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Introduction

- **Chronic obstructive pulmonary disease (COPD)** has become the third leading cause of death worldwide^[1]. In 2019, nearly 3 million patients died from COPD complications and comorbidities^[2].
- **Acute exacerbation of COPD (AECOPD)** is the main cause of death in COPD patients^[1,3], which can induce adverse cardiovascular events, and increase the risk of death^[4–6]. AECOPD can be classified into mild, moderate, and severe according to their **severity**^[7].
- Currently, only a few studies have explored the impact of AECOPD of different severity on the disease burden of patients, but there are issues such as ignoring key outcome indicators^[8–10].

Objective

- Describing the disease burden of patients experiencing AECOPD of varying severity during the follow-up period.

Method

Study Design

- This study was a retrospective cohort study (**Figure 1**) and data source was a random sampling of data from Urban Employee Basic Medical Insurance Database in Tianjin, China from 2016 to 2020.

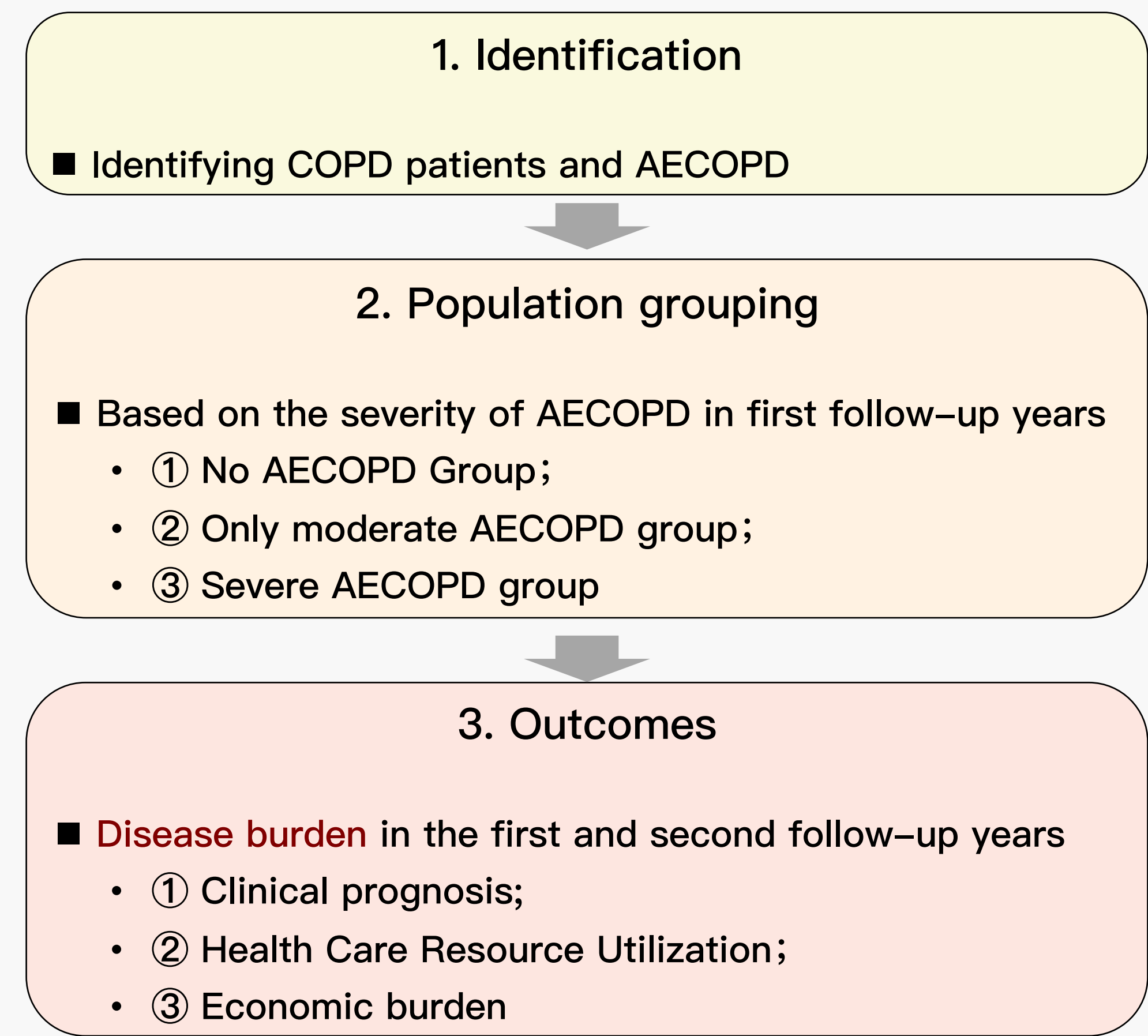


Figure 1 Study design

Identification of patients with COPD

- The study defined the date of the first occurrence of a COPD-related diagnosis during the identification period (January 1, 2017, to December 31, 2018) as the **index date** (**Figure 2**).
- Patients who had COPD-related diagnosis and more than 40 years old were enrolled.

