

Comparison of All-Cause Healthcare Resource Utilization Rates Between Patients With Type 2 Diabetes Who Use a Digital Diabetes Solution Versus Non-Users: A 12-Month Retrospective Cohort Study

Laura Wilson, PharmD,¹ Daniel Malone, PhD, FAMCP,² Praveen Potukuchi, PhD,¹ Nita Thingalaya, MD, FACP, CHIE, Dipl.ABOM,¹ Keni C.S. Lee, CMD, PhD,³ Alison Edwards, MStat,⁴ Xinyan Yu, MD, MS,⁴ Felix Lee, MPharm, MSc, MBA,⁵ Adee Kennedy, MS, MPH,¹ Edward Han-Burgess, MS, MSc, MBA, CFA,⁵ Diana Brixner, RPh, PhD, FAMCP²

¹Sanofi, Bridgewater, NJ, USA; ²University of Utah College of Pharmacy, Salt Lake City, UT, USA; ³Sanofi, Reading, UK; ⁴Symphony Health, ICON plc, Blue Bell, PA, USA; ⁵Sanofi, Cambridge, MA, USA

RWD43

ISPOR 2023
May 7–10, 2023
Boston, MA, USA

INTRODUCTION

- Diabetes, a chronic condition that requires continuous management, was estimated to affect 24.7 million individuals in the United States in 2017.¹
 - Estimated direct medical costs in the United States were \$237 billion.
- Digital technologies that allow for personalized intervention have been developed to improve diabetes care management.^{2,3}
- Dario Diabetes Solution (DDS) is a digital health application for type 2 diabetes mellitus (T2DM) management.
 - DDS combines a blood glucose meter and a mobile application, allowing patients to track blood glucose levels in real time.
 - DDS automatically logs blood glucose measurements and allows the user to log meals, carbohydrate consumption, insulin intake, physical activity, and other parameters.

