pilot phase, the GEM study saw 67% of T2D participants achieve remission within three months (Oser et al., 2022).

In Britain, the Department of Health & Social Care (DHSC) has supported research whose findings suggest CGM can improve glucose control in preterm infants, a group in whom hyperglycaemia and hypoglycaemia are common and linked to increased morbidity and mortality (Beardsall et al., 2021). More recently, the DHSC supported a review of the CGM evidence base in PNLD, in which the authors reported "promising results" from a number of studies that "[highlight] the benefits of CGM in specific populations such as people living with obesity, prediabetes, gestational diabetes mellitus, metabolic dysfunction-associated steatotic liver disease, other endocrinopathies, and genetic syndromes" (Liarakos et al., 2025).

6. Conclusions & Recommendations

Looking ahead, personalised nutrition (PN) research is expected to increasingly integrate CGM-derived glycaemic data with gut microbiome analyses to enhance individualised dietary recommendations (FSA, 2023). Initiatives such as the US NIH's Nutrition for Precision Health programme and the EU-funded EIT Food's eNutri studies highlight strategic opportunities to integrate digital and biological data streams to optimise dietary advice and long-term health outcomes. The EU's Stance4Health (S4H) project, which resulted in the i-Diet app (EUFIC, 2023), is a recent example of an international programme developing tools for personalised nutrition and consumer engagement based on the use of mobile technologies, as well as tailored food production to "optimise the gut microbiota activity and long-term consumer engagement" (Stance4Health, n.d.). With partner countries including Spain, Germany, Denmark, Romania, Italy, Greece, Belgium and the UK, target groups in the research phase included not only overweight children and adults but also those considered "healthy," to prevent the development of diseases such as obesity and type 2 diabetes.

Internationally, Hinojosa-Nogueira et al. (2024) report an exponential growth in both public and commercially-funded research in personalised and precision nutrition since 2015, with the United States, Spain and the UK emerging as the leading contributors.

6.2 Healthcare practitioners

The merging of CGM and PN can already be seen in private clinical practice, aimed at behavioural guidance and dietary interventions among PNLD. Clinicians with specialised interests in PN and metabolic health interviewed in this research had anecdotal evidence for CGM efficacy and were enthusiastic about its value for dietary and lifestyle guidance. There was, however, little discussion of CGM use by the very people it may help most – those at risk of obesity-related diseases.

In public healthcare systems, clinicians are likely to encounter CGM only sporadically, but perhaps notably among users seeking guidance on perceived irregular glucose readings. Some may present with underlying eating disorders, mental health vulnerabilities or cognitive decline, highlighting the need for sensitive, evidence-informed clinical responses to avoid emotional and physical harm. Parallels can be drawn with the emergence of consumer electrocardiogram (ECG)-enabled smartwatches, primarily used by younger, low-risk individuals, which have prompted hospital visits based on false positives, although in some cases, alerts are reported to have supported diagnostic evaluation and medical intervention (Griffin, 2024; Heringer, 2024).

While media attention continues to focus on health-conscious CGM users rather than those at greatest metabolic risk (e.g. Honderich, 2024; Matei, 2024), challenges may persist for clinical education on CGM. If engagement with CGM is largely framed around wellness optimisation for the fit and healthy, rather than disease prevention, messages from the media may reinforce scepticism or dismissiveness toward the technology within mainstream clinical practice.

6. Conclusions & Recommendations

As governments explore (bio)wearable technologies to advance personalised care and healthcare sustainability, the potential of CGM for metabolic health and disease prevention warrants open-minded consideration. It is conceivable that CGM technology could become an important component of public health systems of the future, not only in hospital settings and behaviour change programmes (as currently being explored), but also in routine preventative health checks for the middle-aged and elderly, given the spectrum of conditions such programmes target (e.g. NHS, n.d.; BfG, 2021). Healthcare professionals should follow developments in this evolving field, familiarising themselves with consumer use of CGM and ensuring that clinical perspectives keep pace with technological innovation.