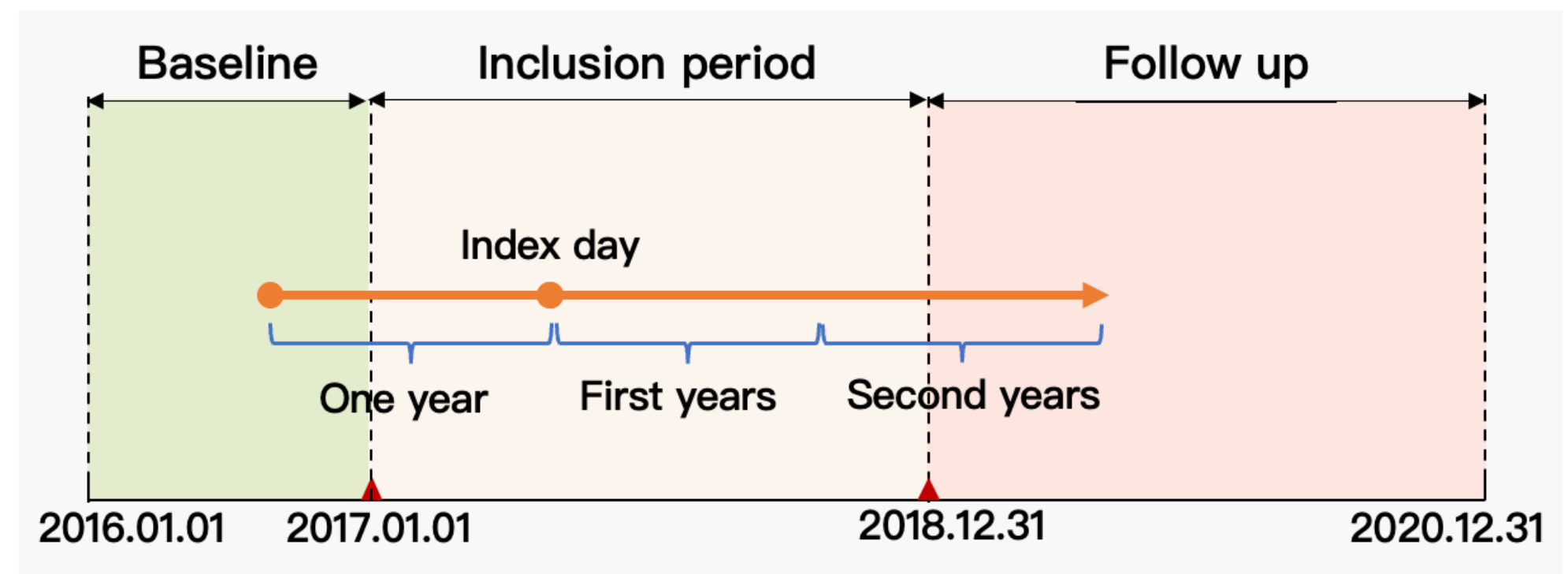


Figure 2 Study Timeline

Identification of AECOPD

- **Moderate AECOPD** was defined as an event where short-acting bronchodilators and antibiotics were used for treatment, with or without the use of oral corticosteroids, and without concurrent respiratory failure.
- **Severe AECOPD** was defined as an event that requires hospitalization or treatment in an emergency room or intensive care unit.