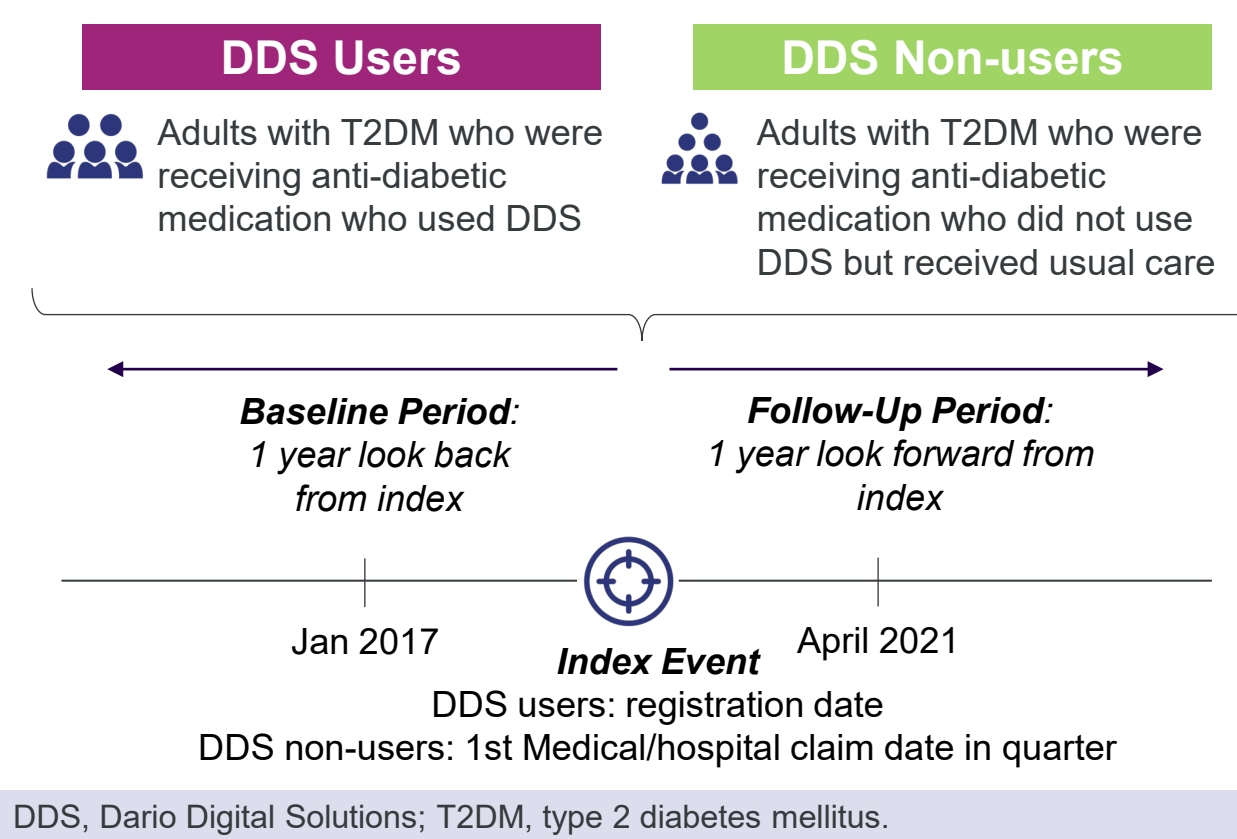
PURPOSE

This study compared healthcare resource utilization (HCRU) by DDS users with a matched non-user cohort.

METHODS

- In this retrospective cohort study, the patient selection window was January 2017 to April 2021 (Figure 1).

Figure 1: Study Timeline



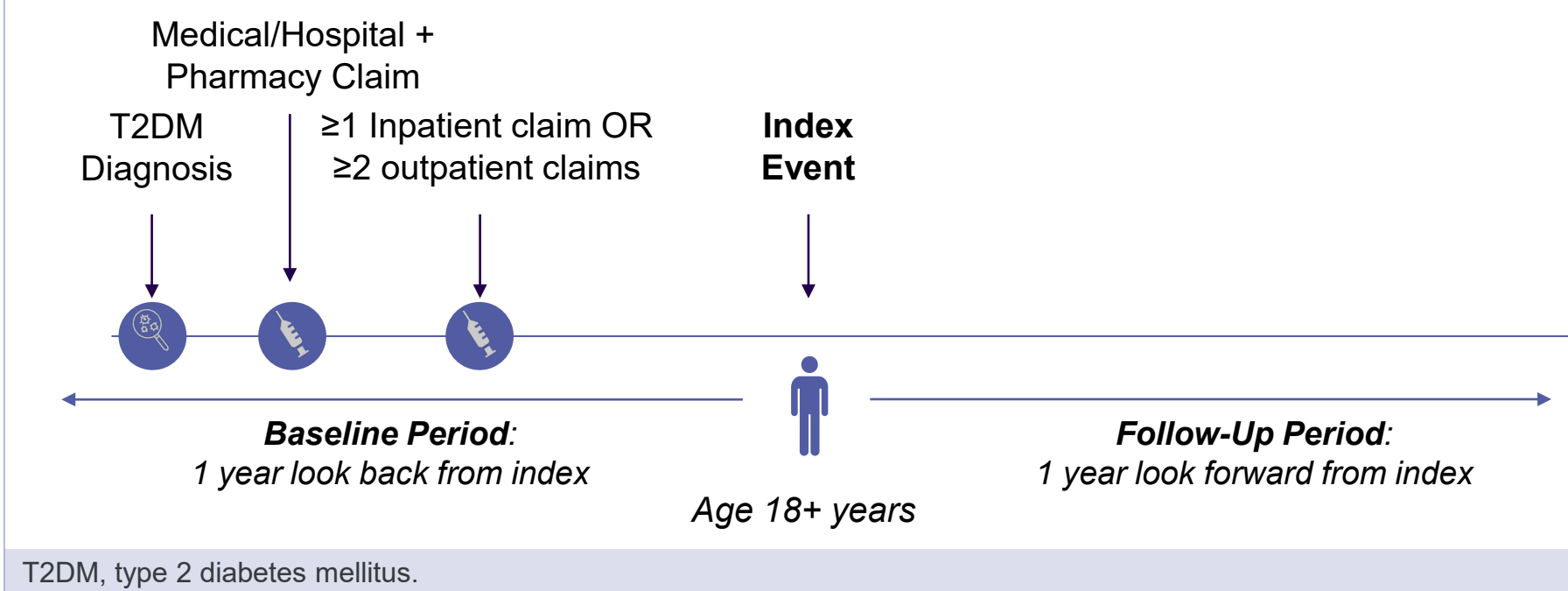
- Inclusion criteria (Figure 2)
 - Patients ≥18 years old with T2DM
 - Patients receiving anti-diabetic medication(s) within 365 days before index date
 - Patients with access to care 12 months before and after index date (confirmed by evidence of 1 medical/hospital and pharmacy claim)
 - Patients with ≥1 inpatient or ≥2 outpatient visits at least 30 days apart during baseline period
- Excluded were patients with type 1 or other types of diabetes, and patients who used continuous glucose monitoring during the study period.

