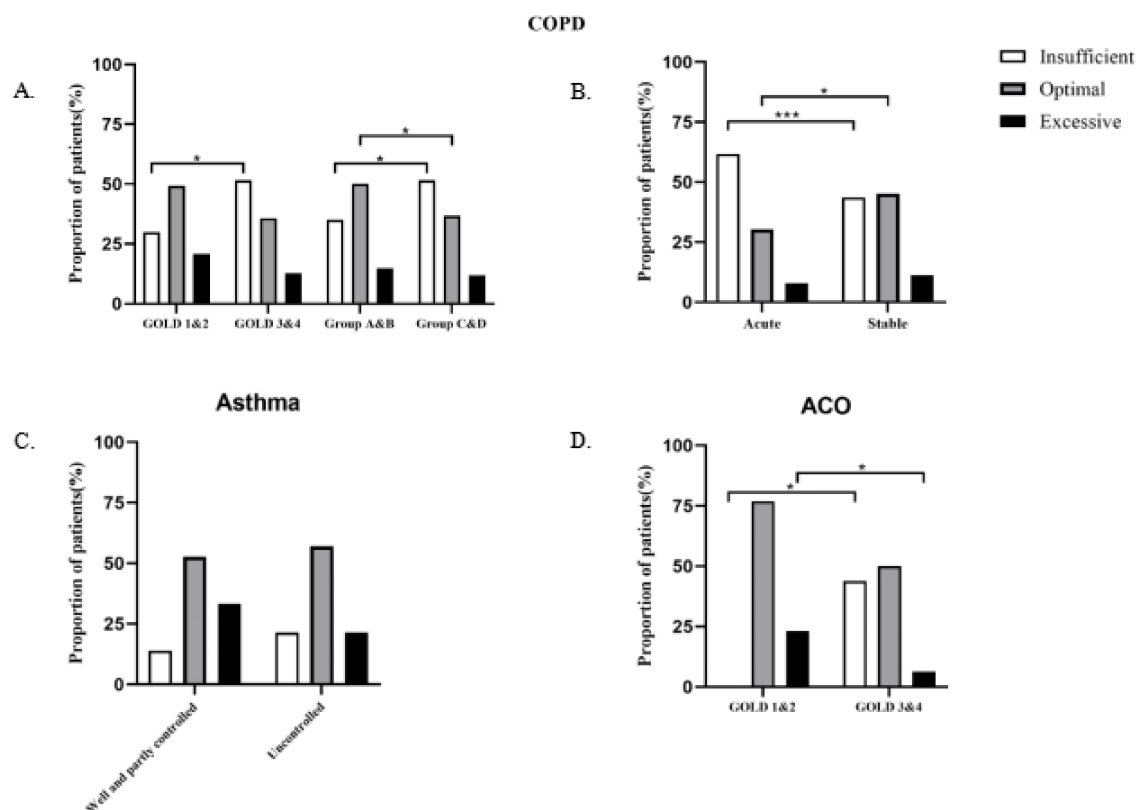


**Online supplemental figure S1: Flow chart of patient enrollment.** COPD: chronic obstructive pulmonary disease; ACO: Asthma-COPD overlap; TAI: the Test of Adherence to inhalers; PIFR: peak inspiratory flow rate.



**Online supplemental figure S2: Percentage of insufficient, optimal and excessive PIFR measured against different resistances of current inhalers among patients with chronic airway diseases.** (A) subgroup analyses in patients with COPD based on GOLD FEV<sub>1</sub> severity stage and GOLD Groups; (B) level of PIFR among patients with COPD with different disease status: acute exacerbations vs. stable status; (C) subgroup analyses in patients with asthma based on the disease control level; (D) subgroup analyses of patients with ACO stratified by GOLD FEV<sub>1</sub> severity stage. \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ . COPD, chronic obstructive pulmonary disease; ACO: Asthma-COPD Overlap; GOLD: global initiative for chronic obstructive lung disease.

**Online supplemental table S1: Distribution and level of PIFR among patients with COPD with different disease states: acute exacerbations vs. stable status.**

Variables	Acute status (n = 115)	Stable status (n = 115)	P Value
Resistance class			
R0	84.96 ± 28.93	96.37 ± 24.93	< 0.001
R1	63.57 ± 21.09	70.35 ± 19.53	< 0.001
R2	55.89 ± 18.95	62.65 ± 16.92	< 0.001
R3	50.67 ± 16.12	56.11 ± 14.20	< 0.001
R4	50.68 ± 17.46	55.47 ± 15.01	< 0.001
R5	39.78 ± 12.68	43.24 ± 10.99	< 0.001
The type of PIFR, n (%)			< 0.001
Insufficient	71 (61.7)	50 (43.5)	
Optimal	35 (30.4)	52 (45.2)	
Excessive	9 (7.9)	13 (11.3)	

Data are presented as the means ± SD or numbers (%). PIFR: peak inspiratory flow rate; COPD: chronic obstructive pulmonary disease.

**Online supplemental table S2: Results of the multivariate logistic regression: variables significantly associated with insufficient PIFR in patients with AECOPD.**

Variables	The exacerbation group	
	Crude OR (95% CI) <sup>b</sup>	Adjusted OR (95% CI)
Sex (male vs. female)	-	-
Body mass index (kg/m <sup>2</sup> )	0.85 (0.75, 0.95)	0.88 (0.76, 1.03)
Educational level (primary vs. secondary school and above)	0.43 (0.20, 0.93)	0.52 (0.17, 1.61)
Smoking status (smoker vs. non-smoker)	-	-
Inhaler device (DPIs <sup>a</sup> vs. pMDIs/SMIs)	0.06 (0.01, 0.45)	0.08 (0.01, 0.73) *
FEV <sub>1</sub> % predicted	0.96 (0.93, 0.99)	0.97 (0.94, 1.00) *
GOLD group (A&B vs. C&D)	2.91 (1.06, 7.97)	3.89 (1.05, 14.46) *

OR: odds ratio; CI: confidence interval; PIFR: peak inspiratory flow rate. AECOPD: acute exacerbation of chronic obstructive pulmonary disease; DPI: dry powder inhalers; pMDI: pressurized metered-dose inhalers; SMI: Respimat<sup>®</sup> soft mist inhalers; FEV<sub>1</sub>: forced expiratory volume in 1 s, GOLD: global initiative for chronic obstructive lung disease.

<sup>a</sup> DPIs, DPis +DPis and DPis +SMI were included.

<sup>b</sup> Only patient covariates significant in bivariate analyses with the primary predictor of interest ( $P < 0.05$ ) were included in the final model.

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$