The Healthcare Resource Use Impact in Adults With Type 1 Diabetes Who Switched From a First to Another First or Next-Generation Basal Insulin Analogue: A Retrospective Linked Primary and Secondary Care Database Study in England

EPH42

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INTRODUCTION

The real-world impact of the next-generation basal insulin (Glargine U300 [Gla-300], Degludec) on healthcare resource use has previously been demonstrated in Type 2 diabetes mellitus[1]. This study aimed to examine this impact in adults in England with Type 1 diabetes mellitus (T1DM) following a switch to Gla-300.

METHODS

- **CPRD-HES linked data** were used to compare hospitalizations in an inverse probability of treatment weighting (IPTW)-weighted set of adults with T1DM who switched from glargine 100U/mL or detemir (collectively Gen1BI) to either another Gen1BI (Gen1 cohort) or Gla-300 (Gla-300 cohort).
- The date of the switch was defined as the **index date**.
- The observation period was defined as the period between 1 July 2014 and 31 March 2021.

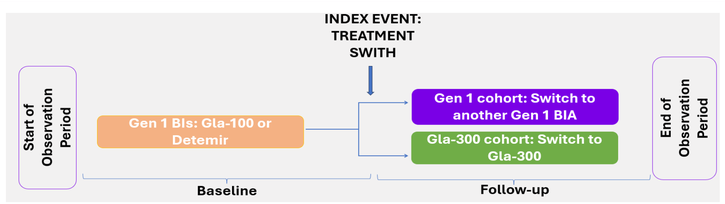


Figure 1. Study design schematic

RESULTS

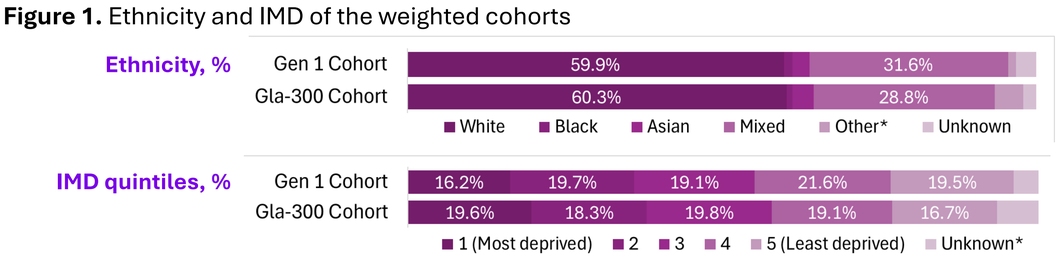
STUDY SAMPLE

- A total of 7,375 patients with T1DM were included:
  - Gen 1 cohort: 5,287 patients switched from a Gen 1 BI to another Gen 1 BI
  - Gla-300 cohort: 2,088 patients switched from a Gen 1 BI to Gla-300
- The IPTW-weighted cohorts included 3,926 patients in the Gen1 cohort and 1,674 in the Gla-300 cohort.
- The average follow-up (mean ± SD) duration was 5.06 ± 4.28 (Gen1) and 2.06 ± 1.64 (Gla-300) years.

DEMOGRAPHIC CHARACTERISTICS

- The two groups were well-balanced after IPTW, except for age at index (41.64 vs. 39.31 years). Males accounted for 48.8% (Gen1) and 51.4% (Gla-300). The average weight at index was 76.1 15.8 (Gen1) and 76.5 18.5 (Gla-300) kg.
- Ethnicity and Index of Multiple Deprivation (IMD) distributions are shown in **Figure 1**.

