Annual Prevalence of Diabetic Ketoacidosis and Severe Hypoglycemia in Type 2 Diabetes

Carol Wysham,MD[1], Jennifer L. Sherr, MD, PhD[2] Shivani Mehta, PhD, MPH[3], Naunihal Virdi, MD, FACP[3]

[1]University of Washington, Spokane, WA, USA
[2]Yale University School of Medicine, CT, USA
[3]Abbott Diabetes Care, Alameda, CA, USA

Background

- Diabetic ketoacidosis (DKA) and severe hypoglycemia (SH) are acute diabetes complications that often require high-intensity emergency department (ED) or inpatient (IP) care.[1]
- Recent trends in type 2 diabetes (T2D) are not well described.

Objective

To estimate annual prevalence of ED/IP-treated DKA and SH among people with T2D from 2017 to 2024.

Methods

Study Design:

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

Population:

Individuals with T2D were identified using ICD-10-CM E11.x claims and required continuous enrollment each calendar year independently.

Outcomes:

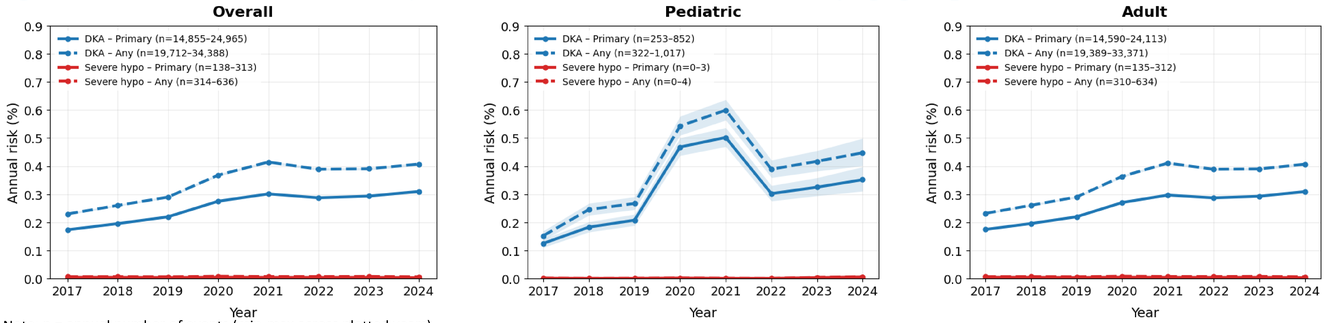
- DKA and SH were identified from ED/IP claims using ICD-10-CM codes.
- Primary diagnosis was defined by ICD01, and any diagnosis position was ICD 01-25.

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

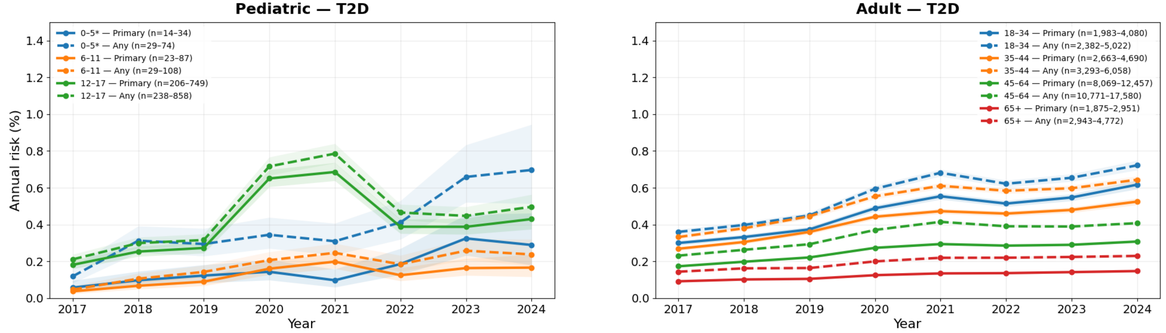


Note: n = annual number of events (min-max across plotted years)

Key findings:

- DKA risk increased over time, with higher risk observed in pediatric compared to adult populations.
- ED/IP-treated severe hypoglycemia remained rare (<0.01%) and was stable over the study period.

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

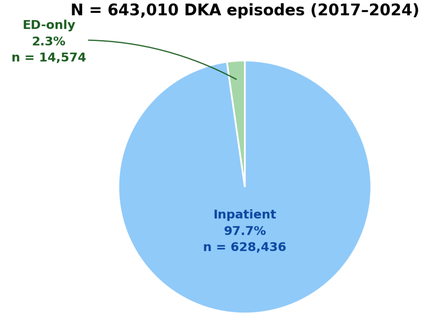


Note: n = annual number of events (min-max across plotted years). *T2D in children aged 0–5 is unlikely, thus, the accuracy of these cases in claims data is uncertain.

Key findings:

- Adolescents aged 12–17 had the highest DKA risk; younger age groups remained below 0.3%
- Among adults, DKA risk was highest in those aged 18–34 (~0.2% to ~0.7%) and lowest in those aged ≥65 (~0.1% to ~0.2%), with gradual increases across all adult age bands over time.

Figure 3. Distribution of DKA episodes by site of care



Note: *ED-only = episodes treated and discharged from the ED. ED visits followed by IP admission on the same or next day were bundled and classified as IP episodes.*

Key findings:

- Across all years, 97.6%–98.0% of DKA episodes were classified as inpatient, while 2.0%–2.4% were ED-only.

Conclusions

- Unlike SH, DKA prevalence increased over time in T2D, with the highest risk observed in pediatric populations.
- Majority of DKA episodes were primary diagnoses.
- Nearly all DKA episodes required inpatient hospitalization.
- Improved DKA prevention strategies are needed for people with T2D.

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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