

If we followed NICE guidelines and treated people with diabetes earlier, patients and the NHS would benefit from a reduction in complications, mortality and direct healthcare costs

M Baxter¹, N Hex², Y Samyshkin³, R Hudson¹, J Mahon², D Alexiou³, C Bartlett²

¹Sanofi, Guildford, UK, ²York Health Economics Consortium, York, UK, ³IMS Health, London, UK



Aim

To estimate the reduction in complications, mortality and costs that could be achieved through population based improvements in glycaemic control.

Methods

- The IMS Core Diabetes Model was used to estimate the impact of reduction in the level of HbA_{1c} for a representative cohort of existing adult patients treated for Type 1 and Type 2 Diabetes Mellitus (T1D and T2D) (25 year time horizon).
- The microvascular and macrovascular complications of diabetes were simulated in addition to non-specific mortality.
- To ensure robust and representative patient data was used in the modelling, real world T1D and T2D patient cohorts were drawn from the IMS Disease Analyzer (UK database).
- The intervention arm for the T2D base case assumed therapy escalations at HbA_{1c} thresholds specified in the NICE guideline (eg. 6.5%, 7.5%, 7.5%, 7.5% and 7.5%).
- This was compared with up to five modifications in therapy at thresholds consistent with clinical practice (eg. 7.5%, 8.7%, 9.1%, 9.7% and 9.8%).
- The T1D base case assumed the trajectory of HbA_{1c} would follow the natural history of disease, with the comparator scenario at 0.4% points below, applied for the full time horizon of the analysis.
- Sensitivity analysis for T2D included treatment escalation at HbA_{1c} levels 1% below current clinical practice
- For T1D sensitivity analysis was carried out at HbA_{1c} levels 0.2% and 0.8% below the expected trajectory for disease progression under current clinical practice.
- Avoided complications were estimated as changes in the cumulative incidence of complications for each sub group in the T1D and T2D cohorts, based on starting HbA_{1c} levels.
- Treatment costs for complications are derived from peer-reviewed literature where available (inflated to 2014 prices, not discounted).

Results

Table 1: Survival increase at 25 years (base case)

| T1D (HbA _{1c} level at start) | Increased survival (years) |
|--|----------------------------|
| ≤7.5% | 2.10 |
| >7.5 to ≤8.0% | 2.40 |
| >8.0 to ≤9.0% | 2.83 |
| >9.0% | 3.95 |
| T2D (HbA _{1c} level at start) | Increased survival (years) |
| ≤7.5% | 1.64 |
| >7.5 to ≤8.0% | 2.66 |
| >8.0 to ≤9.0% | 2.27 |
| >9.0% | 1.41 |

Figure 1: Complications avoided at 25 years (base case)

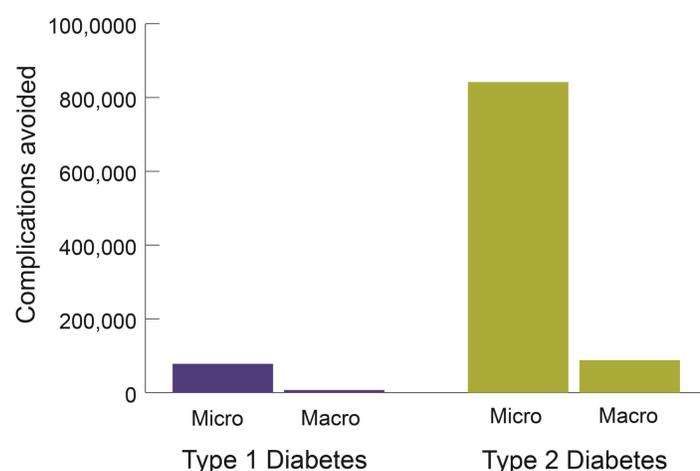
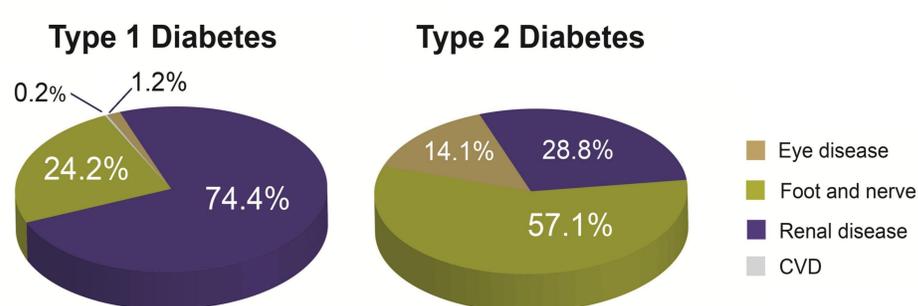


Table 2: Cost savings over 25 years (base case + sensitivity analysis)

| T1D | 5 yr (£m) | 10 yr (£m) | 15 yr (£m) | 20 yr (£m) | 25 yr (£m) |
|--------|-----------|------------|------------|------------|------------|
| Base | 37 | 164 | 399 | 699 | 957 |
| -0.20% | 20 | 88 | 210 | 365 | 495 |
| -0.80% | 68 | 300 | 731 | 1,302 | 1,795 |
| T2D | 5 yr (£m) | 10 yr (£m) | 15 yr (£m) | 20 yr (£m) | 25 yr (£m) |
| Base | 319 | 1,354 | 2,916 | 4,291 | 4,814 |
| -1% | 227 | 728 | 1,542 | 2,261 | 2,645 |

Figure 2: Cost reductions by complication and disease



Conclusions

The study extrapolated improvements in diabetes care that are modest and achievable. It also, for the first time, provides an estimate of the amount of money (c£5.8 billion) that could be invested in improvements to diabetes care, in order to effect long-term improvements in outcomes for people with diabetes. The cost reduction is not money that could be spent on specific treatments, but does identify the extent of the financial impact of improving glycaemic control thus indicating the level of resource the NHS could dedicate to diabetes interventions to manage the costs of diabetes over 25 years.

These benefits will take some time to accrue and there is an imperative to enact these improvements at the earliest possible opportunity to stem the threat of the growing incidence and prevalence of diabetes and the unsustainable cost of treating the complications of the disease.

An emphasis should be placed on the incremental improvement of HbA_{1c}, particularly in patients with high HbA_{1c} (>8%) levels. Even modest improvements in HbA_{1c} can result in significant reductions in both the risk of developing, and the costs of managing, diabetic complications.

For both T1D and T2D, the reduction in microvascular complications significantly outweighs the reduction in macrovascular complications, in the order of ten to one. Those events also contribute the vast majority of the cost reductions observed after 25 years.