6.3 Research community

The clinical evidence base for CGM use in PNLD is expanding rapidly, and the need for robust randomised controlled trials (RCTs) and prospective longitudinal studies is widely recognised. To date, many studies have been of short duration or have lacked control groups, which limits their ability to establish causation. This is not to discount the growing body of research showing encouraging findings, but rather to highlight the urgency of strengthening the evidence base. Future research must give stronger focus to study designs that can more reliably determine the clinical validity and long-term impact of CGM, particularly for high-risk groups who are likely to see the greatest benefit.

Further studies aimed at establishing clinical benchmarks for CGM use in PNLD are also needed, particularly to advance the early detection of prediabetes. The introduction of CGM technology in PNLD provides a unique opportunity to define "normal" and "abnormal" glucose dynamics with a level of granularity unattainable through traditional measures such as fasting plasma glucose and HbA1c. This emerging area of research should be prioritised and explicitly highlighted in government funding strategies to support the development of evidence-based frameworks for metabolic health monitoring and disease prevention.

6. Conclusions & Recommendations

6.4 Recommendations

The following recommendations are intended to guide policymakers, healthcare professionals, researchers and industry stakeholders in supporting further exploration of CGM for PNLD. Recommendations focus on strengthening research, establishing clinical standards, ensuring user safety, and promoting informed engagement with CGM data to maximise public health benefits while mitigating potential harms.

For governments and research funding bodies

1. **Fund RCTs on CGM for at-risk groups with long-term follow-up**
   Government funding bodies should prioritise robust longitudinal research on CGM in people at risk of diabetes to assess long-term behavioural and health outcomes. Studies should examine the synergistic effects of combined CGM, dietary and lifestyle education versus education without CGM to provide clearer indications of causation.

2. **Fund research to establish clinical benchmarks for normative glucose patterns**
   There is an urgent need for benchmark CGM measurements for healthy/normative glucose through to dysglycaemia, according to age, sex, ethnicity and body composition metrics. Particular attention should be given to CGM benchmarks for insulin resistance and prediabetes to enhance clinical interpretation and decision-making.

For CGM providers

3. **Provide clear advice on CGM accuracy and interpretation for general users**
   CGM providers should include clear guidance cautioning against overinterpretation of CGM readings within what may be normal physiological variability. Transparent communication about accuracy and expected variation would mitigate misinterpretation and anxiety, particularly among vulnerable users.

4. **Introduce safeguards for vulnerable users**
   CGM companies are encouraged to create app-based and online pre-screening tools to assess user suitability. Simple digital questionnaires could flag potential vulnerabilities – such as eating disorders, obsessive tendencies or high health anxiety – and provide tailored cautionary advice or signposting to professional support. Such safeguards would promote responsible use and reassure clinicians concerned about unsupervised adoption.

5. **Aim for standardisation in CGM performance assessments**
   The clinical utility of CGMs can be significantly strengthened if manufacturers adopt common calibration standards, ensuring greater consistency and comparability of glucose readings within and between different devices.

6. Conclusions & Recommendations

For healthcare professionals

6. Prepare for user support and guidance

Healthcare professionals (HCPs) are increasingly likely to encounter CGM use among the general public. They should maintain up-to-date knowledge of the technology and consumer use, understanding that glycaemic responses are influenced not just by diet but also sleep, stress, physical activity, sedentary behaviour and meal timing. HCPs should be alert to CGM use among vulnerable groups and the potential for misuse.

For clinical researchers

7. Ensure methodological rigour and clarity in the design of protocols assessing CGM system performance

In addition to the target research areas described above (see Recommendations 1 & 2), researchers are encouraged to pursue greater methodological rigour in the design of protocols assessing CGM system performance. The comprehensive reporting of study design elements is essential to ensure the integrity, transparency and validity of findings.

Appendix A

CGM Research Project Interviewees: The following experts were interviewed during the project period, as described in Methods and Section 5 of this report. The conclusions presented in this report are solely those of the authors and do not necessarily reflect the views of the participants.

