

The Impact of Patient Engagement With a Digital Diabetes Solution on All-Cause Healthcare Resource Utilization Rates and Charges

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INTRODUCTION

- Clinical management of type 2 diabetes mellitus (T2DM) is associated with substantial economic burden and healthcare resource utilization (HCRU).
 - The total estimated costs of diabetes in the US increased by 33% (from \$245 billion to \$327 billion) between 2012 and 2017.¹
- Dario Diabetes Solution (DDS) is a digital health solution that combines a smartphone application with a blood glucose (BG) monitoring system.²
 - DDS enables tracking of various metrics, such as BG levels, physical activity, insulin dose, and diet in real-time, providing actionable insights for optimal self-management of T2DM.³

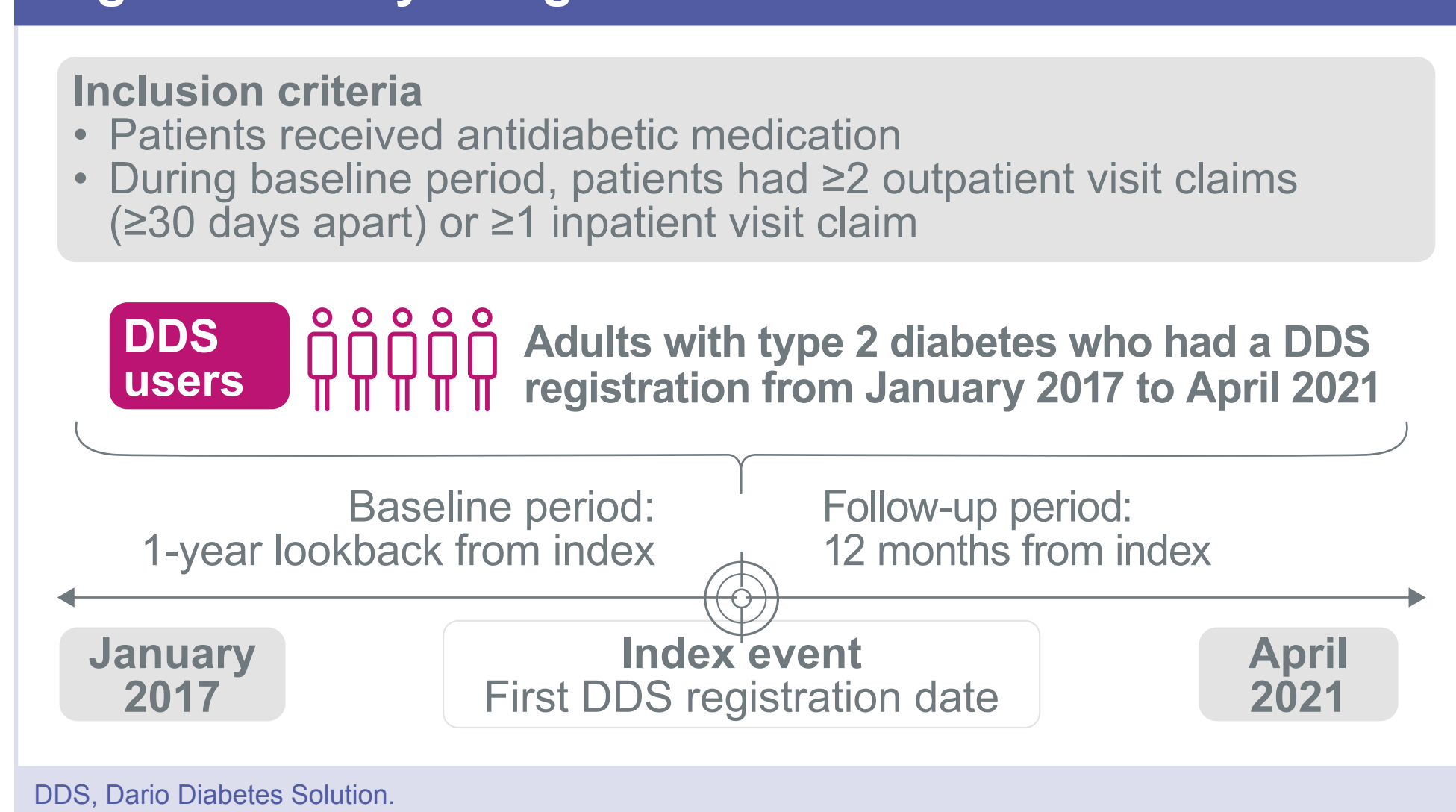
OBJECTIVE

- This analysis reports the impact of patient engagement with the DDS app on HCRU in adult patients with T2DM in a US real-world setting.

METHODS

- This real-world, US, retrospective cohort study identified adults (≥18 years) with T2DM who received antidiabetic therapy and had registered to use DDS between 1 January 2017 and 30 April 2021 (DDS users).
- Clinical information for DDS users was obtained by linking anonymized DDS user records to patient-level claims data from the Symphony Health Integrated Dataverse (Figure 1).
 - The index date for DDS users was defined as the date of first DDS registration.