Figure 1. Ethnicity and IMD of the weighted cohorts

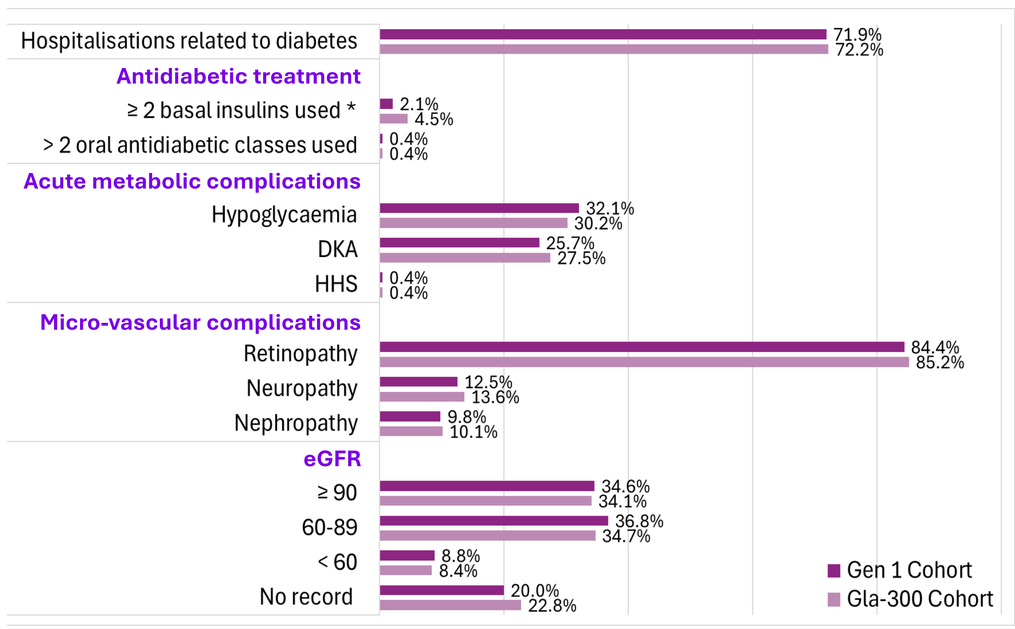


Abbreviation: IMD, Index of Multiple Deprivation

CLINICAL CHARACTERISTICS

- The average duration from T1DM diagnosis to index was 19.35 ± 13.21 (Gen1) and 18.60 ± 13.80 (Gla-300) years. Patient clinical characteristics at baseline are shown in **Figure 2**.

Figure 2. Baseline clinical characteristic of the weighted cohorts

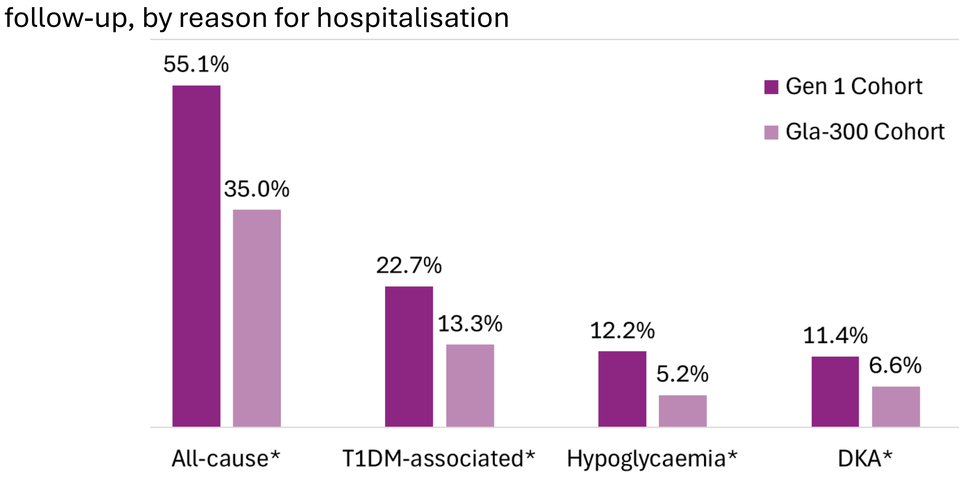


Abbreviation: IMD, Index of Multiple Deprivation
Note: * indicates that the difference between the two groups was still significant after IPTW.

HOSPITALISATION

- **Figure 3** shows the proportion of patients hospitalised, while **Table 2** shows the average number of hospitalisations during follow-up and the results of the regressions, comparing the Gla-300 cohort versus the Gen 1 cohort.

Figure 3. Proportion of patients of the weighted cohorts who were hospitalised during follow-up, by reason for hospitalisation



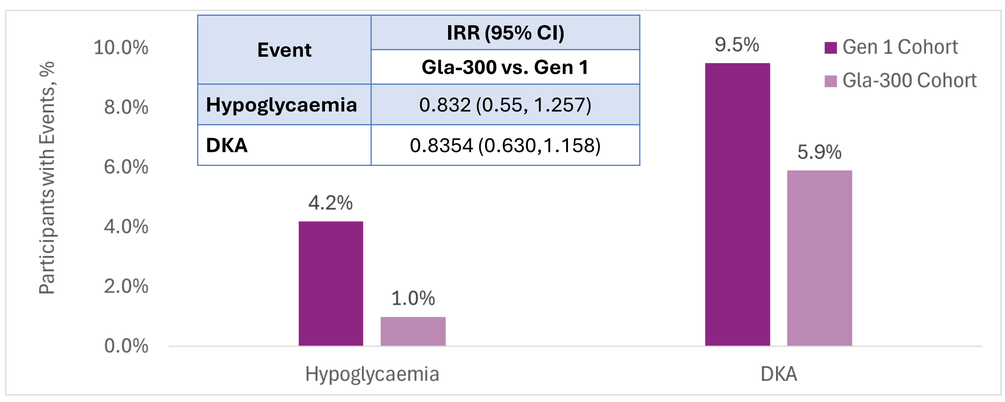
Abbreviations: DKA, diabetic ketoacidosis; T1DM, type 1 diabetes.
Note: * indicates statistically significant.

