



# The impact of the use of a digital diabetes management application on HCRU-related costs and pharmacy claims in patients with type 2 diabetes mellitus

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## INTRODUCTION

- Clinical management of type 2 diabetes mellitus (T2DM) is associated with extensive healthcare resource utilization (HCRU) and consequently incurs a substantial economic burden.
- In 2022, the total cost of diabetes in the US was estimated at \$412.9 billion, of which \$306.6 billion (74.3%) was attributed to direct medical costs and \$106.3 billion (25.7%) to indirect costs.<sup>1</sup>
- Dario Diabetes Solution (DDS) is a digital health solution that combines a smartphone application with a blood glucose (BG) meter<sup>2</sup>; the DDS has been approved by the US Food and Drug Administration for self-testing of BG in people with diabetes in order to monitor the effectiveness of diabetes control.<sup>3</sup>
  - DDS facilitates personalized diabetes management and provides actionable insights through real-time tracking of various metrics, such as BG levels, physical activity, insulin dose, and diet.

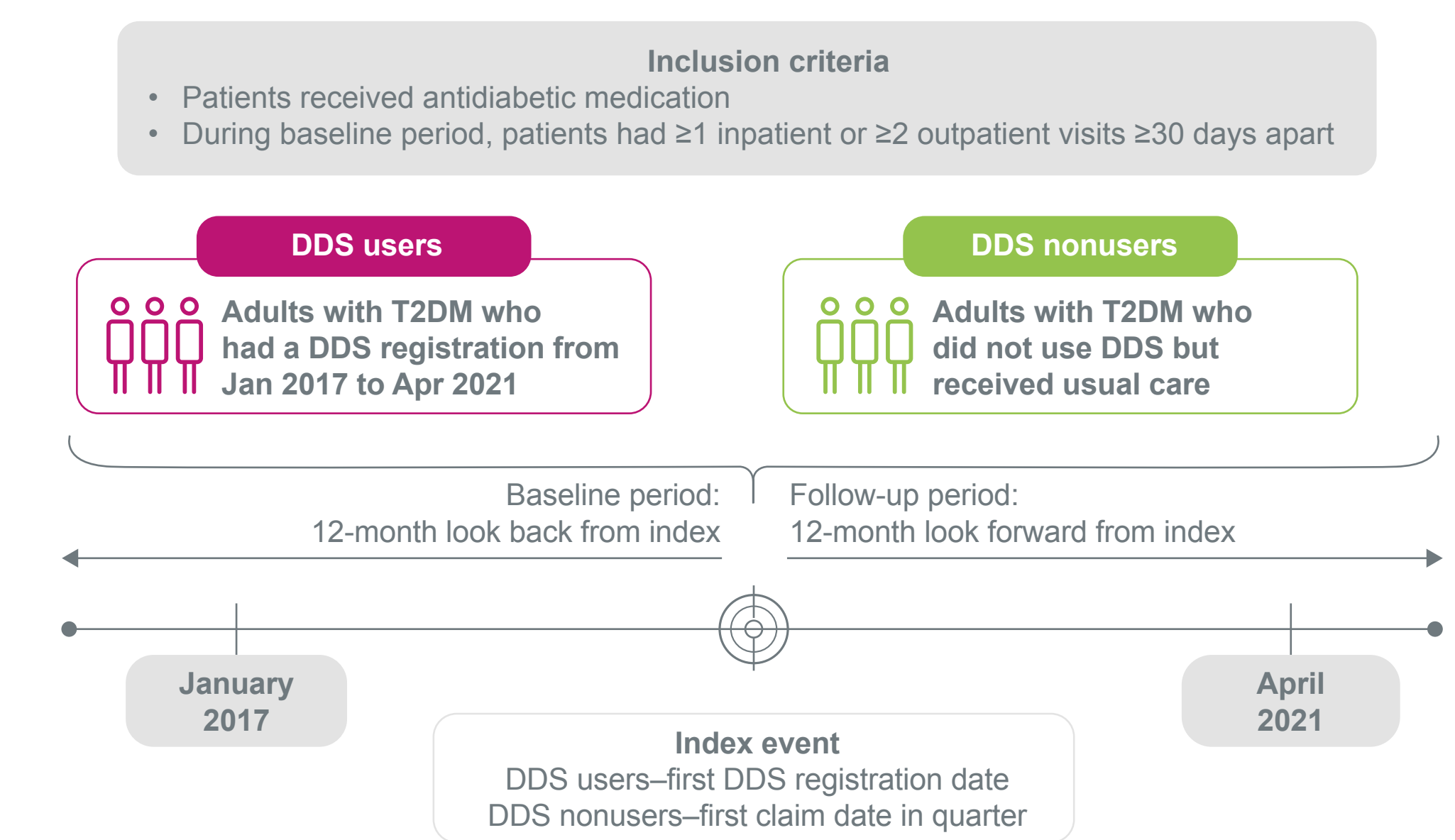
