Declining Baseline HbA1c at GLP-1 Receptor Agonist Initiation in U.S. Adults with Type 2 Diabetes, 2015–2024

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Objective: To evaluate temporal trends in HbA1c levels among adults with type 2 diabetes before and after GLP-1 or dual GIP/GLP-1 receptor agonist initiation over 9-year period, assessing how earlier use of these therapies has influenced glycemic control in real-world practice.

Background

Glucagon-like peptide-1 (GLP-1) agonists are a class of medications utilized to treat Type 2 Diabetes Mellitus (T2DM) and obesity [1,2]. GLP-1 is an incretin hormone inactivated by dipeptidyl peptidase-4 (DPP-4) and stimulates insulin secretion after an oral glucose load via the incretin effect [2]. Hemoglobin A1C (HbA1c) is a blood test that reflects average blood glucose levels over approximately the prior two to three months and is widely used as a marker of long-term glycemic control in patients with diabetes [3]. In this retrospective claims and EMR study, we use HbA1c trends to evaluate how the rise in GLP-1 therapy initiation—particularly since its notable increase beginning in 2018—has influenced diabetes management.

Methods

This retrospective cohort study utilized US claims and electronic medical record (EMR) data from Forian's CHRONOS™ database. We identified Adult Type 2 Diabetes Mellitus (T2DM) patients with a GLP1 claims between 2015-2025. HbA1c laboratory values were extracted from EMR data using LOINC codes. The diabetes index date was defined as the first observed T2DM diagnosis, and the GLP-1 index date was defined as the first observed GLP-1 prescription fill after diabetes diagnosis. HbA1c values were evaluated longitudinally using 3-month interval aggregations relative to the GLP-1 index date. These intervals included pre- and post-initiation periods extending up to 36 months before and after GLP-1 start. Year-over-year patient demographics and HbA1c trends were evaluated across the study period.

Results

A total of 9.7 million patients (16% of those with T2DM) had a GLP-1 claim following their T2DM index date during the study period. The proportion of GLP-1-users increased ~28-fold from 2015 to 2025 (Figure 1), while the mean time to initiation decreased by 95%, from 69 to 3 days (Figure 2). Patient demographics began to shift around 2020, with a 9–percentage point increase in female patients and a 10–percentage point increase in those aged 18–39 between 2020 and 2022 (Figure 3). Mean HbA1c at GLP-1 initiation declined from 8.52% in 2015 to 7.33% in 2024 (~0.13% per year) (Figure 4). Similar declines in the pre-index period suggest earlier treatment initiation over time. Despite lower baseline HbA1c, post-initiation reductions remained consistent, with an average decrease of ~1.1 percentage points at 6 months and sustained improvement through 18 months. Patients whose last GLP-1 claim occurred within 1 year of initiation had higher baseline HbA1c and smaller early reductions compared to those with GLP-1 claims extending beyond 1 year (7% vs 11% at 3 months), with differences persisting through 2 years among patients with continuous pharmacy activity.

Figure 1. Percentage of Diabetic Patients on GLP-1 Over Time (2015-2024)

Figure 2. Average Months Between T2DM Index and GLP-1 Index Over Time

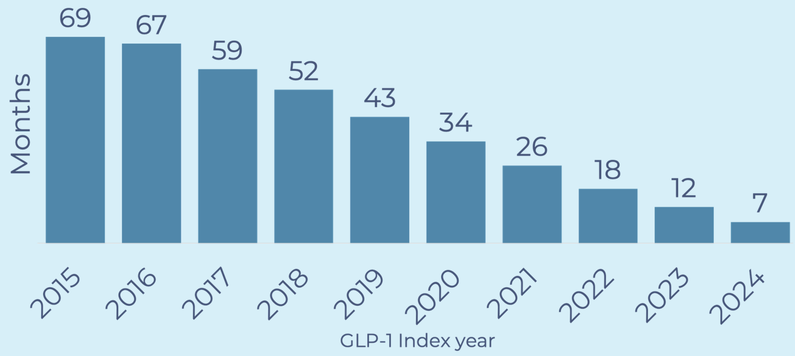


Figure 3. Changes in Patient Age and Sex Composition at GLP1 Index Year over Year

