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TIMELY INITIATION OF INSULIN TREATMENT DELAYS THE DEVELOPMENT OF DIABETES-RELATED COMPLICATIONS RESULTING IN COST SAVINGS AT A POPULATION LEVEL

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Introduction

- Many patients with type 2 diabetes (T2D) in the United Kingdom (UK) fail to achieve glycaemic targets (glycated haemoglobin [HbA_{1c}] <7.0%). Delays in initiating or intensifying insulin treatment are a major contributing factor.[1-3]
- In patients with T2D, every 1% increase in HbA_{1c} above a threshold of 6.5% is associated with an increased risk of microvascular events (40%), macrovascular events (38%), and mortality (38%).[4]
- Clinical or therapeutic inertia, defined as a failure to initiate or intensify treatment in a timely manner, is a key reason why many patients fail to achieve glycaemic targets.[5-7] The causes of clinical inertia are complex and multifactorial, including patient-, physician-, and system-level barriers to treatment initiation.[6, 7]
- Patients are often reluctant to initiate or intensify treatment, citing fears of injections, weight gain, and hypoglycaemia as reasons.[6-8] Limited specialist training among primary care physicians as well as time and resource constraints are key physician-related factors contributing to clinical inertia, while other considerable causes include system-level barriers, such as the inconsistent implementation of guidelines, a lack of tailored care-plans, and issues with medication costs and availability.[6, 7]
- Delays to treatment initiation or intensification can lead to an increased risk of developing severe long-term complications for patients with T2D, resulting in costs of approximately £10.7 billion during 2021–2022, and these costs are predicted to rise to approximately £17.9 billion by 2036–37.[9, 10]
- We aimed to estimate the cost-savings due to avoided complications associated with the timely initiation or intensification of insulin therapy for insulin-naïve patients with T2D and uncontrolled hyperglycaemia in the UK, compared with delayed insulin initiation or intensification.

Methods

- The analysis was conducted from the UK National Health Service perspective using the validated PRIME T2D Model.[11]
- Baseline characteristics were based on the ONWARDS 5 randomised controlled trial, with sampling around the mean values to generate a cohort representative of a real-world cohort of patients with T2D. ONWARDS 5 was a 52-week, randomised, open-label trial comparing the efficacy of a once-weekly basal insulin guided by a dose titration app with once-daily basal insulin analogues (degludec, glargine U100, or glargine U300) in 1,085 insulin-naïve people with T2D.[12]
- The analysis compared achieving a glycaemic control target of 7% at the start of the analysis with remaining at an HbA_{1c} value of 9.0% for 7 years before achieving glycaemic control and was conducted over a 20-year time horizon (**Table 1**).[13, 16]
- Results of the patient-level simulation were extrapolated to population level (N=1,552,498) by using the Office for National Statistics (ONS) mid-year UK population estimate (mid-2022 edition of this dataset; N=67,596,281),[13] the proportion of UK adults (79.36%),[13] prevalence of diabetes in the UK (6.36%),[13, 14] and the proportion of those with T2D (90.00%)[14] who are estimated to have poor glycaemic control (50.56%).[2]
- All risk factors were held constant with HbA_{1c} in the poor control arm brought to the level in the immediate control arm after the specified delay.[15]
- Outcomes of interest included the cumulative incidence of complications and the associated additional direct costs. Costs were reported in 2022 pounds sterling (£). The analysis focused on the cost of managing complications arising from poor glycaemic control and did not include any diabetes treatment-related costs.

Table 1: Model parameters used for illustrative analysis

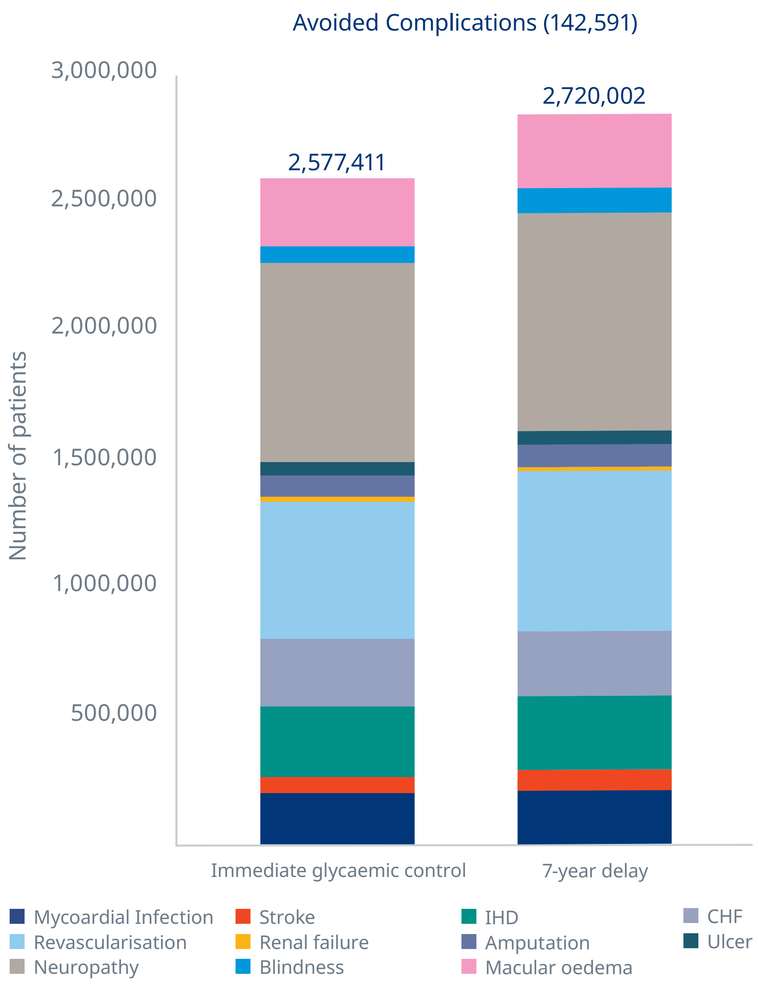
Parameters	Value
Baseline HbA_{1c}, %	9.0
Target HbA_{1c}, %	7.0
Delay in treatment, years	7.0
Time horizon, years	20.0
Patients with T2D in poor glycaemic control, N	1,552,498

