

# Controller Adherence and Albuterol Use among Adult Asthma Patients On Once or Twice Daily ICS/LABA Therapy Using Sensor Technology

Poster No. 1011/A5929

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## Aims

- Successful asthma management depends, in part, on adherence to and proper use of prescribed inhaler therapies.
- Newly developed electronic medical devices, including remote inhaler sensors, confer the ability to measure and understand asthma patients' real-world use of controller and rescue medications in real-time.
- The objective of this study was to examine adherence to controller medication and albuterol metered dose inhaler (MDI) use among adult patients with asthma on twice daily fluticasone propionate/salmeterol (FP/SAL) in the Diskus device or once daily fluticasone furoate/vilanterol (FF/VI) in the Ellipta device using sensor technology.

## Methods

- A multi-phase longitudinal observational research study was conducted.
  - In Phase 1, FP/SAL Diskus subjects were identified in the Optum Research Database (ORD) in December 2016 using medical and pharmacy claims data from November 1, 2015 to October 31, 2016.
  - In Phase 2, FF/VI Ellipta subjects were identified in the ORD using medical and pharmacy claims data from June 1, 2016 to May 31, 2017
- Eligible subjects met the following claims-based criteria:
  - ≥18 years of age at the time of identification
  - ≥1 pharmacy claims for FP/SAL Diskus during the most recent 6 months of the claims identification period (Phase 1) or ≥1 pharmacy claims for FF/VI Ellipta during the most recent 6 months of the claims identification period (Phase 2)
  - ≥1 pharmacy claims for an albuterol MDI compatible with a Propeller Health sensor during the most recent 6 months of the claims identification period
  - Continuous and current enrollment in Optum affiliated health plans during the 12-month identification period
  - No COPD-related diagnosis code during the 12 month identification period
- During each phase:
  - subjects were asked to complete a baseline mailed survey, and follow-up web surveys administered at 3 and 6 months to collect the Asthma Control Test (ACT) and other patient-reported measures
  - subjects received a Propeller Health kit containing a sensor and hub for the FP/SAL Diskus or FF/VI Ellipta device and a sensor and hub for the albuterol MDI to capture the date, time, and number of controller and albuterol MDI actuations in real time
  - subjects' pharmacy claims data were extracted for the 6-month follow-up period to examine controller and albuterol MDI dispensings
- This study was reviewed and approved by a central institutional review board (IRB).
- Statistical Analysis: All data presented is descriptive in nature. No formal statistical comparisons were performed.

## Results

### Descriptive Characteristics

- During Phase 1, 241 subjects enrolled in the FP/SAL Diskus cohort (mean age 49.2 years, 66.0% female), while 127 subjects enrolled in the FF/VI Ellipta cohort (mean age 47.1 years, 64.6% female) during Phase 2. Mean baseline ACT scores were 19.0 for FP/SAL Diskus patients and 19.1 for FF/VI Ellipta patients (Table 1).