## OBJECTIVE

- This analysis reports the HCRU-related costs incurred in DDS users compared with DDS nonusers in a US real-world setting.

## METHODS

- This real-world, retrospective cohort study identified adults (≥18 years) with T2DM who were treated with any antidiabetic therapy and had registered to use DDS between January 1, 2017, and April 30, 2021 (**Figure 1**).
- DDS users were identified by linking anonymized DDS-user data to patient-level claims data from the Symphony Health Integrated Dataverse (IDV).
- Identified DDS users were matched 1:3 with DDS nonusers within the IDV using exact and propensity score matching (PSM).
  - The index date for DDS users was defined as the first registration date.
  - The index date for DDS nonusers was the first medical claim date within the matched quarter.
  - Nonusers who had ≥1 medical claim with a diagnosis of T2DM within the study period were randomly assigned to an annual quarter with any medical claim and matched with a DDS user, ensuring that the nonuser medical claim date and DDS-user registration date were in the same quarter.

Figure 1. Study design



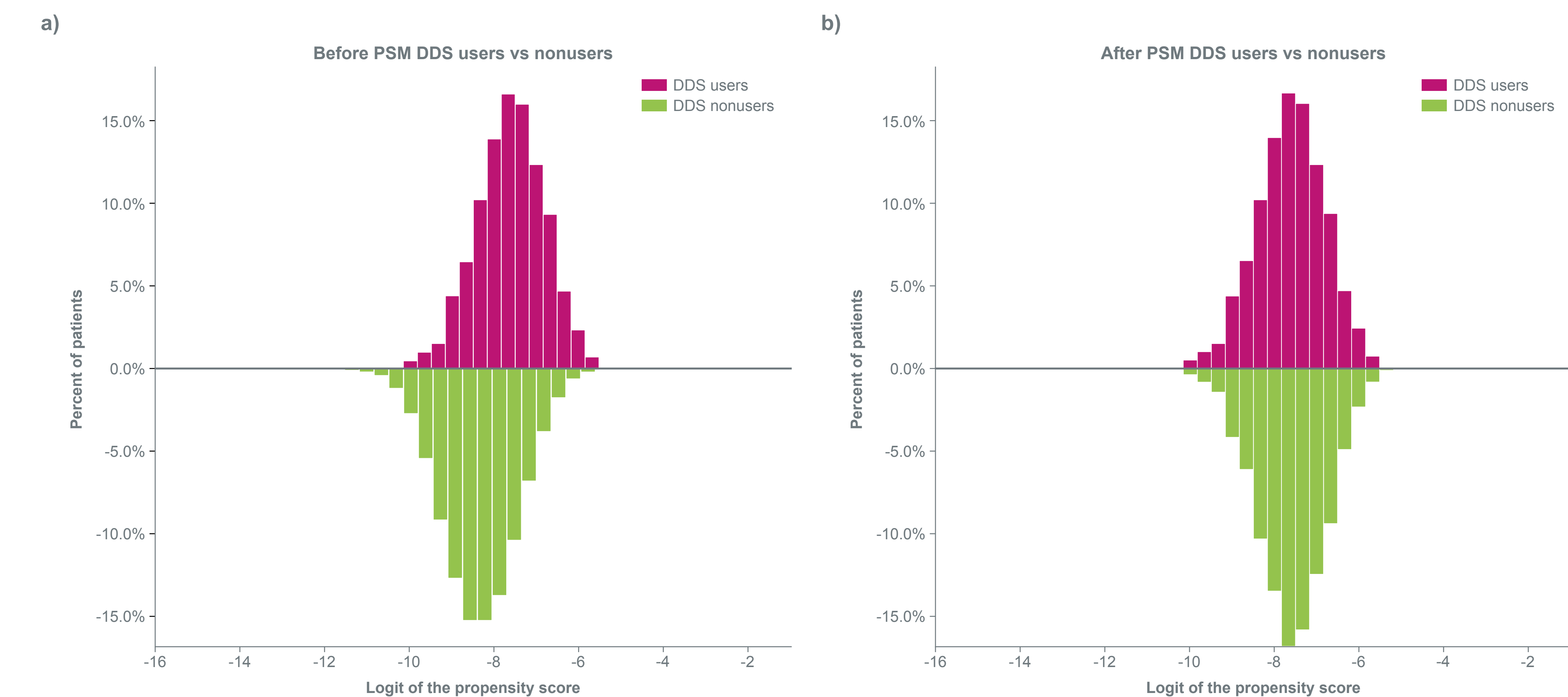
DDS, Dario Diabetes Solution; T2DM, type 2 diabetes mellitus.