Table 1. Hospital admissions (per patient-year) during follow-up of the weighted cohorts

Hospital admissions	Number of admissions per patient-year, mean (SD)		IRR (95% CI)
	Gen 1 N = 3,926	Gla-300 N = 1,674	Gla-300 vs. Gen 1
All-cause	1.45 (7.60)	0.91 (8.63)*	0.73 (0.64, 0.83)*
Related to diabetes	0.18 (0.81)	0.11 (0.50)*	0.85 (0.71, 1.03)
Related to hypoglycaemia	0.08 (0.48)	0.05 (0.37)*	1.01 (0.79, 1.16)
Related to DKA	0.07 (0.49)	0.05 (0.27)*	0.89 (0.68, 1.16)

Abbreviations: CI, confidence interval; DKA, diabetic ketoacidosis; IRR, incidence rate ratio; SD, standard deviation.
Note: * indicates statistically significant. Zero-inflated negative binomial was used to conduct the analysis, considering the probability of having no visit as well as the number of visits among those who had any.

HOSPITALISATION DUE TO METABOLIC COMPLICATIONS



Event	IRR (95% CI)
	Gla-300 vs. Gen 1
Hypoglycaemia	0.832 (0.55, 1.257)
DKA	0.8354 (0.630,1.158)

Figure 4. Proportion of patients in the Gen 1 BI and Gla-300 cohorts who were hospitalised, where the metabolic complication was the primary reason for hospitalisation

CI: confidence interval; DKA: diabetic ketoacidosis; IRR: incidence rate ratio.

PRIMARY CARE INTERACTIONS

- **Table 2** shows the average number of primary care interactions after the index and the results of the regressions, comparing the Gla-300 cohort versus the Gen 1 cohort.

Table 2. Primary care interactions (per patient-year) during follow-up of the weighted cohorts

Primary care visits	Number of visits per patient-year, mean (SD)		IRR (95% CI)
	Gen 1 N = 3,926	Gla-300 N = 1,674	Gla-300 vs. Gen 1
All-cause	11.98 (14.98)	7.99 (11.60)*	0.78 (0.74, 0.83)*
Related to diabetes	1.09 (2.66)	0.80 (2.40)*	0.85 (0.76, 0.95)*
Related to hypoglycaemia	0.02 (0.14)	0.01 (0.08)*	0.68 (0.68, 0.68)*
Related to DKA	0.01 (0.33)	0.00 (0.06)	0.02 (0.00, 0.14)*

Abbreviations: CI, confidence interval; DKA, diabetic ketoacidosis; IRR, incidence rate ratio; SD, standard deviation.
Note: * indicates statistically significant. Zero-inflated negative binomial was used to conduct the analysis, considering the probability of having no visit as well as the number of visits among those who had any.

DISCUSSION & CONCLUSION

- Overall, the proportion of patients who experienced a hospitalisation event (all-cause, T1DM-associated, hypoglycaemia, DKA) was lower among the group of patients who switched to Gla-300 than those that switched to an alternative Gen 1 BI. The same was observed where hypoglycaemia and DKA were the primary reasons for hospitalisation (recorded in HES primary position).
- Furthermore, the number of admissions per patient year was lower among the cohort of patients who switched to Gla-300 than those that switched to an alternative Gen 1 BI, including when looking at healthcare interactions within the primary care setting.
- Taken together, the results showed that a switch to Gla-300 from a Gen1BI was associated with significantly reduced healthcare resource use which constitutes an overall benefit for people with TIDM. within the primary and secondary care setting,
- For the National Health Service, this switch could potentially result in considerable cost savings and more efficient allocation of healthcare resources, ultimately enhancing the overall management of T1DM.

LIMITATIONS

- Linkage between HES and CPRD results in loss of data since general practitioners included in CPRD do not fully overlap with secondary care settings in HES.
- The IPTW approach cannot exclude that unmeasured confounding factors may influence the endpoints of interest and the interpretation of the study results.

REFERENCES

1. Blonde, L., Bailey, T., Sullivan, S. D., & Freemantle, N. (2021). Insulin glargine 300 units/mL for the treatment of individuals with type 2 diabetes in the real world: A review of the DELIVER programme. Diabetes, Obesity and Metabolism, 23(S3), 3-13

DISCLOSURES & CONTACT

OD, NH, KP, AP, AM, CN are employees of Sanofi and may hold shares or stock options in the company. ND and XM are employees of OPEN Health, which received consulting fees to conduct the research from Sanofi.
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