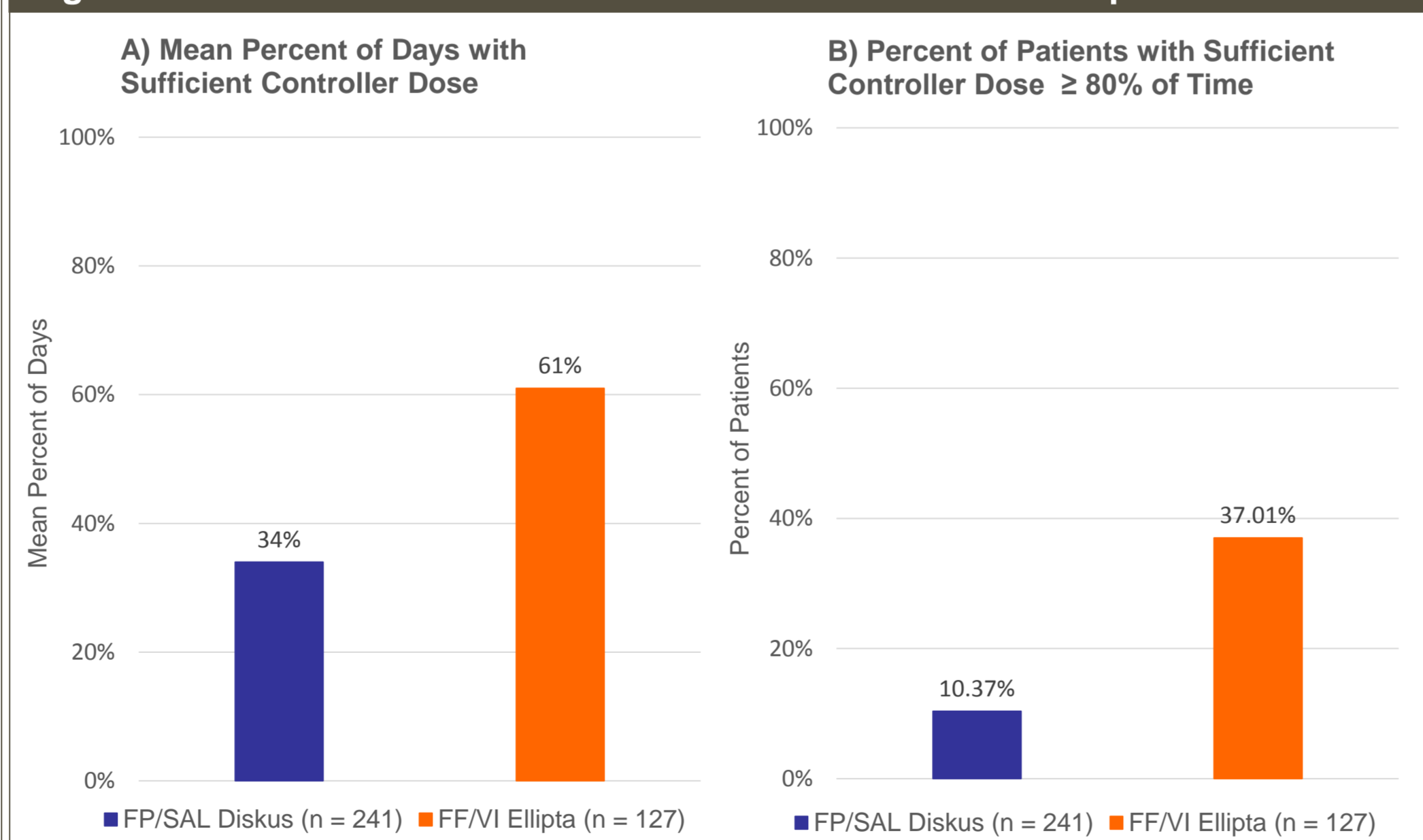
Table 1. Demographic Characteristics

|  | Phase 1: FP/SAL Diskus, (N=241) | Phase 2: FF/VI Ellipta, (N=127) |
|--|---------------------------------|---------------------------------|
| Age – Mean (SD) Years                      | 49.18 (12.09)                   | 47.13 (12.09)                   |
| Female – %                                 | 65.98                           | 64.57                           |
| Race – %, American Indian or Alaska Native | 1.24                            | 0                               |
| Asian                                      | 3.73                            | 0.79                            |
| Black or African American                  | 5.39                            | 4.72                            |
| Native Hawaiian/other Pacific Islander     | 0.41                            | 0.79                            |
| White                                      | 89.63                           | 91.34                           |
| Other Race                                 | 2.49                            | 3.15                            |
| BMI – Mean (SD)                            | 30.30 (7.20)                    | 31.12 (8.39)                    |
| Baseline ACT Scores – Mean (SD)            | 19.02 (4.00)                    | 19.06 (3.90)                    |