- All patients were required to have ≥2 outpatient visits (≥30 days apart) or ≥1 inpatient visit prior to the index date.
- This analysis compared all-cause per patient per year (PPPY) payer costs relating to acute care (inpatient and emergency room visits), office visits, and pharmacy costs between DDS users and nonusers at 12-month follow-up.
  - Payer costs were estimated by applying cost-to-charge ratios to acute care and office visit claim charges, and pharmacy costs were identified from pharmacy claims.
  - Costs were adjusted for baseline values using generalized linear models (following gamma distribution for acute care/office visits, and normal distribution for pharmacy costs).

## RESULTS

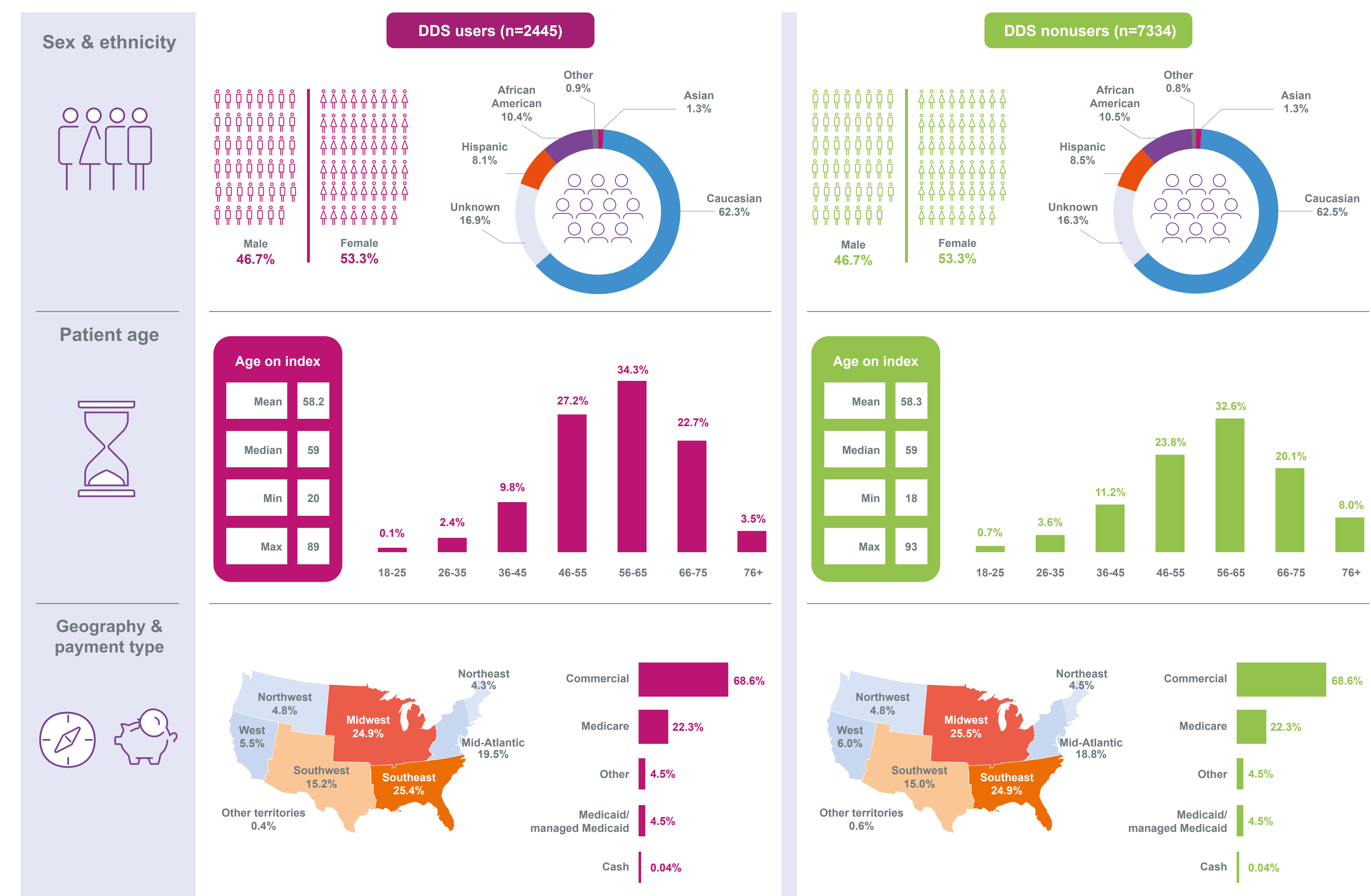
- In total, 9779 T2DM patients were included in this analysis, with 2445 DDS users matched with 7334 nonusers (**Figures 2 and 3**).
  - Mean age (SD) was 58.2 (10.6) years for DDS users and 58.3 (12.5) years for DDS nonusers; 53.3% of patients were female in each cohort.