REFERENCES

- American Diabetes Association. *Diabetes Care*. 2018;41(5):917-928.
- Chen F, et al. *Sci Diabetes Self Manag Care*. 2022;48(4):258-269.
- Whaley CM, et al. *J Med Econ*. 2019;22(9):869-877.

METHODS (cont'd)

Figure 2: Inclusion Criteria

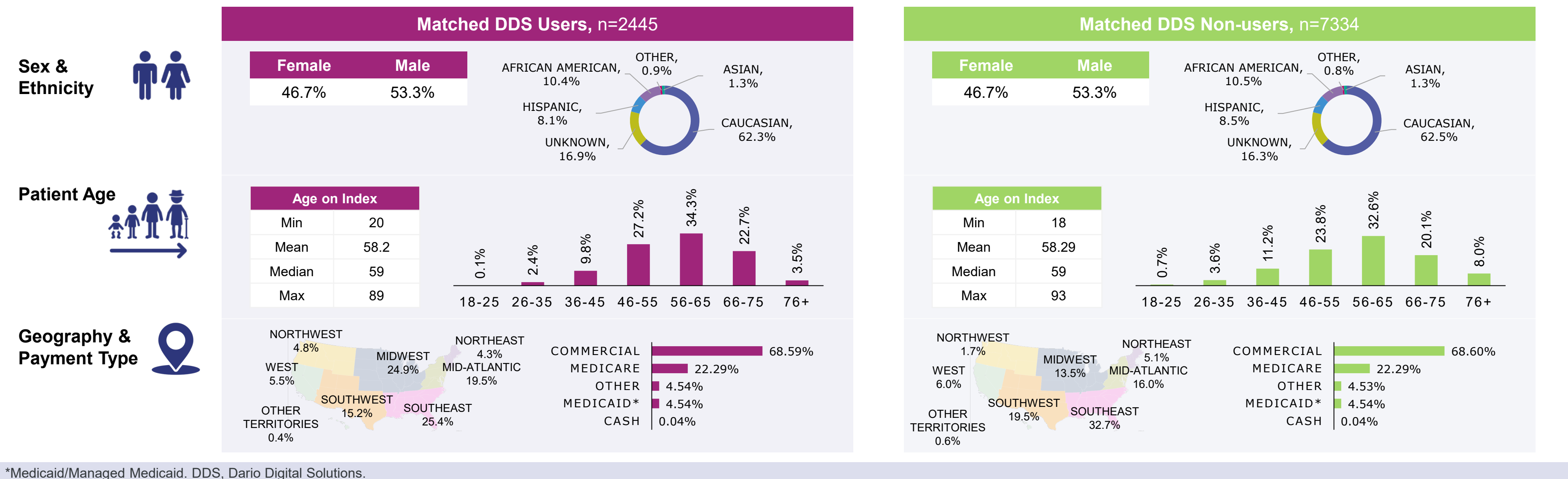


- User and non-user cohorts were sequentially matched 1:3 using exact and propensity score matching.
 - Exact matching: index quarter, sex, payer, and medications
 - Propensity matching: age, region, race and ethnicity, Charlson Comorbidity Index score, comorbidities, comedications, baseline HCRU
- Primary endpoint was all-cause HCRU (defined as either inpatient hospitalizations or emergency room [ER] visits) rates during the follow-up period.
- Data were analyzed using a generalized linear model with negative binomial distribution adjusted for baseline HCRU.
 - Incidence rate ratio (IRR) was calculated.
 - Statistical significance was determined using Wald chi-square statistics.