### Sensor-derived Controller and Albuterol MDI Use over 6-Month Follow-Up

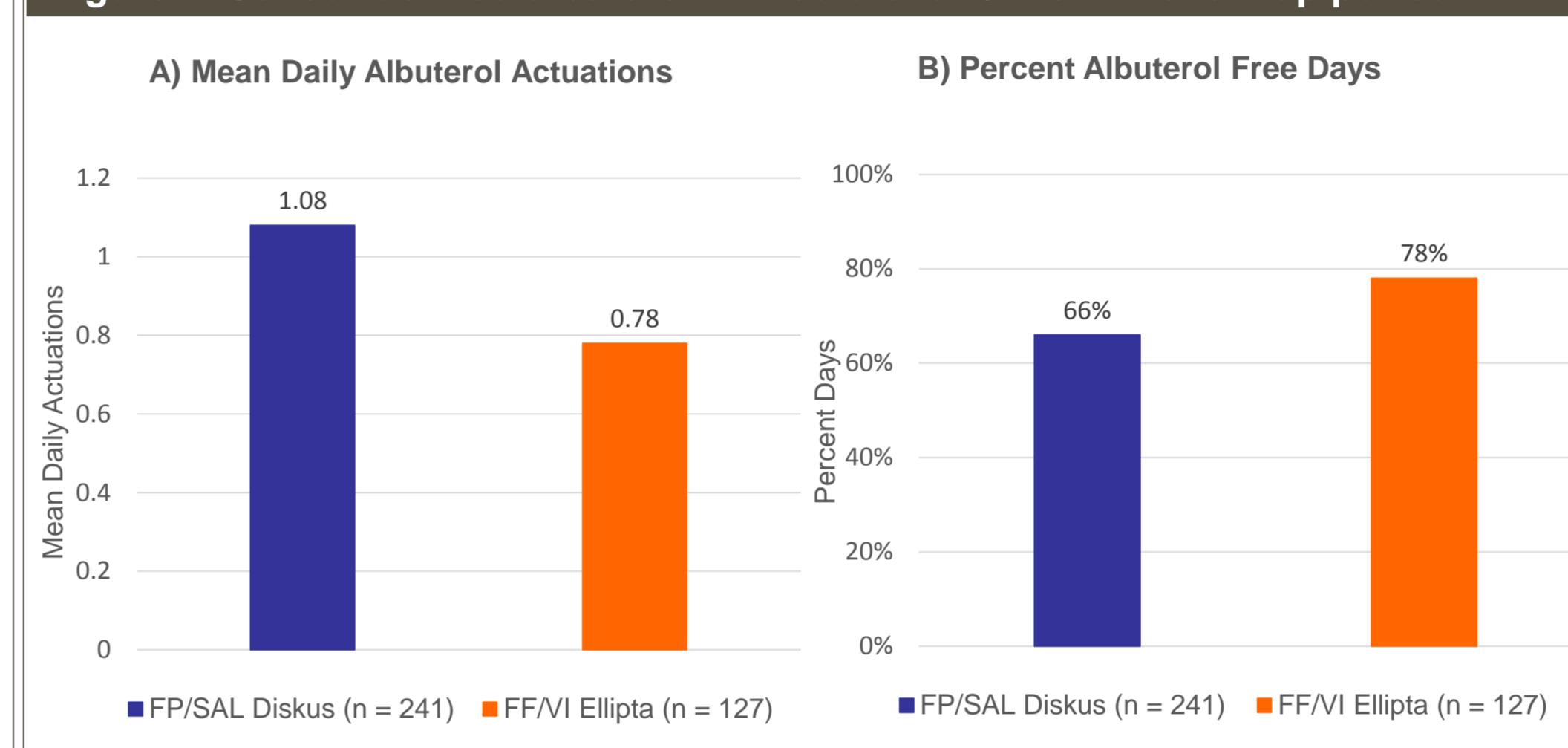
- The percent of days with sufficient controller dose was 34% among FP/SAL Diskus users and 61% in FF/VI Ellipta users (Figure 1).
- The percent of patients with sufficient controller dose ≥80% of the time was 10% for FP/SAL Diskus users and 37% for FF/VI Ellipta users.

Figure 1. Sensor-derived controller data over 6-month follow-up



- FF/VI Ellipta users had a lower mean number of albuterol MDI actuations per patient per day (0.78 FF/VI, 1.08 FP/SAL) and higher percent of albuterol-free days (78% FF/VI vs 66% FP/SAL) than FP/SAL Diskus users (Figure 2).