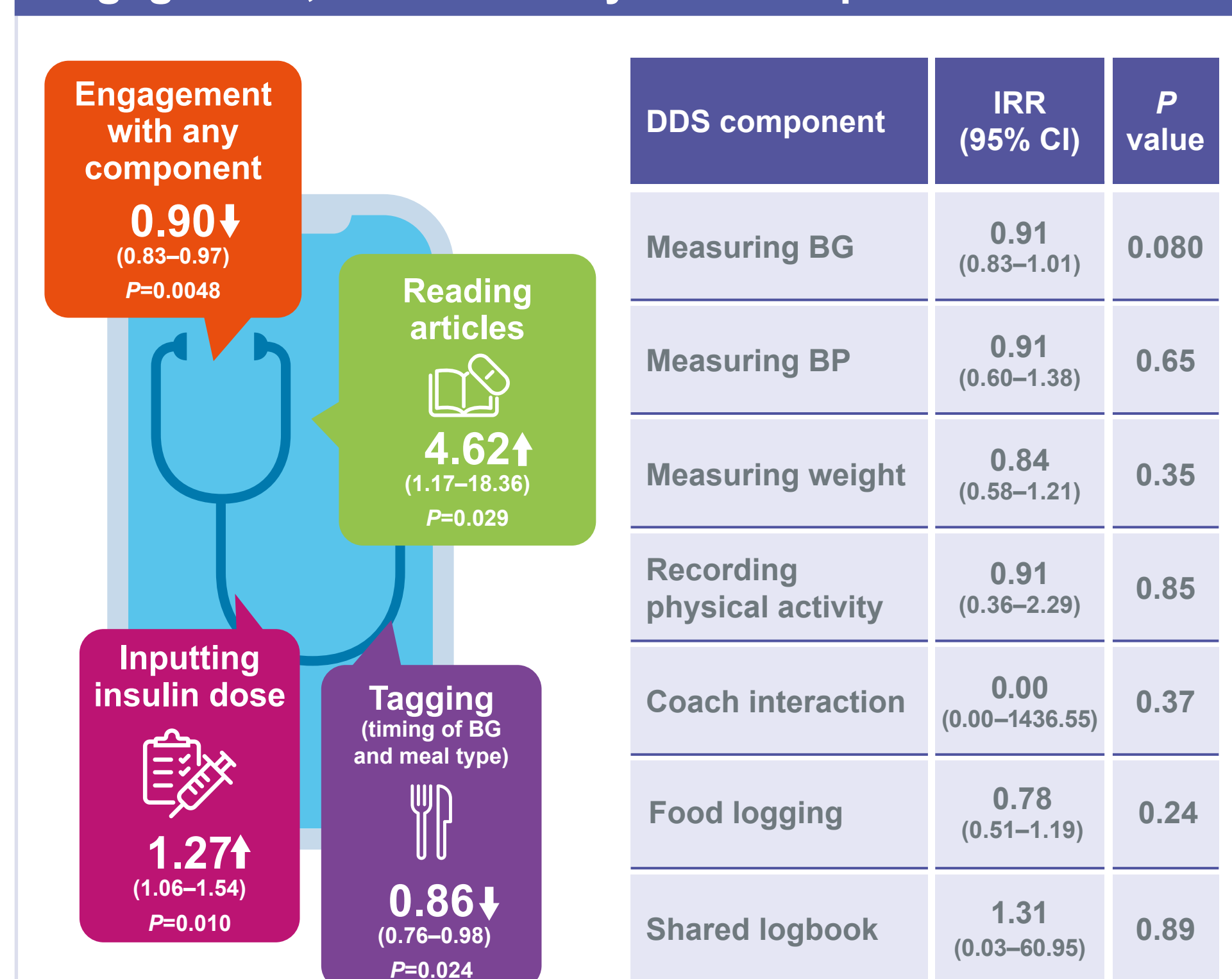
Figure 1. Study design



- All patients were required to have at least two outpatient visit claims (of any diagnosis and at least 30 days apart) or at least one inpatient medical claim (of any diagnosis), both within 12 months prior to the index date, and were followed for 12 months postindex.

- User engagement was captured for each of the 10 DDS activity components:
 - measuring BG
 - measuring blood pressure
 - measuring weight
 - tagging BG timing and meal type
 - food logging
 - inputting insulin dose
 - recording physical activity
 - sharing logbooks
 - reading articles
 - coach interaction
- Overall engagement was defined as the number of days any of the 10 components were used within the 12-month period postindex.
- This analysis assessed the impact of engagement metrics on HCRU, defined as all-cause inpatient (IP) hospitalizations and all-cause emergency room (ER) visits, and the odds of incurring any HCRU-related charge.
 - Incidence rate ratios (IRRs) for all-cause HCRU rates per 100 days of engagement were adjusted for baseline values and derived with a negative binomial generalized linear model.
 - Odds ratios (ORs) for HCRU-related charges >\$0 per 100 days of engagement were adjusted for baseline values and derived with a logistic model.
- Variance inflation factor (VIF) was used to assess multicollinearity between the DDS components.

Figure 3. IRRs of all-cause HCRU per 100 days of engagement, overall and by DDS components

