Trends in the Prevalence of Diabetic Ketoacidosis and Severe Hypoglycemia in Type 1 Diabetes

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Background

- Diabetic ketoacidosis (DKA) and severe hypoglycemia (SH) are costly acute diabetes complications that can require emergency department (ED) and inpatient (IP) care.[1]
- Despite advances in diabetes technology, recent evidence suggests DKA rates may be rising, whereas population-level SH trends remain poorly characterized.

Objective

To estimate the annual prevalence of ED/IP-treated DKA and SH among people with type 1 diabetes (T1D) from 2017–2024.

Methods

Study deign:

Retrospective, cross-sectional analysis of Inovalon (Commercial, Managed Medicaid, Medicare Advantage) claims data, 2017–2024.

Population:

Individuals with T1D were identified using ICD-10-CM E10.x claims and required continuous enrollment each calendar year independently.

Outcomes:

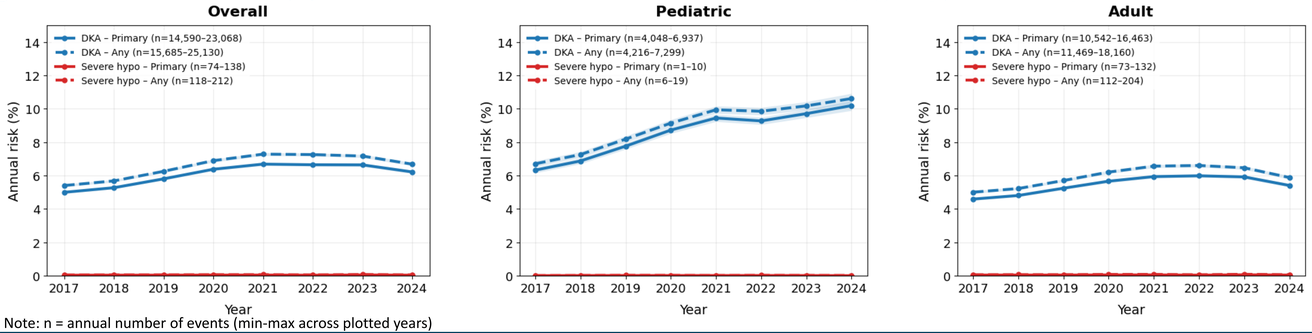
- DKA and SH were identified from ED/IP claims using ICD-10-CM codes
- Primary diagnosis was defined by ICD01, and any diagnosis position was ICD 01-25

Analysis:

Annual risk was calculated as the proportion of eligible members with ≥1 event; 95% CIs were estimated using the Wilson score method.

Results

Figure 1. Crude annual risk (%) of ED/IP-treated DKA and SH, overall and by age group, 2017–2024

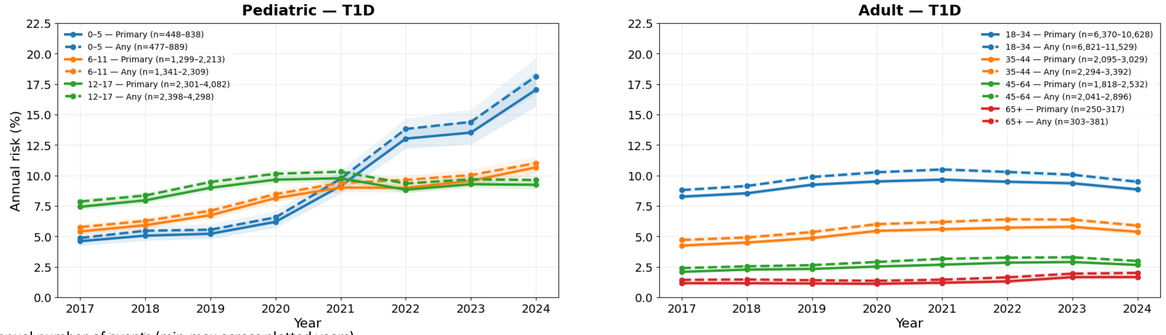


Note: n = annual number of events (min-max across plotted years)

Key findings:

- DKA annual prevalence rose from ~5.2% in 2017 to ~6.5% in 2024.
- Pediatric DKA prevalence increased markedly — from ~6.2% to ~10.2% — outpacing the adult trend.
- SH prevalence remained <0.2% throughout.

Figure 2. Crude annual risk (%) of DKA by age band and diagnosis position, 2017–2024

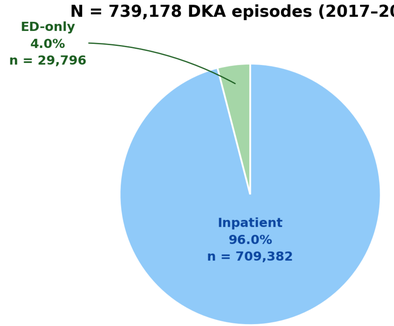


Note: n = annual number of events (min-max across plotted years)

Key findings:

- Among pediatric age bands, the most pronounced rise was observed in children aged 0–5 years (~5% to ~17%)
- Adults (18–34) had the highest DKA risk across all years, reaching ~9–10%, roughly 5× higher than adults aged 65+

Figure 3. Distribution of DKA episodes by site of care



Note: *ED-only = episodes treated and discharged from the ED. ED-to-inpatient transfers are classified as inpatient episodes.*

Key findings:

- ~96% of DKA episodes were managed as inpatient admissions; this ED/IP distribution remained stable from 2017 to 2024.

Conclusions

- DKA burden represents a growing problem especially in pediatric patients and requires significant HRCU with 96% of recorded events requiring hospitalization.
- SH prevalence requiring ED/IP care has remained low and relatively stable over time.

References

[1]Umpierrez GE, Davis GM, ElSayed NA, et al. Hyperglycemic Crises in Adults With Diabetes: A Consensus Report. *Diabetes Care*. 2024;47(8):1257-1275. doi:10.2337/dci24-0032

Acknowledgements

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