Figure 2. Mirrored histogram of propensity scores a) before and b) after propensity score matching of DDS-user and nonuser cohorts



DDS, Dario Diabetes Solution; PSM, propensity score matching.

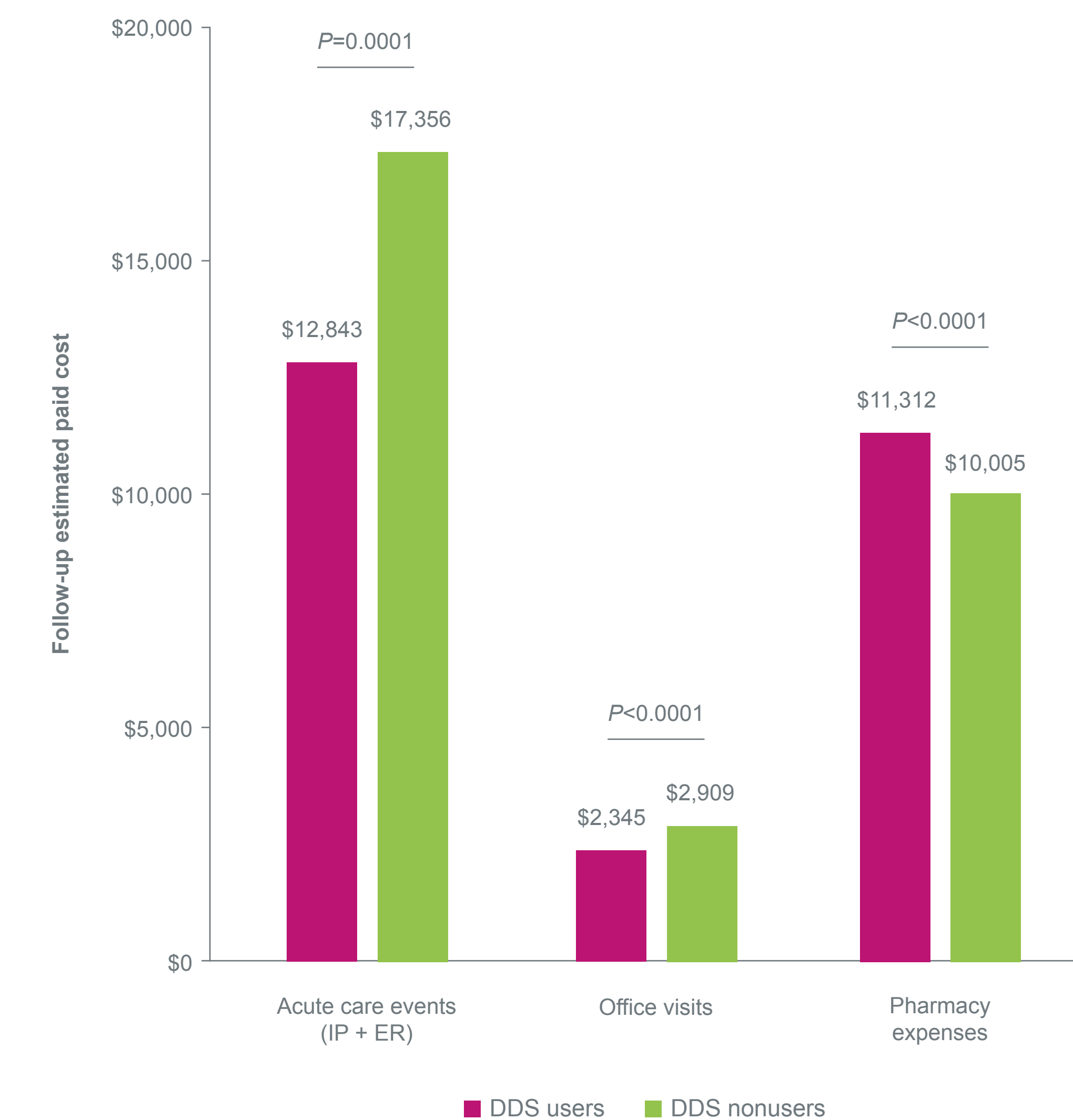
Figure 3. Key baseline demographics after propensity score matching of DDS-user and nonuser cohorts