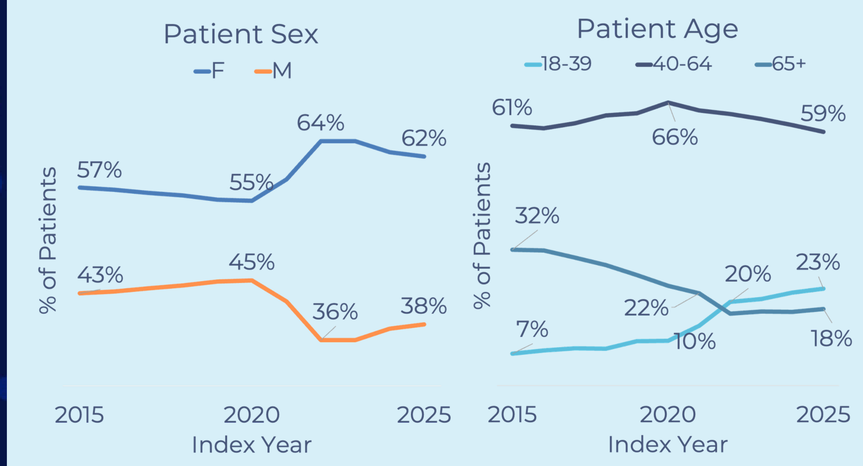
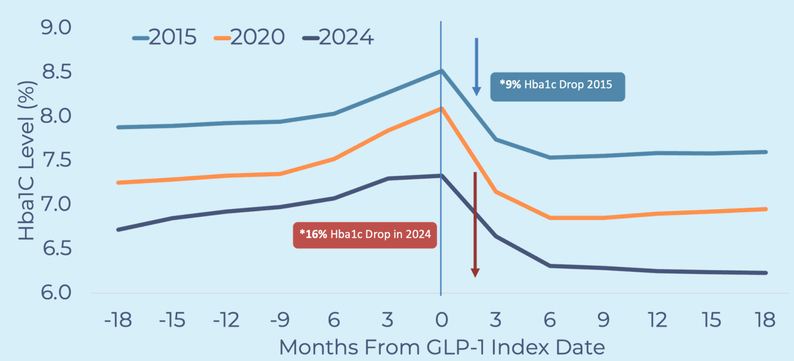
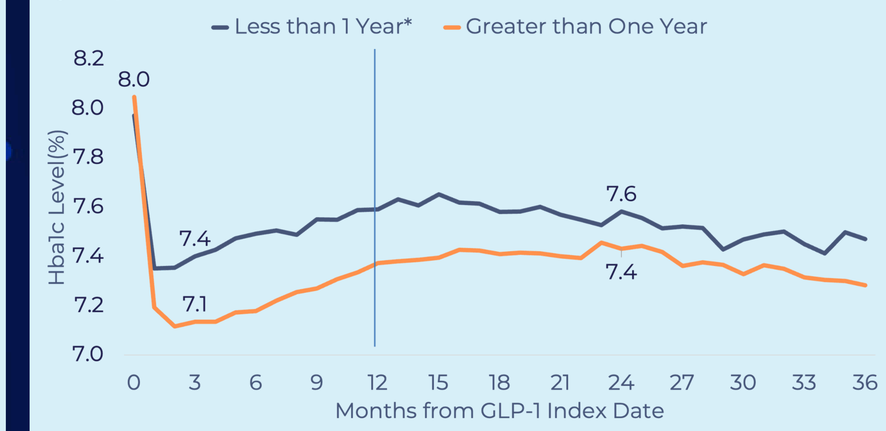


Figure 4. Average Hba1c Levels Before and After GLP1 Index, Year over Year



*Percent drop is calculated between Hba1c values at GLP-1 Index Date and 3 Months after GLP-1 Index date.

Figure 5. Average HbA1c over time, stratified by GLP-1 use beyond 1-year post-index



Conclusion

Use of GLP-1 receptor agonists has expanded rapidly in real-world practice, with evidence of earlier initiation during type 2 diabetes management. Despite shifts in patient characteristics and baseline glycemic levels, GLP-1 therapy continues to demonstrate consistent effectiveness in improving glycemic control, aligning with prior clinical and real-world evidence [3] Sustained use of GLP-1 therapy appears to be associated with greater glycemic benefit, underscoring the importance of treatment persistence in routine care. Evolving demographic patterns further suggest broadening access and uptake across patient populations.

References

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2. Drucker DJ. The biology of incretin hormones. Cell Metab. 2006;3(3):153–165.
3. Little RR, Rohlfing CL, Sacks DB. The National Glycohemoglobin Standardization Program: over 20 years of improving HbA1c measurement. Clin Chem. 2019;65(7):839–848.