Result

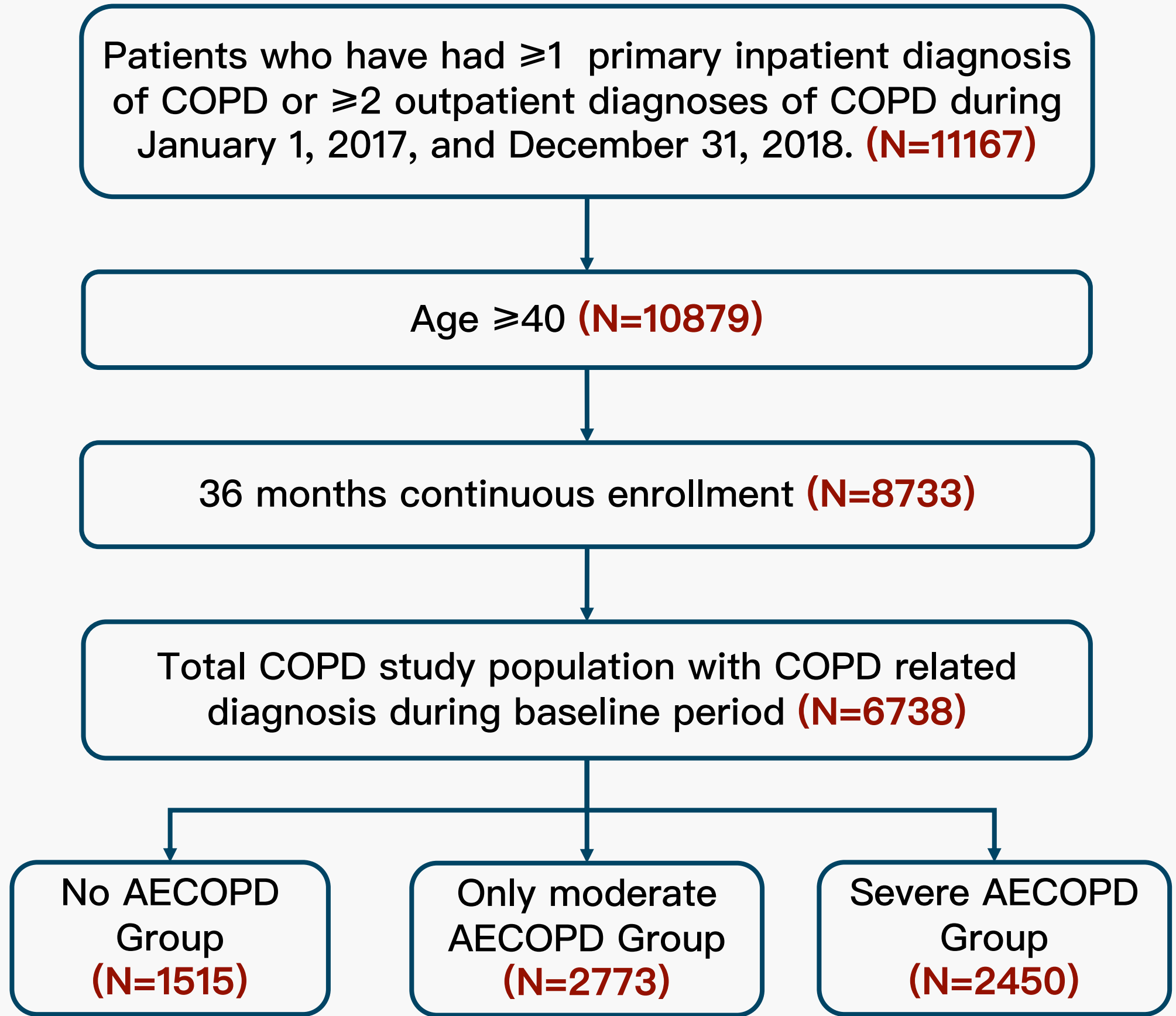


Figure 3 Patient selection

Table 1 Baseline patient characteristics

Baseline characteristic, mean(SD) / n (%)	Total (n=6738)	No AECOPD (n=1515)	Only moderate (n=2773)	Severe (n=2450)	P value
Sociodemographics and Comorbidities					
Female	4200 (62.3)	902 (59.5)	1719 (62.0)	1579 (64.4)	0.007
Age, years	68.36(11.46)	64.64 (11.51)	65.51 (11.04)	73.89 (9.65)	<0.001
CCI	3.16 (2.50)	2.77 (2.33)	3.35 (2.64)	3.18 (2.41)	<0.001
Comorbidities					
Coronary heart disease	4870 (72.3)	1014 (66.9)	2020 (72.8)	1836 (74.9)	<0.001
Hypertension	4755 (70.6)	983 (64.9)	2047 (73.8)	1725 (70.4)	<0.001
dyslipidemia	3589 (53.3)	783 (51.7)	1606 (57.9)	1200 (49.0)	<0.001
Number of Exacerbations, mean (SD)					
Total AECOPD	1.46 (1.94)	0.67 (1.09)	1.82 (2.28)	1.53 (1.77)	<0.001
Severe AECOPD	0.16 (0.49)	0.05 (0.27)	0.07 (0.31)	0.32 (0.69)	<0.001
All-cause Health Care Resource Utilization and Cost, mean (SD)					
Number of hospitalizations	0.57 (1.09)	0.35 (0.84)	0.46 (1.01)	0.82 (1.24)	<0.001
Number of outpatient visits	51.97(62.29)	41.06(49.25)	67.97(78.19)	40.61(41.97)	<0.001
Total costs	23964 (32197)	16868 (27202)	27575 (34167)	24266 (32046)	<0.001
inpatient cost	9134 (24016)	5825 (20048)	7542 (21905)	12980 (27759)	<0.001

