Characteristics of Medicare Advantage Beneficiaries Initiating Long-Acting Muscarinic Antagonists (LAMA) Using Dry Powder or Soft Mist Inhalers

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BACKGROUND

- Long-acting bronchodilators (LABDs) are recommended for management of moderate or severe chronic obstructive pulmonary disease (COPD).[1]
- Among the types of LABDs are long acting muscarinic antagonists (LAMAs), which are commonly available as soft mist inhalers (SMIs) and dry powder inhalers (DPIs).[2]
- LAMA SMIs and LAMA DPIs are proven safe and effective. However, there is a lack of real-world data documenting characteristics of patients who are prescribed LAMA SMIs and LAMA DPIs.

STUDY OBJECTIVES

- This study was conducted to compare pre-treatment characteristics between patients initiating LAMA SMIs versus LAMA DPIs.

METHODS

Study Design and Sample

- This retrospective cohort study used the Optum Research Database, a de-identified research database including medical and pharmacy administrative claims data.
- Medicare Advantage beneficiaries who initiated a LAMA SMI or LAMA DPI between 01 Sept 2014 and 30 June 2018 were identified, with first claim as the index date.
- Inclusion criteria were: age ≥40 years, with continuous enrollment 1 year pre- and ≥30 days post-index.
- Exclusion criteria were: ≥1 non-diagnostic claim with an asthma, cystic fibrosis, or lung cancer diagnosis; missing demographic information; baseline LAMA use; or multiple index medications on the index date.

Baseline Measures

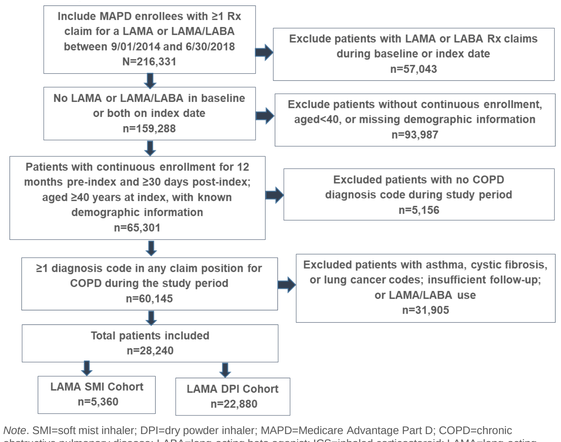
- All data were analyzed for the 12-month pre-index period (baseline).
- Demographics included age, sex, and geographic region.[3]
- Clinical characteristics were Charlson Comorbidity Index (CCI) score,[4] COPD Severity Score,[5] most common comorbidities, and prescriber type.
- Per patient per month (PPPM) COPD-related healthcare resource utilization (HRU) and mean COPD-related healthcare costs (adjusted to 2018 $US) were calculated for office, outpatient, emergency room (ER), inpatient, and pharmacy categories.

Analyses

- Patients were assigned to cohorts based on index inhaler: LAMA SMI or LAMA DPI, and the balance of characteristics between cohorts was measured using standardized differences <10% to indicate similarity.
- Comparisons were made with Pearson chi-square tests or two-sample t-tests, with p<0.05 significance, as well as standardized differences.
- Analyses were performed using SAS v9.4 (SAS Institute, Cary, NC).

RESULTS

Figure 1. Sample Selection and Attrition



Note. SMI=soft mist inhaler; DPI=dry powder inhaler; MAPD=Medicare Advantage Part D; COPD=chronic obstructive pulmonary disease; LABA=long-acting beta agonist; ICS=inhaled corticosteroid; LAMA=long-acting muscarinic antagonist. Patients initiating LAMA or LAMA/LABA were originally included to describe baseline characteristics, but comparative analyses focused only on patients initiating LAMA inhalers..

- The study included 28,240 patients initiating LAMA: 5,360 initiating LAMA SMIs and 22,880 initiating with LAMA DPIs (Figure 1; Table 1).
- The LAMA SMI cohort (mean age 72.5 yrs) was similar in age to the LAMA DPI cohort (72.8 yrs), standardized difference <10%.
- Similar proportions (29.4% of LAMA SMI vs. 31.7% of LAMA DPI; standardized difference <10%) in each cohort had general practitioner prescribers.
- A larger proportion of prescribers in the LAMA SMI cohort were pulmonologists (37.8% vs. 19.5% for LAMA DPI). This difference was reversed for internal medicine prescribers (20.6% for LAMA SMI vs. 33.2% for LAMA DPI). Standardized differences were greater than 10%.
- The cohorts had similar comorbidity burden by CCI Score and COPD Severity Score (standardized differences <10%).