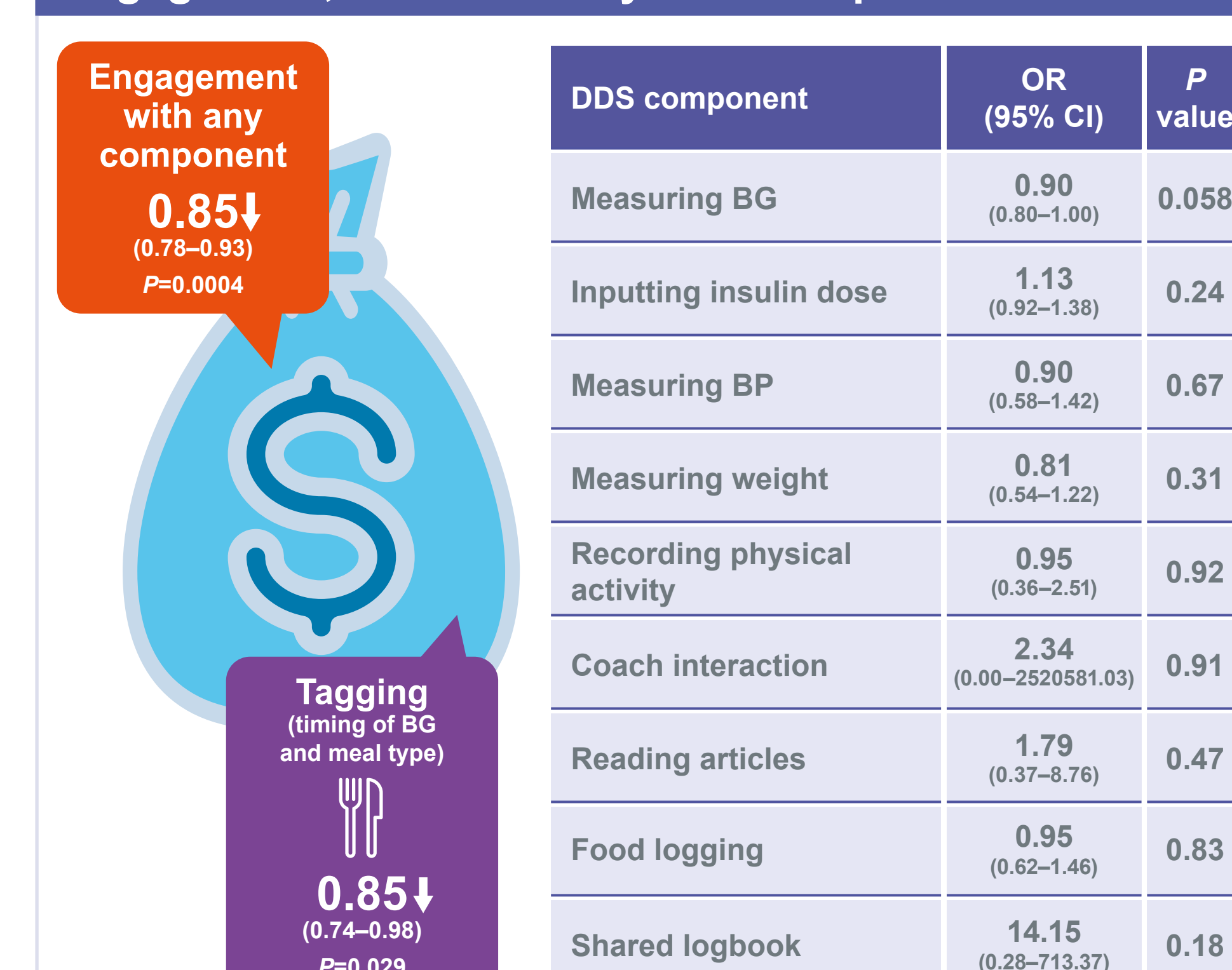


BG, blood glucose; BP, blood pressure; DDS, Dario Diabetes Solution; IRR, incidence rate ratio.

