

Supplemental material**Supplemental Table 1.** Anatomical Therapeutic Chemical (ATC) codes of index drugs

Classification	Generic name	ATC code
Cardioselective BB	Metoprolol	C07AB02
	Atenolol	C07AB03
	Bisoprolol	C07AB07
	Nebivolol	C07AB12
	Atenolol and thiazides	C07BB03
	Atenolol and other diuretics	C07CB03
Non-selective BB	Labetalol	C07AG01
	Carvedilol	C07AG02
	Propranolol	C07AA05
Non-DHP CCB	Verapamil	C08DA01
	Diltiazem	C08DB01

BB, beta-blocker; non-DHP CCB, non-dihydropyridine calcium channel blocker.

Supplemental Table 2. International Classification of Diseases (ICD) codes of comorbidities

Comorbidities	ICD-9	ICD-10
Hypertension	401–404	I10–I15
Heart failure	428	I50
Myocardial infarction	410, 412	I21, I22, I25.2
Coronary revascularization*	68023A, 68023B, 68024A, 68024B, 68025A, 68025B, 68053B, 68054B, 68055B 83064A1, 97901K, 97902A, 97903B, 97906K, 97907A, 97908B, 97911K, 97912A, 97913B, 97916K, 97917A, 97918B, 33076A, 33076B, 33077A, 33077B, 33078A, 33078B, 97511K, 97512A, 97513B, 97516K, 97517A, 97518B, 97521K, 97522A, 97523B, N26002, N26003	
Ischemic heart disease	411, 413, 414	I20, I24, I25.1, I25.7
Cardiac dysrhythmia	427 except 427.3	I47, I49
Cerebrovascular disease	430–438	I60–I64, G458, G459
Hyperthyroidism	242	E05
Hypothyroidism	244.9	E03.9
Diabetes mellitus	250	E10–E14
Dyslipidemia	272.0–272.5, 272.8, 272.9	E78

Chronic kidney disease	585	N18
Pulmonary hypertension	416	I27.0
Cancer	140–208	C00–C97

* Coronary revascularization was identified using procedure codes from the National Health Insurance Database

Supplemental Table 3. Anatomical Therapeutic Chemical (ATC) Codes of Co-mediations

Co-medication	ATC Codes
COPD medication	
Long-acting inhalation medication	
LABA+LAMA+ICS	Both one of LAMA and one of LABA+ICS using at the same time
LABA+LAMA	R03AL03, R03AL04, R03AL05, R03AL06, R03AL07, R03AL08
LABA+ICS	R03AK06, R03AK07, R03AK08, R03AK09, R03AK10, R03AK11, R03AK12, R03AK14
LABA	R03AC12, R03AC13, R03AC16, R03AC18, R03AC19
LAMA	R03BB04, R03BB05, R03BB06, R03BB07
Short-acting inhalation medication	
SABA	R03AC02, R03AC03, R03AC04, R03AC06
SAMA	R03BB01
SABA+SAMA	R03AL01, R03AL02
Xanthine	R03DA01, R03DA02, R03DA03, R03DA04, R03DA05, R03DA51, R03DA54
Systemic steroid	H02A, H02B
Cardiovascular medication	
Antiplatelet	B01AA, B01AE, B01AF
Anticoagulant	B01AC

Class I	C01BA, C01BB, C01BC
Amiodarone	C01BD01
Class III except amiodarone	C01BD EXCEPT C01BD01
ACEI/ARB	C09
Statin	C10AA
Diabetes medication	A10

Supplemental Table 4. Subdistribution Hazard Ratios (SHR) of after-matching cohort

	SHR (95% CI)
BB	0.84 (0.76–0.94)
non-DHP CCB (ref)	1
Mild COPD	
BB	0.80 (0.70–0.91)
non-DHP CCB (ref)	1
Severe COPD	
BB	1.05 (0.87–1.27)
non-DHP CCB (ref)	1

BB, beta blocker; CI, confidence interval; COPD, chronic obstructive pulmonary disease;

non-DHB CCB, non-dihydropyridine calcium channel blockers PS, propensity score;

SMD, standardized mean difference

Supplemental Table 5. Proportion of spirometry test at different timing in selected cohort, data presented as n (%)

Intervention	Before PS matching			After PS matching		
	BB (n=7,590)	CCB (n=5,872)	SMD	BB (n=4,480)	CCB (n=4,480)	SMD
Within 2 years before COPD diagnosis date						
	1,053 (13.9%)	1,022 (17.4%)	-0.1	687 (15.3%)	712 (15.9%)	-0.02
From COPD diagnosis date to index date						
	2,539 (33.45%)	1,894 (32.3%)	0.03	1,486 (33.1%)	1,447 (32.3)	0.02
Within 2 years before COPD to index date						
	3,060 (40.3%)	2,403 (40.9)	-0	1,836 (40.9%)	1,807 (40.3%)	0.01

BB, beta blocker; COPD, chronic obstructive pulmonary disease; SMD, standardized mean difference