Table 1. Baseline Patient Characteristics

	LAMA SMI (n=5,360)	LAMA DPI (n=22,880)	Standardized Difference (%)	p-value
Age, mean (SD)	72.5 (8.2)	72.8 (8.8)	3.7	0.013
Gender, female, n (%)	2,748 (51.3)	11,909 (52.1)	1.6	0.303
Geographic region, n (%)				
Northeast	878 (16.4)	4,208 (18.4)	5.3	<0.001
Midwest	1,408 (26.3)	7,142 (31.2)	11.0	<0.001
South	2,640 (49.3)	9,488 (41.5)	-15.7	<0.001
West	434 (8.1)	2,042 (8.9)	3.0	0.054
Prescriber type, n (%)				
Pulmonologist	2,027 (37.8)	4,457 (19.5)	-41.4	<0.001
General practitioner	1,578 (29.4)	7,249 (31.7)	4.9	0.001
Internal medicine	1,104 (20.6)	7,592 (33.2)	28.7	<0.001
CCI Score, mean (SD)	2.5 (1.9)	2.6 (1.9)	5.9	<0.001
COPD Severity Score, mean (SD)	31.5 (11.4)	31.5 (11.8)	0.2	0.914

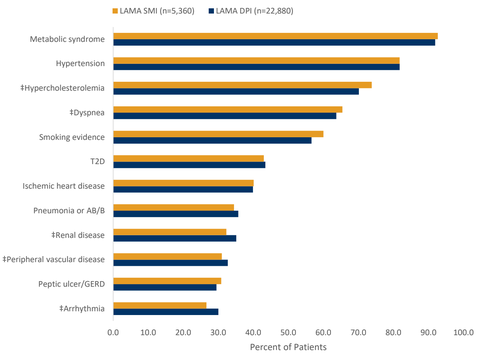
Note. SMI=soft mist inhaler; DPI= dry powder inhaler; COPD=chronic obstructive pulmonary disease; CCI=Charlson Comorbidity Index; SD=standard deviation

RESULTS, continued

Baseline Comorbidities

- The LAMA SMI cohort and the LAMA DPI cohort had similar proportions of patients with baseline comorbid conditions, with the most prevalent shown in Figure 2. All standardized differences <10%.

Figure 2. Baseline Comorbidities among Patients, by Cohort

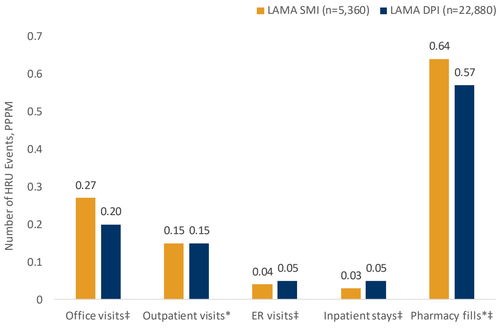


Note. All standardized differences <10%. SMI=soft mist inhaler; DPI= dry powder inhaler; GERD=gastroesophageal reflux disease; AB/B=acute bronchitis/bronchiolitis; T2D=type 2 diabetes, including insulin resistance. ‡p<0.05. P-values may not indicate clinically significant differences because of large sample sizes.

Baseline COPD-Related HRU

- The LAMA SMI cohort had more baseline office visits and pharmacy fills, but fewer inpatient admissions, compared with the LAMA DPI cohort (Figure 3).

Figure 3. Baseline COPD-Related HRU, PPPM by Cohort

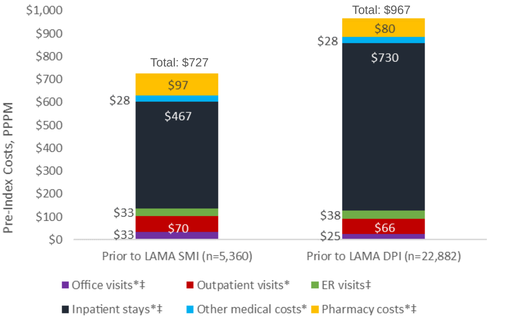


Note. *Standardized differences <10%. SMI=soft mist inhaler; DPI= dry powder inhaler; COPD=chronic obstructive pulmonary disease; ER=emergency room; HRU=healthcare resource utilization; PPPM=per patient per month . ‡p<0.05. P-values may not indicate clinically significant differences because of large sample sizes.

Baseline COPD-Related Healthcare Costs

- The LAMA SMI cohort had lower mean [SD] total COPD-related baseline costs, PPPM (LAMA SMI: $727 [$1,437] vs. LAMA DPI: $967 [$2,250]), most notably for inpatient hospitalizations (LAMA SMI: $467 [$1,312] vs. LAMA DPI $730 [$2,163]).

Figure 4. COPD-Related Costs, prior to Index LAMA Initiation, by Cohort



Note. *Standardized differences <10%. SMI=soft mist inhaler; DPI= dry powder inhaler; COPD=chronic obstructive pulmonary disease; ER=emergency room; HRU=healthcare resource utilization; PPPM=per patient per month. ‡p<0.05. P-values may not indicate clinically significant differences because of large sample sizes.

CONCLUSIONS

- Patients initiating a LAMA SMI versus a LAMA DPI had similar clinical characteristics before initiating treatment. Most demographic characteristics were also similar.
- Despite similarities observed in pre-treatment clinical characteristics, pre-treatment healthcare resource use patterns and associated costs appeared to differ between patients using LAMA SMI versus LAMA DPI.

LIMITATIONS

- There are many different health insurers and plans in the US; these results may not be generalizable to non-Medicare Advantage patients
- COPD severity based on lung function, and clinical characteristics such as smoking status, symptomology, and peak inspiratory flow are unavailable in claims; thus, it was impossible to compare them in this study.

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