RESULTS

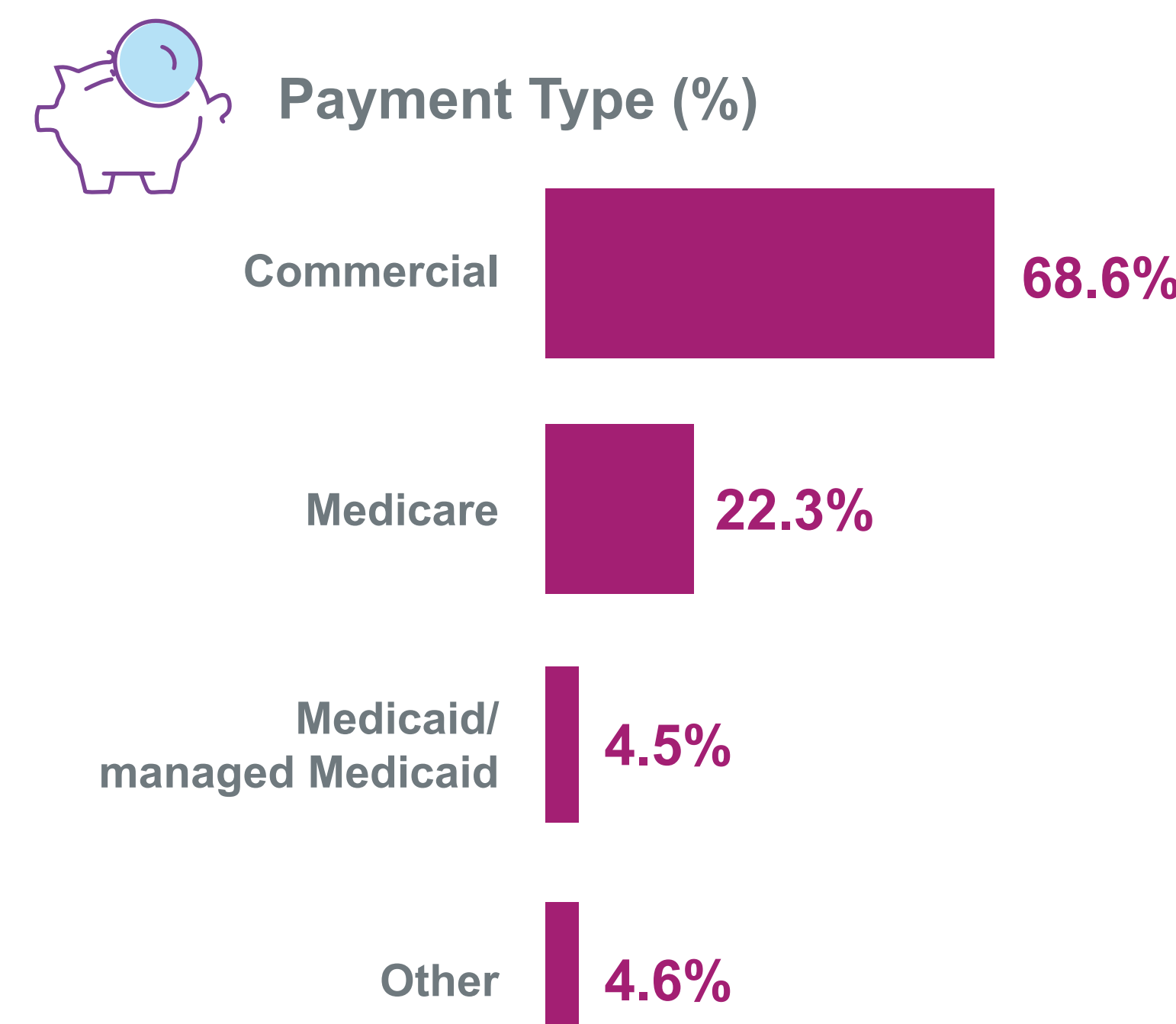
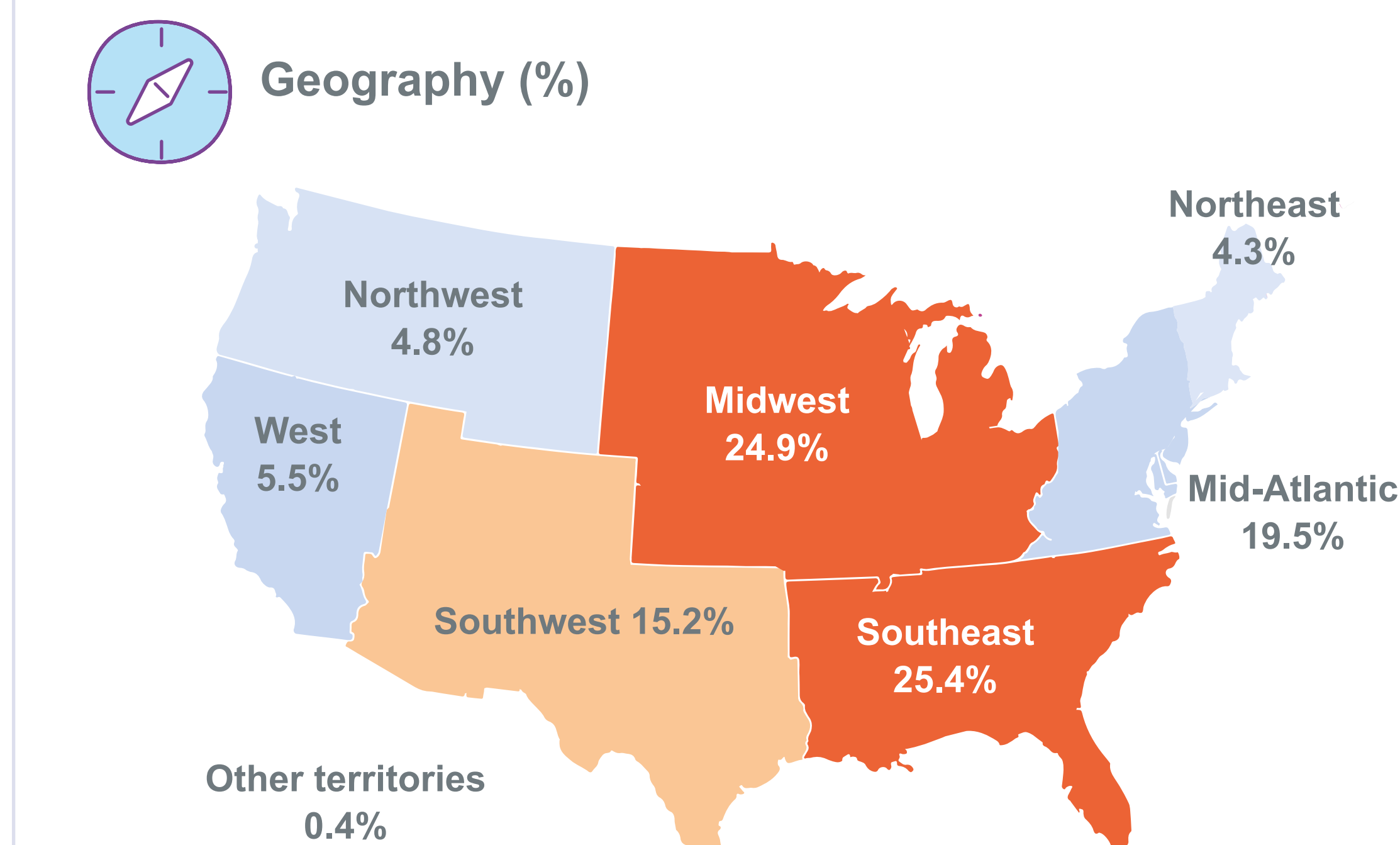
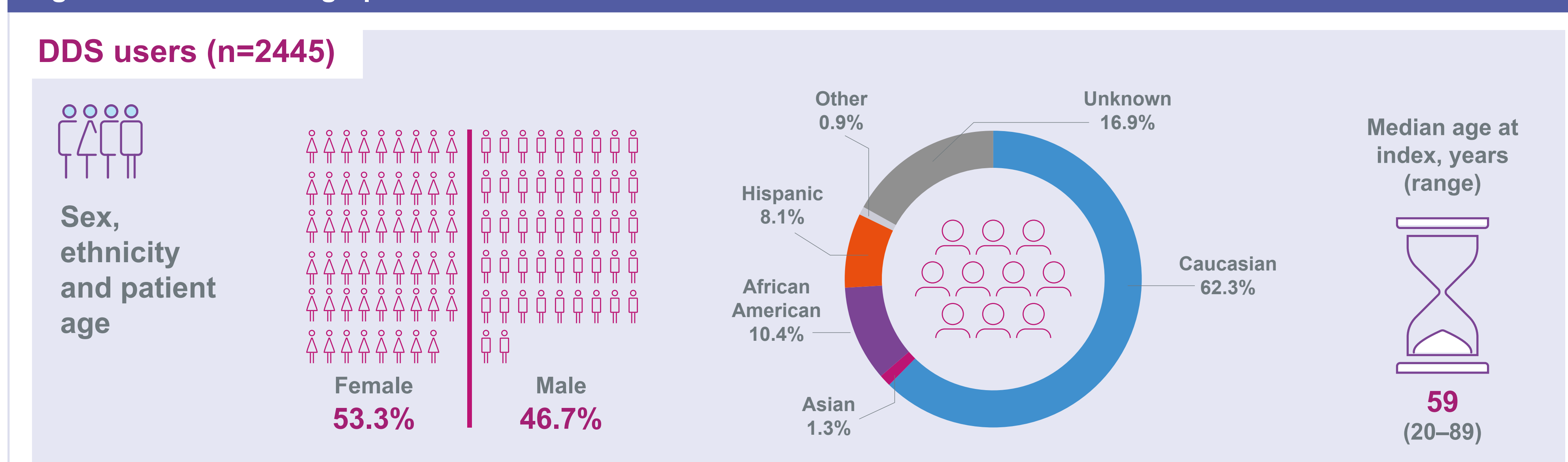
- A total of 2445 DDS users were included in this analysis (Figure 2).
 - Mean (SD) age was 58.2 (10.6) years, and 53.3% patients were female.
- All DDS components had low multicollinearity (VIF <2 for all components).
- Overall engagement, defined as use of any of the 10 DDS components, was associated with significantly lower all-cause HCRU (IP + ER) and lower odds of incurring HCRU-related charges.
 - The incidence of HCRU was 10% lower in engaged DDS users compared with nonengaged DDS users (IRR: 0.90; 95% CI, 0.83–0.97; P=0.0048) (Figure 3).