DDS, Dario Diabetes Solution.

- DDS users who had acute care events (n=699 [28.6%]) incurred significantly lower estimated paid costs (\$12,843 PPPY) compared with DDS nonusers (n=2200 [30.0%]; \$17,356 PPPY) ( $P=0.0001$ ) (**Figure 4**).

Figure 4. Acute care event costs, office visit costs, and pharmacy expenses incurred in DDS-user and nonuser cohorts



DDS, Dario Diabetes Solution; ER, emergency room; IP, inpatient.

- DDS users with office visits (n=2004 [82.0%]) incurred significantly lower estimated paid costs (\$2,345 PPPY) compared with DDS nonusers (n=5800 [79.1%]; \$2,909 PPPY) ( $P<0.0001$ ) (**Figure 4**).
- DDS users incurred \$11,312 PPPY in pharmacy expenses, which was statistically higher than DDS nonusers, who incurred \$10,005 PPPY ( $P<0.0001$ ) (**Figure 4**).

## CONCLUSIONS

- In this retrospective cohort study in real-world US patients, the use of a digital health solution by US patients with T2DM was associated with significant reductions in acute care (\$4,513) and office visit–related (\$564) costs and a significant increase in pharmacy costs (\$1,307) compared with nonuse.
- Because DDS users were self-registered, a selection bias may have been possible, and it could be speculated that underlying differences may remain between the cohorts after PSM.
- The lower acute care and office visit–related costs in parallel with higher pharmacy costs observed in DDS users compared with nonusers may suggest improved patient self-management of T2DM with DDS use.

## REFERENCES

- Parker ED, et al. *Diabetes Care*. 2023;47:26-43.
- Dario® Blood Glucose Monitoring System. Digital Therapeutics Alliance; 2024. Accessed March 25, 2024. <https://dtxalliance.org/products/dario-blood-glucose-monitoring-system/>.
- US Food and Drug Administration. Substantial equivalence determination decision summary. 510(k) number: K150817. 2015. Accessed March 25, 2024. [https://www.accessdata.fda.gov/cdrh\\_docs/reviews/K150817.pdf](https://www.accessdata.fda.gov/cdrh_docs/reviews/K150817.pdf)

## DISCLOSURES

This study was funded by Sanofi.  
Laura Wilson and Praveen Potukuchi are employees and stockholders of Sanofi.  
Daniel C. Malone has served as a consultant to Sanofi for this study and has received consulting fees from Avidity, Neurocrine, Pear Therapeutics, and Sarepta.  
Alison Edwards is an employee of Symphony Health, which received funding from Sanofi for this analysis.  
Diana Brixner has consulted for Insulet, Sanofi, and Tandem and is an investigator on research grants from Dexcom and Insulet.

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