Name	Roles/specialisms	Country / experience
Anonymous	Doctor with clinical and allied health-related policy and public health roles	Austria, Germany
Dr Angeline Romano	Doctor; women's health & lifestyle medicine	Italy, UK
Anonymous	Doctor with clinical and allied health-related policy and public health roles.	Spain
Dr Evelyn Bischof	Internal medicine, oncology, preventive and precision medicine, biogerontology, geronto-oncology, AI. President, Healthy Longevity Medicine Society.	Switzerland, Germany
Dr Elizabeth Smee	Consultant anaesthetist; longevity, competitive sports.	UK
Dr Paul Charlston	GP; NHS/Private dermatology specialist; former President of British College of Aesthetic Medicine.	UK
Dr Ruby Wang	Medical Doctor; Director, LINTRIS Health Consultancy; Digital Health Council, Royal Society of Medicine.	UK, US, Europe, China
Dr Elizabeth Stutters	GP; GP appraiser; former Systems and Technology Lead, Babylon Health.	UK, France
Dr Ravi Kumar	Consultant; biochemical testing, longevity, genetics.	UK, India, Spain
Dr Alice Byram	Emergency and Family Medicine MD; President Digital Health, Royal Society of Medicine. CMO MedTech and Digital Health.	UK, Spain

Appendix A

CGM Research Project Interviewees (continued)

Name	Roles/specialisms	Country / experience
Dr Georgia Ede	Nutritional and Metabolic Psychiatrist.	USA
Dr Mark Cucuzzella	Physician; Professor at West Virginia University School of Medicine; author.	USA
Dr Nicole Spartano	Assistant Professor of Medicine in Endocrinology, Diabetes, Nutrition and Weight Management, Boston University Chobanian & Avedisian School of Medicine.	USA

Project Advisory Board: The Advisory Board provided advice and support on the project's scope and participant outreach, and reviewed and provided feedback on draft versions of the report. Their participation does not imply endorsement of the report's findings or conclusions.

Professor Julia Manning	Dean of Education, Royal Society of Medicine.
Dr Adam Collins	Associate Professor of Nutrition, University of Surrey.
Ash Soni, OBE	Chair Pharm@Sea, former President RPS and NAPC.