RESULTS

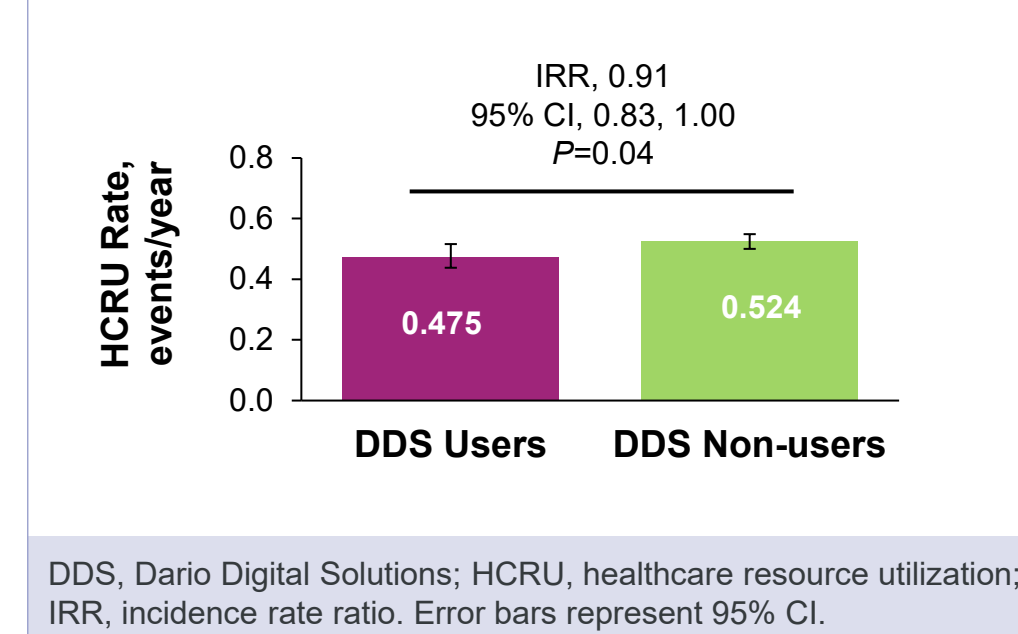
- Of 9779 patients, 2445 DDS users and 7334 DDS non-users were matched (Figure 3).

Figure 3: Demographics and Baseline Characteristics



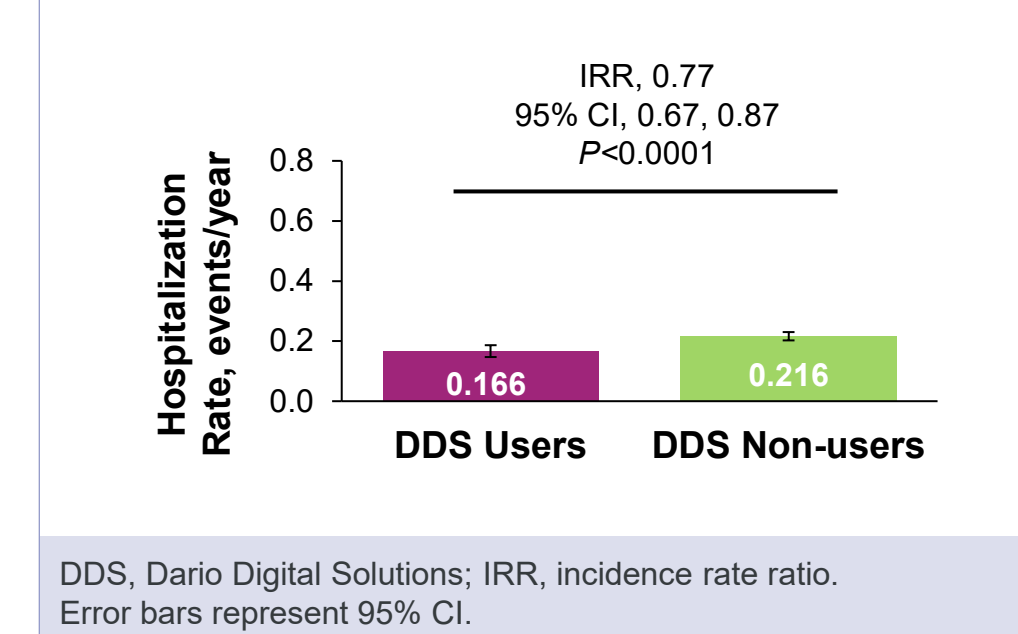
RESULTS (cont'd)

Figure 4: All-Cause HCRU Rate (Inpatient Hospitalizations + ER Visits) at 12 Months