 - The odds of incurring charges >\$0 was 15% lower in engaged DDS users compared with nonengaged DDS users (IRR: 0.85; 95% CI, 0.78–0.93; P=0.0004) (Figure 4).
- Engagement with the component “tagging BG timing and meal type” was associated with a significant reduction in all-cause HCRU rate and reduction in odds of incurring charges.
 - The incidence of HCRU was 14% lower in DDS users who were engaged with this component compared with those who were not engaged (IRR: 0.86; 95% CI, 0.76–0.98; P=0.024) (Figure 3).
 - The odds of incurring charges >\$0 was 15% lower in DDS users who engaged with this component compared with those who did not engaged (IRR: 0.85; 95% CI, 0.74–0.98; P=0.029) (Figure 4).
- Engagement with the components “reading articles” and “inputting insulin dose” was associated with higher rates of HCRU.
 - IRRs of HCRU rates between DDS users who were engaged with “reading articles” and “inputting insulin dose” vs those who were not engaged were 4.62 (95% CI, 1.17–18.36; P=0.029) and 1.27 (95% CI, 1.06–1.54; P=0.010), respectively (Figure 3).

Figure 4. ORs of all-cause charges per 100 days of engagement, overall and by DDS components



BG, blood glucose; BP, blood pressure; DDS, Dario Diabetes Solution; OR, odds ratio.

Figure 2. Patient demographics and characteristics



CONCLUSIONS

- Overall engagement with any of the 10 DDS components was associated with reductions in all-cause HCRU rates and lower likelihood of incurring HCRU-related charges.
- Use of the “tagging a meal” component was associated with significantly lower HCRU and likelihood of incurring costs; “reading articles” and “inputting insulin dose” were associated with higher HCRU and may reflect acute T2DM events.
- The improved HCRU and cost outcomes associated with overall DDS engagement most likely reflect facilitated patient self-management of T2DM.

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DISCLOSURES

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

ACKNOWLEDGMENTS

Donald Nelinson, PhD, at Sanofi, assisted with the coordination of the development of this poster and performed a courtesy review. Medical writing support was provided by Yasmin Lau and Martin Bell of Envision Value, Access & Data Sciences and was funded by Sanofi.