Appendix B

Supplementary material (Section 4): literature identified from rapid review

CGM applications, feasibility and toleration: Recent reviews			
Authors	**Study type**	**Title**	**Relevance / Study conclusions**
Hegedus et al., 2021	Scoping review	Use of continuous glucose monitoring in obesity research: A scoping review	*Finds CGM a well-tolerated and versatile tool for obesity research in pediatric and adult patients. Further investigation is needed to substantiate the feasibility and utility of CGM in obesity research and maximise comparability across studies.*
Klonoff et al., 2022	Scoping review	Use of Continuous Glucose Monitors by People Without Diabetes: An Idea Whose Time Has Come?	*Different clinical user cases identified; notes research investigating CGM with a "goal of improving glucose patterns to avoid diabetes, improving mental or physical performance, and promoting…healthy behavioral changes."*
Holzer et al., 2022	Mini review	Continuous Glucose Monitoring in Healthy Adults—Possible Applications in Health Care, Wellness, and Sports	*Considers CGM to have "high potential for health benefits and self-optimization [but] more scientific studies are needed to improve the interpretation of CGM data. The interaction with other wearables and combined data collection and analysis in one single device would contribute to developing more precise recommendations for users."*
Kim et al., 2023	Narrative review	The role of continuous glucose monitoring in physical activity and nutrition management: perspectives on present and possible uses	*"Numerical modeling can be used to analyze the complex relationship between stress, sleep, nutrition, and physical activity, which affect blood glucose levels. In future, blood glucose, sleep, and stress data will be integrated to predict appropriate lifestyle levels for blood glucose management. This integrated approach improves glucose control and overall wellbeing, potentially reducing societal costs."*
Hjort et al., 2024	Systematic review and meta-analysis	Glycemic variability assessed using continuous glucose monitoring in individuals without diabetes … A systematic review and meta-analysis	*Review of studies evaluating glycemic variability (GV) using CGM for ≥24 h. Finds that multiple measures of GV are higher in individuals with prediabetes compared to those without; GV appears to be inversely associated with beta cell function. By contrast, GV is not clearly associated with insulin sensitivity, fatty liver disease, adiposity, blood lipids, blood pressure or oxidative stress. GV may be positively associated with the degree of atherosclerosis and cardiovascular events in individuals with coronary disease.*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Study conclusions
Flockhart & Larsen, 2024	Narrative review	Continuous Glucose Monitoring in Endurance Athletes: Interpretation and Relevance of Measurements for Improving Performance and Health	*CGM increasingly used by endurance athletes but no consensus on how to interpret CGM data in this population and no well-defined approaches for using it to improve performance or health. With CGM studies showing that athletes have highly individual glucose profiles (often with significant time spent with hypo- and hyperglycemia), more targeted research is needed to clarify how glucose regulation affects performance, recovery and overall health in endurance athletes.*
Ji et al., 2025	Perspective article / narrative review	Continuous glucose monitoring combined with artificial intelligence: redefining the pathway for prediabetes management	*The technological synergy of CGM + AI shows strong potential to improve glucose tracking, optimize treatment and empower patients with prediabetes toward better metabolic health. "Future research…should focus on the development of higher-precision CGM devices, optimized AI algorithms, and integrated management systems."*
Liarakos et al., 2025	Narrative review	Continuous glucose monitoring in people at high risk of diabetes and dysglycaemia: Transforming early risk detection and personalised care	*Review considers broad contextual & clinical applications as well as preliminary findings – see next section.*
CGM insights for behaviour change: Recent reviews			
Lindquist et al., 2023	Rapid review	Continuous Glucose Monitoring in Prediabetic and Type II Diabetic Mellitus Patients: A Rapid Review	*Concludes CGM to be an important tool for prediabetic and T2D patients, noting evidence of lifestyle change, lower HbA1C and fewer hypoglycemic episodes.*
Jospe et al., 2024	Scoping review	Leveraging continuous glucose monitoring as a catalyst for behaviour change: a scoping review	*Finds a "predominant focus on diabetes in CGM-based interventions, pointing out a research gap in its wider application for behaviour change. Future research should expand the evidence base to support the use of CGM as a behaviour change tool and establish best practices for its implementation."*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Study conclusions
Oganesova et al., 2024	Narrative review	Innovative solution or cause for concern? The use of continuous glucose monitors in people not living with diabetes: A narrative review	*Finds a lack of consistent and high-quality evidence to support the utility of CGMs for (1) detection of abnormal glucose; (2) behavioural change, and (3) metabolic health improvement. Many questions remain concerning clinical benchmarks and scoring procedures for CGM measures, device acceptability, and potential adverse effects of CGMs on eating habits in PNLD. Raises concerns about the robustness of available CGM research.*
Richardson et al., 2024	Systematic review and meta-analysis (of RCTs)	The efficacy of using continuous glucose monitoring as a behaviour change tool in populations with and without diabetes: a systematic review and meta-analysis of randomised controlled trials	*Finds "favourable, though modest, effects of CGM-based feedback on glycaemic control in adults with and without diabetes. Further research is needed to establish the behaviours and behavioural mechanisms driving the observed effects across diverse populations."*
Battelino et al., 2025	Narrative review	The use of continuous glucose monitoring in people living with obesity, intermediate hyperglycemia or type 2 diabetes	*"CGM technology in people at-risk of intermediate hyperglycemia or type 2 diabetes mellitus can significantly improve the rate and timing of detection of dysglycemia. Earlier detection allows intervention, including through continued use of CGM to guide changes to diet and lifestyle, that can delay or prevent harmful progression of early dysglycemia… Further research is needed to fully understand the cost-effectiveness of [CGM]."*
Liarakos et al., 2025	Narrative review	Continuous glucose monitoring in people at high risk of diabetes and dysglycaemia: Transforming early risk detection and personalised care	*Finds promising results that highlight potential benefits of CGM in specific populations, such as people living with obesity, prediabetes, gestational diabetes mellitus, metabolic dysfunction-associated steatotic liver disease, other endocrinopathies, and genetic syndromes. CGM also shows promising potential in people with positive islet autoantibodies and pre-symptomatic T1D, those treated with medications that induce hyperglycaemia or diabetes, and individuals receiving solid organ transplantation who are at risk of post-transplant diabetes mellitus. Larger studies are needed to confirm these preliminary results.*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Study conclusions
Wilczek et al., 2025	Systematic Review	Non-Invasive Continuous Glucose Monitoring in Patients Without Diabetes: Use in Cardiovascular Prevention – A Systematic Review	*CGM "may offer significant potential benefits for cardiovascular prevention in healthy individuals without diabetes." Long-term and outcome-oriented studies on glucose regulation in healthy, non-diabetic individuals are required for better understanding of impact on cardiovascular health.*
Zahalka et al., 2025	Review article	Continuous Glucose Monitoring for Prediabetes: Roles, Evidence, and Gaps	*Examines evidence on CGM metrics in normoglycemia, the use of CGM to diagnose prediabetes, and CGM use during lifestyle interventions. "The use of CGM to identify individuals with prediabetes early and allow for implementation of tailored lifestyle interventions to prevent diabetes would lead to substantial improvements in individual and population health."*

