### Supplementary Table S1 Baseline characteristics of patients without concurrent treatments (N=97)

| Characteristics                      | All patients | Treatment with LAMA | Treatment with LABA | Treatment with LAMA-LABA |
|---------------------------------------|--------------|---------------------|---------------------|--------------------------|
| Number of patients                    | 97           | 45                  | 17                  | 35                       |
| Age*, years                           | 63 (55.5–68) | 63 (56–67.5)        | 57 (50–63.5)        | 64 (55–70)               |
| Male sex, %                           | 34 (35.1%)   | 16 (35.6%)          | 6 (35.3%)           | 12 (34.30%)              |
| Body mass index*, kg/m²               | 23 (21.3–25.3)| 22.8 (21.3–25.3)   | 22.8 (20.2–23.9)   | 24 (21.5–27.2)           |
| mMRC dyspnea scale                    |              |                     |                     |                          |
| 0                                     | 38 (39.2%)   | 18 (40%)            | 11 (64.7%)          | 9 (25.7%)                |
| 1                                     | 38 (39.2%)   | 22 (48.9%)          | 4 (23.5%)           | 12 (34.3%)               |
| 2                                     | 11 (11.3%)   | 4 (8.9%)            | 1 (5.9%)            | 6 (17.1%)                |
| 3                                     | 1 (1.0%)     | 0 (0%)              | 0 (0%)              | 1 (2.9%)                 |
| 4                                     | 0 (0%)       | 0 (0%)              | 0 (0%)              | 0 (0%)                   |
| Coexisting pulmonary comorbidities    |              |                     |                     |                          |
| Past tuberculosis infection           | 20 (20.6%)   | 9 (20%)             | 4 (23.5%)           | 19 (19.2%)               |
| Past or current NTM infection         | 11 (11.3%)   | 4 (8.9%)            | 2 (11.8%)           | 11 (11.1%)               |
| Extrapulmonary comorbidities          |              |                     |                     |                          |
| Hypertension                          | 29 (29.9%)   | 10 (22.2%)          | 6 (35.3%)           | 34 (34.3%)               |
| Diabetes mellitus                     | 18 (18.6%)   | 7 (15.6%)           | 5 (29.4%)           | 14 (14.1%)               |
| Cardiocerebrovascular disease         | 4 (4.1%)     | 2 (4.4%)            | 1 (5.9%)            | 9 (9.1%)                 |
| Chronic kidney disease                | 3 (3.1%)     | 0 (0%)              | 0 (0%)              | 1 (5.9%)                 |
| Baseline lung function*               |              |                     |                     |                          |
| FEV₁, liter                           | 1.50±0.42    | 1.58±0.37           | 1.59±0.43           | 1.23±0.44                |
| FEV₁, % predicted                     | 57.7±12.9    | 61.0±10.3           | 58.5±17.1           | 47.6±15.0                |
| FVC, liter                            | 2.49±0.61    | 2.5±0.54            | 2.47±0.61           | 2.25±0.79                |
| FVC, % predicted                      | 72.5±12.3    | 73±11.5             | 70.2±13.4           | 65.7±17.0                |
| FEV₁/FVC                              | 0.608±0.11   | 0.635±0.086         | 0.653±0.128         | 0.56±0.12                |

Data are presented as numbers (%) unless specified otherwise. *, median(interquartile range); *, mean ± standard deviation. LAMA, long-acting muscarinic antagonist; LABA, long-acting beta-2 agonist; NTM, nontuberculous mycobacteria; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity.
Figure S1 Patients selection flow after excluding patients treated with other medications. LAMA, long-acting muscarinic antagonist; LABA, long-acting beta-agonists.

Figure S2 Scatter plot of baseline FEV1 and FEV1 changes after LAMA, LABA or LAMA-LABA treatment in (A) all patients (N=230, R=−0.242, P<0.001) and (B) patients without concurrent treatments (N=97, R=−0.386, P<0.001). FEV1, forced expiratory volume in 1 second; LAMA, long-acting muscarinic antagonist; LABA, long-acting beta-agonists.
Appendix 1 The CT scans of five patients with emphysema

<Patient 1>

<Patient 2>