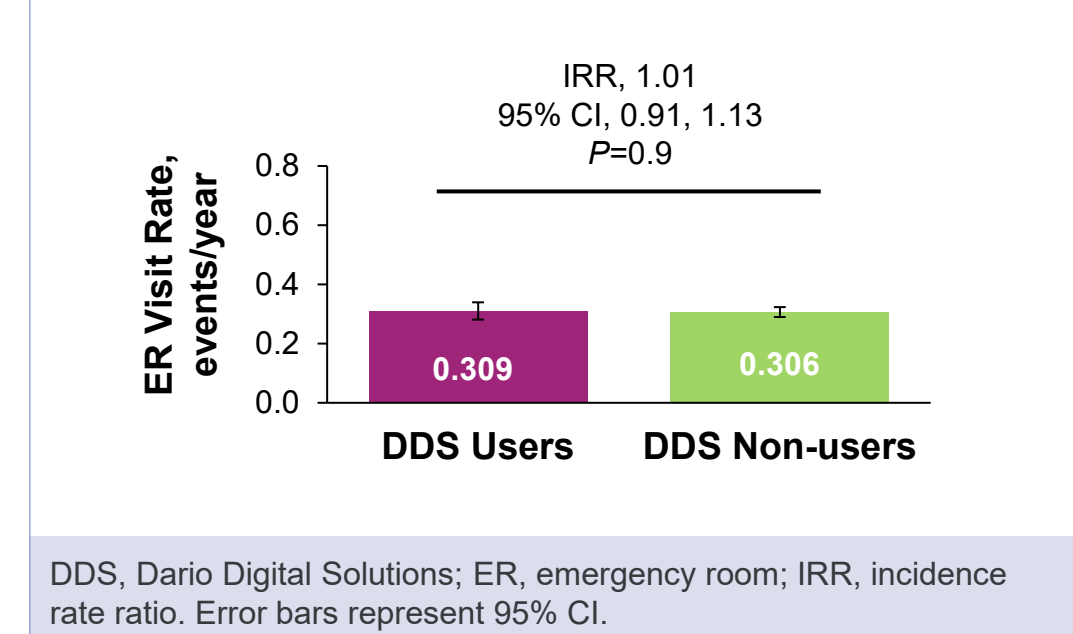
- At 12 months, mean all-cause HCRU rate (inpatient hospitalization + ER visits) was 0.475 and 0.524 events/year for DDS users and non-users, respectively (Figure 4).
 - DDS users had a 9.3% lower all-cause HCRU rate compared with non-users.
 - DDS users achieved significantly lower all-cause HCRU rate compared with non-users ($P=0.0411$).
- For DDS users, ≥1 HCRU event was reported for 30.5% of patients at baseline and 28.6% during follow-up.
- For non-users, ≥1 HCRU event was reported for 29.5% of patients at baseline and 30.0% during follow-up.

Figure 5: All-Cause Inpatient Hospitalization Rate at 12 Months



- At 12 months, mean all-cause hospitalization rate was 0.166 and 0.216 events/year for users and non-users, respectively (Figure 5).
 - DDS users had a 23.5% lower all-cause inpatient hospitalization rate compared with non-users.
 - DDS users achieved significantly lower all-cause inpatient hospitalization rate compared with non-users ($P<0.0001$).
- For DDS users, ≥1 inpatient event was reported for 14.8% of patients at baseline and 13.4% during follow-up.
- For non-users, ≥1 inpatient event was reported for 14.3% of patients at baseline and 16.3% during follow-up.

Figure 6: All-Cause Emergency Room Visit Rate at 12 Months



- At 12 months, mean all-cause ER visit rate was 0.309 and 0.306 events/year for users and non-users, respectively (Figure 6).
 - ER visit rates were similar in the two cohorts ($P=0.86$).
- For DDS users, ≥1 ER event was reported for 22.9% of patients at baseline and 21.7% during follow-up.
- For non-users, ≥1 ER event was reported for 21.6% of patients at baseline and 21.2% during follow-up.

CONCLUSIONS

In this retrospective matched cohort study, utilizing DDS demonstrated a significantly greater reduction in all-cause HCRU (ER and inpatient hospitalization rates) during 12-month follow-up compared with non-users receiving usual care.

- DDS users had 9.3% lower all-cause HCRU rate compared with non-users (absolute rate reduction of 0.049 events/year; IRR, 0.91; $P=0.04$).
- DDS users had 23.5% lower all-cause inpatient hospitalization rates compared with non-users (absolute rate reduction of 0.05 events/year; IRR, 0.77; $P<0.0001$).
- ER visit rates were similar for the two cohorts. The numeric difference of 0.003 events/year between DDS users and non-users was not statistically significant.

ACKNOWLEDGMENT

Editorial assistance was provided by Natalia Zhukovskaya, PhD, of ICON plc (Blue Bell, PA, USA) and was funded by Sanofi.

FUNDING

The study was sponsored by Sanofi.

DISCLOSURES

L. Wilson, P. Potukuchi, N. Thingalaya, K.C.S. Lee, F. Lee, A. Kennedy, and E. Han-Burgess are employees of Sanofi and may hold stocks/shares in Sanofi. D. Malone is a consultant to Sanofi and received consulting fees from Sarepta, Pear Therapeutics, Avidity, Gilead, and Otsuka.

A. Edwards and X. Yu are employees of Symphony Health, ICON plc, and received support from Sanofi. D. Brixner received consulting fees from Otsuka and Sanofi.