CGM for behaviour change: Primary research

Authors	Study type	Title	Relevance / Results
Bailey et al., 2015	RCT pilot (8 weeks) Canada	Self-monitoring using continuous glucose monitors with real-time feedback improves exercise adherence in individuals with impaired blood glucose: a pilot study	*13 adults with prediabetes or T2D were randomised to an 8-week standard care exercise vs self-monitoring program using real-time CGM to track exercise and blood glucose. CGM self-monitoring group showed greater improvements in self-monitoring behaviours, goal setting and exercise adherence; both groups improved fitness, waist circumference, and quality of life (P values <0.05).*
Jospe et al., 2020	Two-arm randomised feasibility trial (6 months) New Zealand	Teaching people to eat according to appetite – Does the method of glucose measurement matter?	*40 adults with obesity (female 55%), randomised to measure glucose via fingerpricking or CGM during 6-month hunger training program. Both methods produced similar weight loss (~4 kg) and satisfaction, though with CGM users testing more frequently and showing better adherence.*
Liao et al., 2020	Prospective feasibility single arm (10 days) USA	Using Continuous Glucose Monitoring to Motivate Physical Activity in Overweight and Obese Adults: A Pilot Study	*19 adults with overweight or obesity: physical activity education module combining counselling on glucose responses to activity with 10 days of CGM and Fitbit self-monitoring. Participants rated the program highly for PA-related knowledge, motivation, and providing personally relevant information (Likert range 4.22 – 4.35 / 5). Summary acceptability scores: 4.46 for CGM and 4.51 for Fitbit.*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Results
Yost et al., 2020	Single-arm pilot (22 days; 6-month qual follow-up) USA	Continuous Glucose Monitoring With Low-Carbohydrate Diet Coaching in Adults With Prediabetes: Mixed Methods Pilot Study	*Combining CGM use with low-carbohydrate diet coaching in 15 adults with obesity & prediabetes (HbA1c 5.7–6.4%, BMI > 30 kg/m²). Intervention achieved high satisfaction (93%), modest reductions in weight (−1.4 lb, P = .02) and HbA1c (−0.71%, P<.001). Qualitative interview themes indicated that CGM feedback effectively motivated carbohydrate reduction and dietary behaviour change.*
Dehghani Zahedani et al., 2021	Prospective (single arm) (10 days) USA	Improvement in Glucose Regulation Using a Digital Tracker and Continuous Glucose Monitoring in Healthy Adults and Those with Type 2 Diabetes	*Participants: healthy through to non-insulin-treated T2D. Used CGM linked to a mobile app that integrated glucose, diet, heart rate (from an HRM device) and activity data over 10 days to assess changes in time in range (TIR; 54–140 mg/dL for healthy/prediabetes, 54–180 mg/dL for T2D). Among the 665 eligible participants, TIR improved significantly (mean +6.4%, p < 0.001), with the largest gains (~23%) in those with poor baseline control.*
Chekima et al., 2022	RCT (8 weeks) Malaysia	Utilising a Real-Time Continuous Glucose Monitor as Part of a Low Glycaemic Index and Load Diet and Determining Its Effect on Improving Dietary Intake, Body Composition and Metabolic Parameters of Overweight and Obese Young Adults...	*40 young adults (mean age 26.4 ± 5.3 years, BMI 29.4 ± 4.7 kg/m²) randomised equally to intervention and control groups; both groups received education on low-glycaemic index/load diets, with the intervention group also using CGM. Compared with controls, CGM group showed greater improvements in body weight, BMI, fat mass, fasting glucose, HbA1c and lipid profile (p < 0.05).*
Khan et al., 2022	RCT (6 months)	OR03-3 Impact of Continuous Glucose Monitoring (CGM) on Lifestyle Modifications in Individuals with Prediabetes	*57 individuals with prediabetes, randomised to use CGM alongside diabetes education (CGM group) or education alone (EDU). Both groups made healthier food choices, with greater dietary improvements observed in the EDU group. CGM group showed larger improvements in physical activity and blood pressure (both statistically significant), HbA1c (borderline significance), and weight (not significant) compared with the EDU group.*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Results