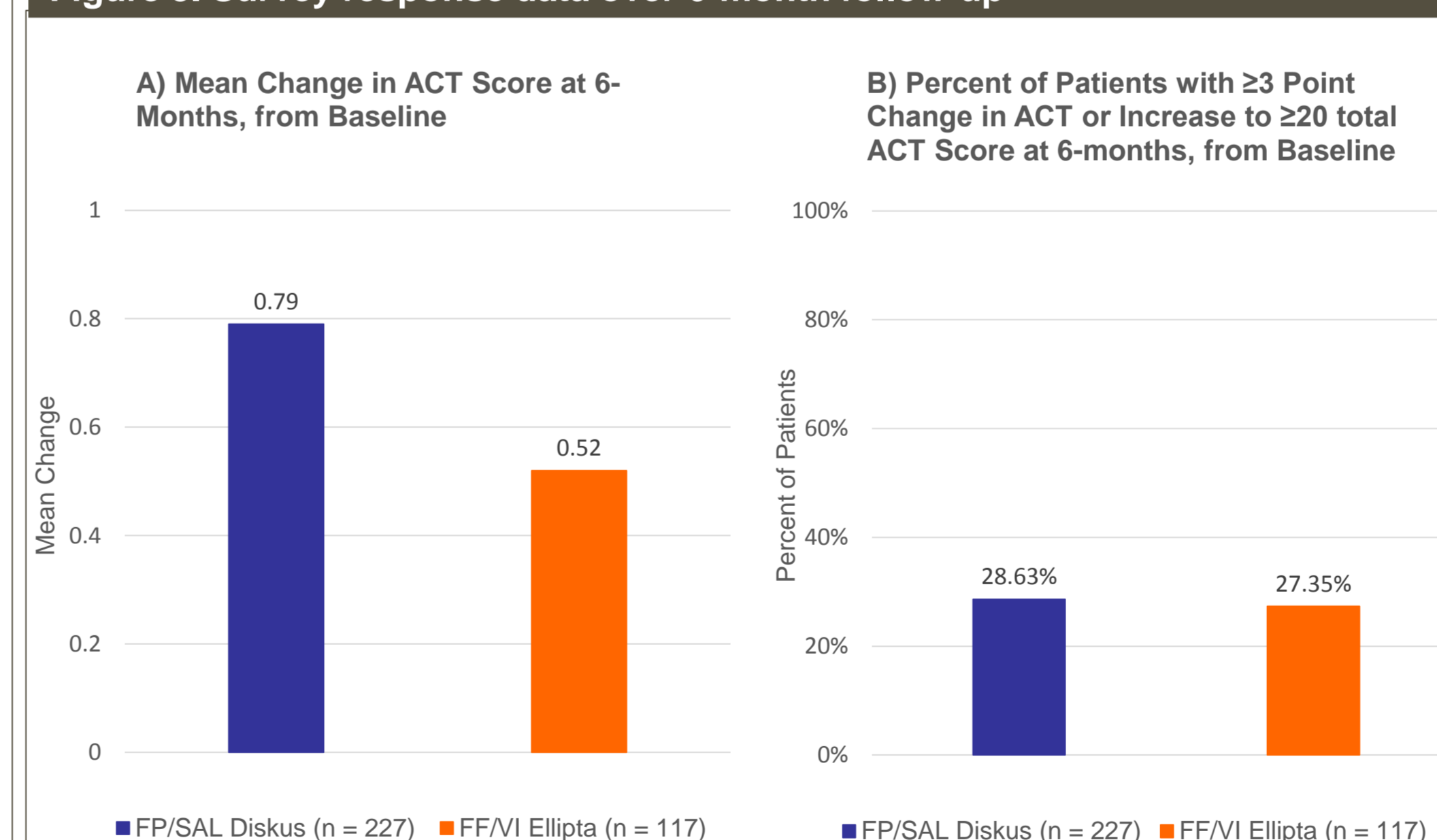
Figure 2. Sensor-derived albuterol MDI data over 6-month follow-up period



### Survey-Based Outcomes over 6-Month Follow-Up

- Mean ACT score change from baseline and percent of patients with improvement in ACT scores of ≥ 3 points or a change to ≥ 20 points overall are reported in Figure 3, with 28.6% showing improvement with FP/SAL Diskus and 27.4% showing improvement with FF/VI Ellipta.