Abbreviations: HbA_{1c}, glycated haemoglobin; T2D, type 2 diabetes.

Results

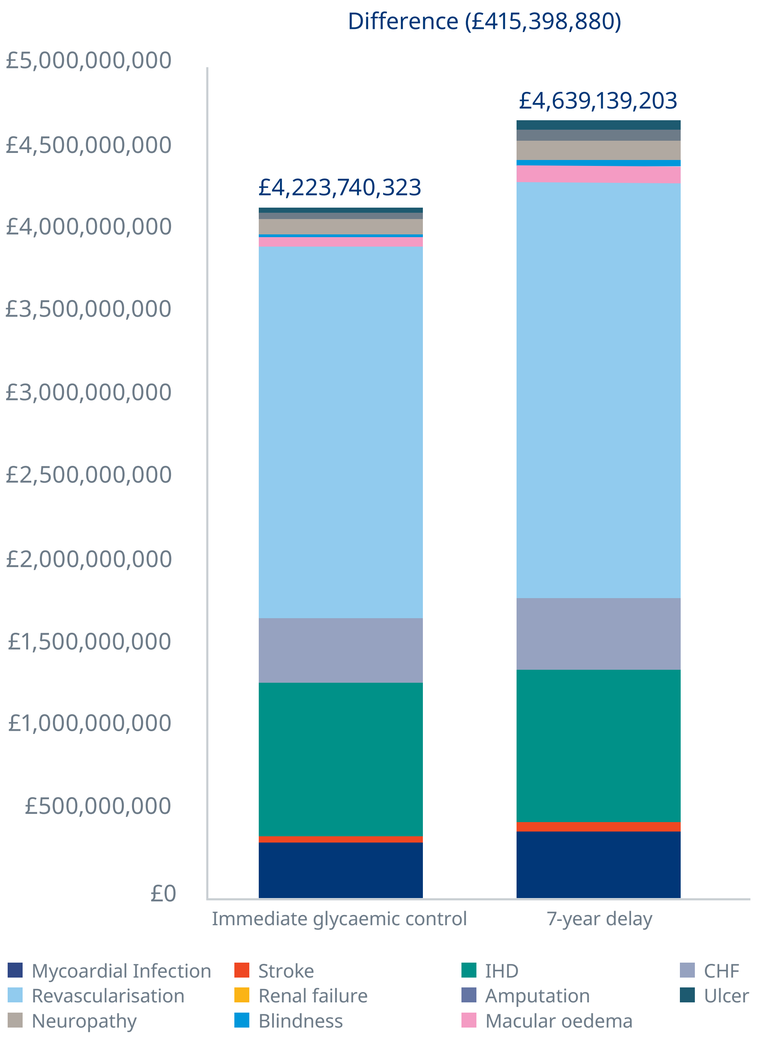
- For the simulated population of patients in the UK with T2D and poor glycaemic control (N=1,552,498), timely insulin initiation or intensification would result in 142,591 fewer cumulative complications (**Figure 1**) and associated cost savings of £415,398,880, compared with a delay of 7 years (£4,223,740,323 vs £4,639,139,203, respectively) (**Figure 2**).
- The primary cost savings were from the reduced incidence of severe long-term complications associated with poor glycaemic control, including revascularisation (£260,192,361), myocardial infarction (£60,584,974), congestive heart failure (£31,632,053), neuropathy (£30,564,923), stroke (£21,543,555), and amputation (£19,398,800).

Figure 1: Cumulative complications with immediate glycaemic control or a 7-year delay in treatment initiation or intensification



Abbreviations: CHF, congestive heart failure; IHD, ischaemic heart disease.

Figure 2: Cost of complications associated with immediate glycaemic control compared with a 7-year delay in treatment initiation or intensification



Abbreviations: CHF, congestive heart failure; IHD, ischaemic heart disease.

Conclusions

This analysis highlights the impact of clinical inertia on the incidence and associated costs of complications for patients with T2D and poor glycaemic control in a UK setting.

Clinicians and policy makers should consider strategies to mitigate the impacts of clinical inertia, including regularly updating guidelines with recommendations on the latest technological and therapeutic advances, and using multidisciplinary teams (including physicians, dieticians, clinical pharmacists and specialist diabetes nurse practitioners) to implement personalised-care packages and improve patient education.[5-7]

The increase in the incidence and associated costs of ischaemic heart disease and macular oedema resulting from no delay in treatment initiation or intensification are most likely due to the survival paradox; a phenomenon in which patients live longer due to timely treatment initiation or intensification and develop comorbidities due to their increased survival.

Findings of this analysis highlight the need for timely insulin initiation for insulin-naïve patients with T2D and poor glycaemic control to delay the development of diabetes-related complications and result in considerable cost savings at a population level in the UK.

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