Schembre et al., 2022	RCT (16 weeks) USA	Hunger Training as a self-regulation strategy in a comprehensive weight loss program for breast cancer prevention: a randomized feasibility study	*50 postmenopausal women (BMI > 27 kg/m2) at risk of breast cancer were randomised to the Diabetes Prevention Program (DPP) + Hunger Training (HT) program or DPP-only arm for 16 weeks. Intervention (DPP+HT) group wore CGM during weeks 4–6. Programme was delivered weekly by a trained registered dietitian. Accrual rate 67%; retention 81%; HT adherence 90%. Weight losses and BMI reductions were significant over time, as were changes in metabolic and breast cancer risk biomarkers, but did not vary by group.*
Ahn et al., 2023	RCT (4 weeks) Rep of Korea	Effectiveness of Non-Contact Dietary Coaching in Adults with Diabetes or Prediabetes Using a Continuous Glucose Monitoring Device: A Randomized Controlled Trial	*45 adults with prediabetes or diabetes randomised to CGM plus nurse-led dietary coaching or CGM plus usual care. After 4 weeks, men in the intervention group showed significantly greater reductions in thigh circumference, and women demonstrated greater improvements in eating self-efficacy. Insomnia was negatively associated with gains in self-efficacy and thigh-circumference change.*
Dehghani Zahedani et al., 2023	Single arm (28 days' CGM wear; 12 week follow-up) USA	Digital health application integrating wearable data and behavioral patterns improves metabolic health	*28-day remote lifestyle program using CGM, wearables and a smartphone app. 2,217 participants with glucose levels ranging from normal to T2D logged diet, activity, and weight while receiving personalised feedback and recommendations. Among completing participants – normoglycemic (n = 746), prediabetes (n = 206), non-insulin-treated T2D (n = 94) – significant improvements were seen in hyperglycemia, glucose variability and weight, along with healthier eating patterns. Among participants without diabetes who had a baseline TIR < 90% (70–140 mg/dL), those with prediabetes (n = 57) and healthy non-diabetics (n = 182) increased their TIR by 6.2% and 9.6%, respectively.*
Lee et al., 2023	Prospective feasibility (single arm 28 days) USA	Feasibility and Acceptability of Using Flash Glucose Monitoring System Sensors to Empower Lifestyle Changes in People With Prediabetes	*32 participants with prediabetes: Hispanic (10; 31.3%), Asian (10; 31.3%), Black (6; 18.8%), White (5; 15.5%). Satisfaction toward wearing sensors largely positive; 68.8% of participants agreed or strongly agreed that they would pay a copay if their insurance covered the FGMS sensors for people with prediabetes.*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Results
Basiri & Cheskin, 2024	RCT (30 days) USA	Enhancing the impact of individualized nutrition therapy with real-time continuous glucose monitoring feedback in overweight and obese individuals with prediabetes	*Participants with prediabetes (mean age ± SD: 55 ± 6 years; BMI: 31.1 ± 4.1 kg/m²) received individualised nutrition therapy and CGM; control group blinded to the CGM data until end of study. Participants followed for 30 days, visiting the lab every 10 days for CGM replacement, study measurements and dietary consultations. Results for treatment group included significant % increase in TIR (95.1% to 97.9%, p = 0.02) and significant decrease in average blood glucose (129.1 ± 4.3 to 121.6 ± 4.9 mg/dL (p < 0.05)). Changes were not statistically significant for the control group.*
Bermingham et al., 2024	RCT (18 weeks) UK	Effects of a personalized nutrition program on cardiometabolic health: a randomized controlled trial	*18-week RCT of 347 participants aged 41 – 70 years, average BMI of 34 ± 5.8 kg/m². App-based personalised dietary program (PDP), including CGM, produced a modest but statistically significant reduction in triglycerides versus standard USDA dietary advice (mean difference −0.13 mmol/L, 95% CI −0.07 to −0.01; P = 0.016). Changes in LDL cholesterol were not significant. PDP group also saw greater improvements in body weight, waist circumference, HbA1c, diet quality and gut-microbiome (P<0.05). No between-group differences shown for blood pressure, insulin, glucose, C-peptide, apolipoprotein A1 and B, and postprandial TGs.*