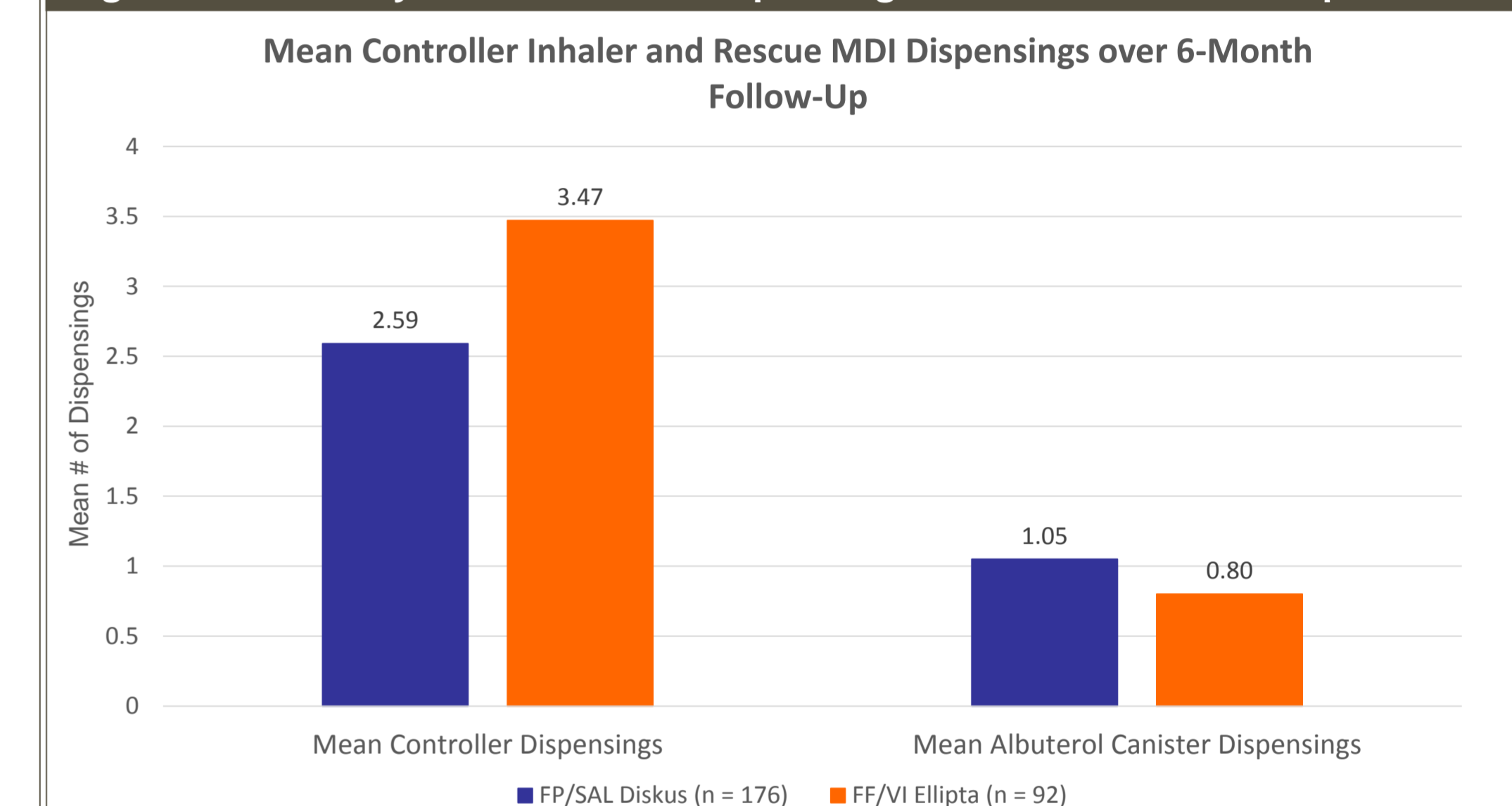
Figure 3. Survey response data over 6-month follow-up



### Pharmacy Claims-derived Controller and Albuterol MDI dispensings over 6-Month Follow-Up

- Figure 4 shows mean controller and albuterol MDI dispensings over 6-month follow-up. The mean number of controller dispensings was 2.59 for FP/SAL Diskus vs. 3.47 for FF/VI Ellipta. The mean number of albuterol MDI dispensings was 1.05 for FP/SAL Diskus vs. 0.80 for FF/VI Ellipta.

Figure 4. Pharmacy claims-derived dispensings over 6-month follow-up



## Conclusions

- This study found that asthma patients using FP/SAL Diskus with sensors were adherent to their controller medications for approximately one-third of the follow-up period and on average used albuterol MDI more than once a day. Patients using once daily FF/VI Ellipta with sensors were adherent to their controller medications for over 60% of the follow-up period and used albuterol MDI less than once a day.
- Limitations of this study are rooted in the survey design, as all surveys may be subject to sampling error, coverage error, and measurement error. Participants in this study were selected from among those with commercial coverage in a national health plan, which may not be representative of a sample of all asthma patients.

## Acknowledgements

- RS and CA are GSK employees and hold stocks/shares. PJ, EB, and MC, are employees of Optum, a consulting company that has received research funds from GSK.
- This study was funded by GlaxoSmithKline (GSK ID HO-16-16516)