Note: CCI, Charlson Comorbidity Index; HCRU, health care resource utilization; SD, standard deviation; AECOPD, Acute exacerbation of Chronic obstructive pulmonary disease

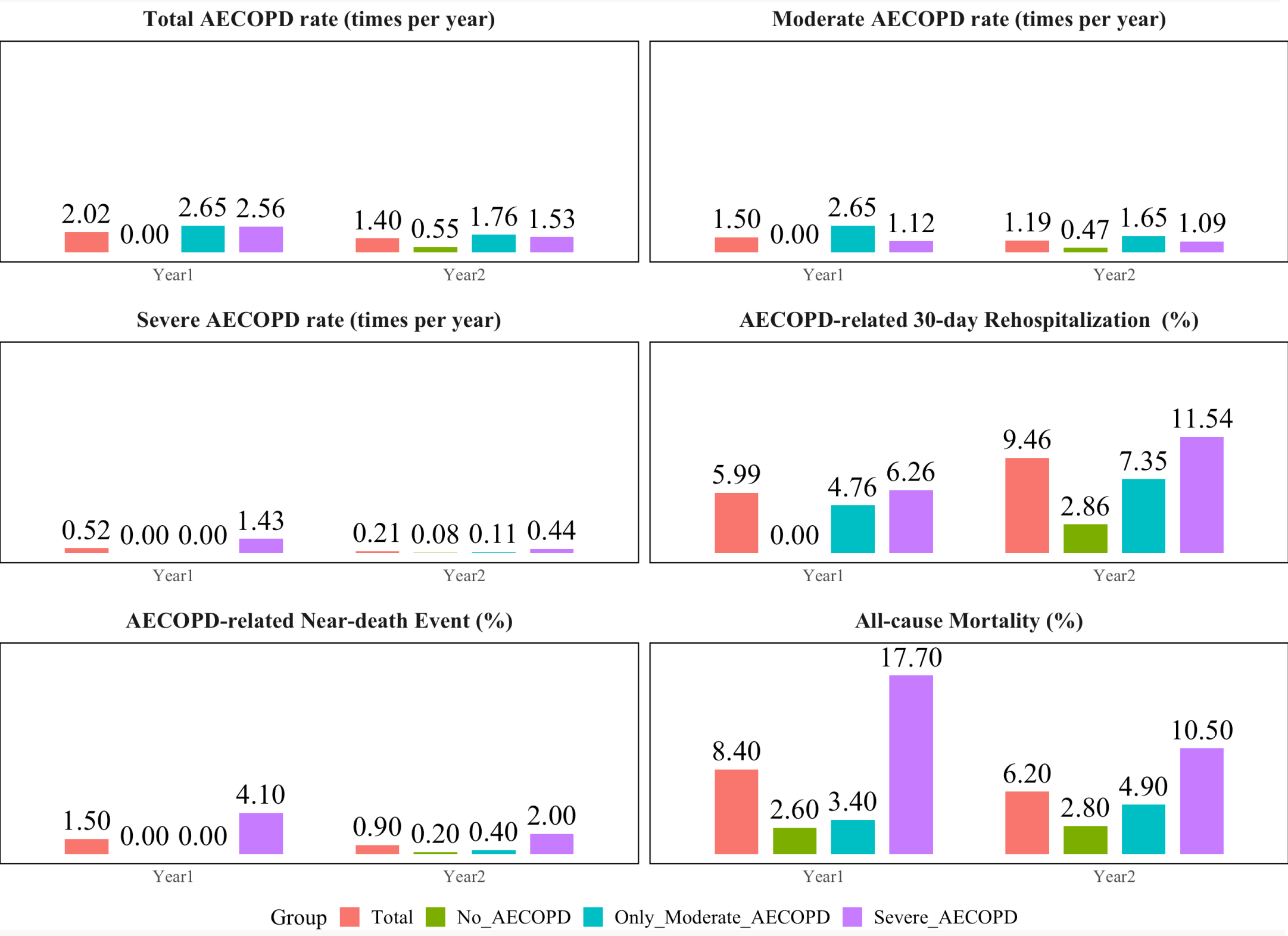


Figure 4 Outcomes of clinical prognosis