Kitazawa et al., 2024	RCT (12 weeks) Japan	Lifestyle Intervention With Smartphone App and isCGM for People at High Risk of Type 2 Diabetes: Randomized Trial	*168 Participants (mean age 48.1 years; mean BMI 26.6 kg/m²; 80.4% male); 82 assigned to the intervention (App/isCGM) group and 86 to control. After 12 weeks, time-in-range (TIR, 70–140 mg/dL / 3.9–7.8 mmol/L) significantly improved in the intervention group compared with control (+31.5 vs −2.7 minutes/day, P = .03). No differences were observed in HbA1c or mean glucose between groups. Weight reductions ≥2 kg were noted in 22 (32.8%) participants in the intervention group and 11 (15.9%) in the control group (P = .028).* *[Note: data presented in the Abstract results are misleading and conflict with the full article.]*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Results
Richardson et al., 2024	Multimethod feasibility (12 weeks; 10-day CGM wear) USA	Adding a Brief Continuous Glucose Monitoring Intervention to the National Diabetes Prevention Program: A Multimethod Feasibility Study	*27 enrolled participants (26 female) with prediabetes – 24 completed. High acceptability of CGM, with nearly all (n = 23/24) participants believing that CGM should be offered as part of the National Diabetes Prevention Program. Participants described how CGM helped them make behaviour changes to improve their glucose (e.g., reduced portion sizes, increased activity around eating events, and meditation). Adding a single CGM-based education session and 10-day CGM wear to the DPP was considered feasible and acceptable.*
Basiri & Rajanala, 2025	RCT (30 days) USA	Effects of Individualized Nutrition Therapy and Continuous Glucose Monitoring on Dietary and Sleep Quality in Individuals with Prediabetes and Overweight or Obesity	*Further data and analysis from trial reported in Basiri & Cheskin (2024) - see above. Here the analysis focused on diet and sleep. Adding CGM feedback into nutrition therapy significantly increased whole-grain (p = 0.02) and plant-based protein intake (p = 0.02) in the treatment group, with trends toward increased fruit intake (p = 0.07) and a reduced percentage of calories from carbohydrates (p = 0.08). Sleep efficiency also improved significantly by 5% (p = 0.02) in the treatment group but not in control group.*
Black et al., 2025	Single-participant Case study (16 days) USA	Continuous Glucose Monitoring and Glycemic Control in an Adult Without Diabetes: Over 4,000 Automated Recordings Guide Contingency-Shaped Learning	*Examining whether standalone CGM feedback could reduce % of time out of range (TOR) in an adult woman with obesity but without diabetes. Participant was monitored over 16 days with more than 4,000 glucose readings; results showed substantial improvements, including a drop in daily TOR from 9.2% to 1.9% and a reduction in high-glucose excursions.*
Ma et al., 2025	RCT (two consecutive cycles: 14-day education period with 12-month follow-up; 24 months total) China	Effectiveness of an Individualized Diabetes Health Education Program Using Real-Time Continuous Glucose Monitoring in Improving Blood Glucose: A Pilot Interventional Study on Subjects with Prediabetes	*41 adults (>18 years) with prediabetes, randomly assigned to either: (1) RT-CGM group (n=20) receiving meal adjustments based on continuous glucose data and energy balance, or (2) control group (n=21) receiving adjustments based solely on energy balance. The study comprised two intensive 14-day education sessions (at baseline and 1-year follow-up) with metabolic assessments conducted at baseline, 1-year and 2-year timepoints. The RT-CGM group demonstrated greater improvements in HbA1c compared to controls at both 1-year (p=0.007) and 2-year (p=0.033) follow-ups, though downward trends in the group itself did not reach statistical significance (HbA1c baseline 5.86%±0.78%; 12 months 5.68%±0.66%; 24 months 5.74%±0.54%).*

Appendix B

Supplementary material (continued)

Authors	Study type	Title	Relevance / Results
Mayer et al., 2025	Prospective (single arm) (12 weeks) USA	Pilot Study: Improving Glycemic Control Among Children and Adolescents With Obesity and Prediabetes With Real-Time Feedback Via Continuous Glucose Monitoring	*22 participants recruited (aged 10 – 17 years), with 14 completing. Over 12 weeks, the mean BMI percentage of the 95th percentile decreased from 153.4 to 150.1% (P = 0.006), daily estimated carbohydrate consumption decreased by 41.4% (P = 0.009), and A1C decreased by 0.2% (P = 0.03).*
Torii-Goto et al., 2025	Prospective (2 months) Japan	Usefulness of an Intermittently Scanned Continuous Glucose Monitoring System for Risk Management of Individuals without Diabetes in Japan	*36 Japanese participants (21m/15f); mean age 50.7; intermittently scanned CGM (isCGM) system combined with lifestyle coaching. Stratified analysis performed, dividing participants into 18 control (glycated hemoglobin level <5.7%) and 18 with prediabetes (glycated hemoglobin level 5.7–6.4%). After intervention, TIR significantly increased (p=0.029) and AUC significantly decreased (p<0.001) in participants with prediabetes but not in control. TAR significantly decreased for overall participants.*
Veluvali et al., 2025	Retrospective cohort study (33 days) USA	Impact of digital health interventions on glycemic control and weight management	*Study with 944 users, including healthy individuals and those with prediabetes or T2D. The app, leveraging AI to personalize feedback, tracked users' food intake, activity and glucose responses over 14 days. Healthy users' TIR increased from 74.7% to 85.5% (p < 0.0001). Higher app engagement correlated with greater TIR improvements. Users experienced an average weight reduction of 3.3 lbs over 33 days; most significant weight loss observed in prediabetes cohort (4.0 lbs, p<0.0001).*

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