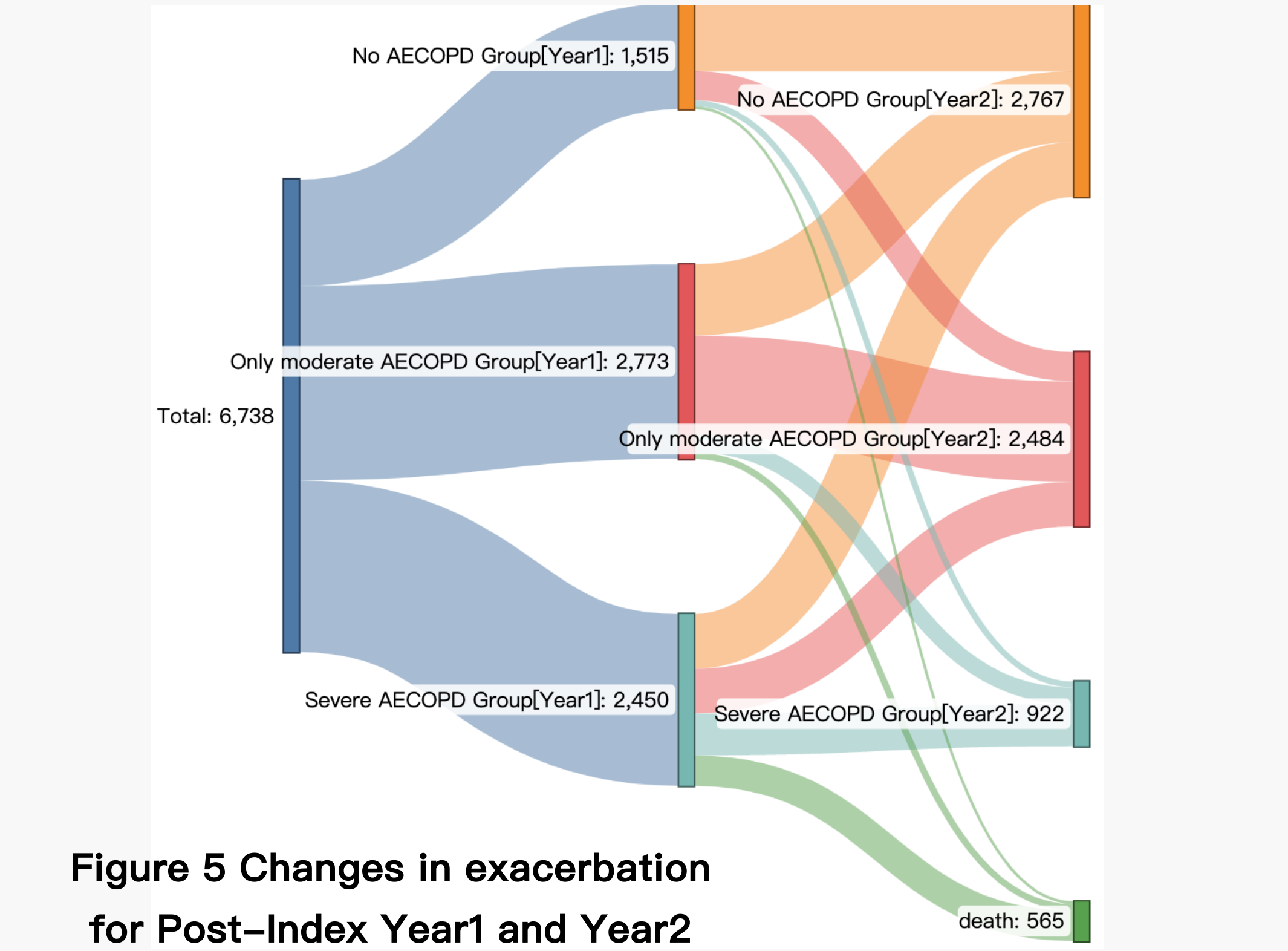


Figure 5 Changes in exacerbation for Post-Index Year1 and Year2

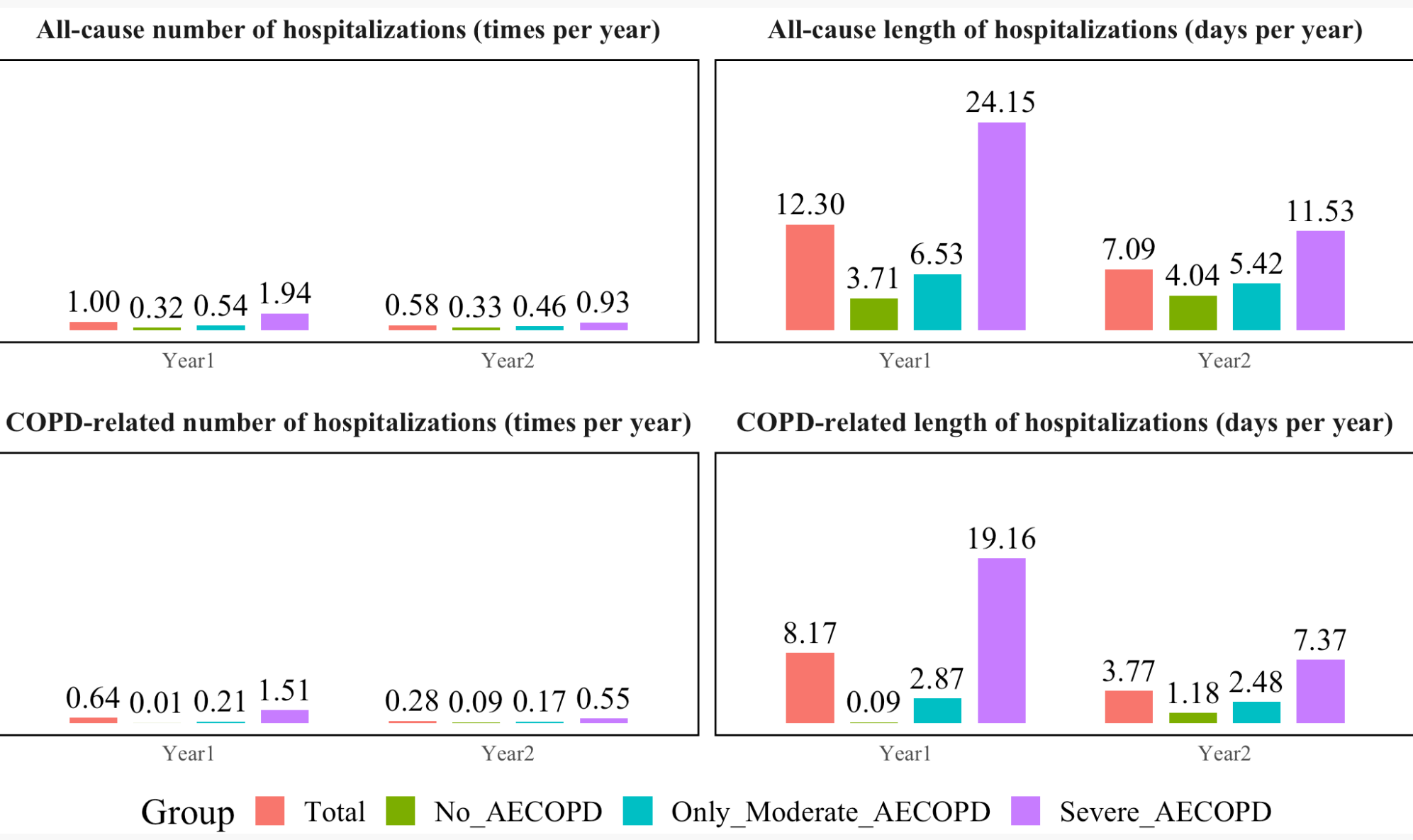


Figure 6 Outcomes of Health Care Resource Utilization

Study Population

- **6,738** patients with COPD: **1,515** for “no AECOPD group”, **2,773** for “only moderate AECOPD”, and **2,450** for “severe AECOPD group” (**Figure 3**).
- **Severe AECOPD** subgroup exhibited **a markedly increased disease burden** compared to other groups, with a correspondingly elevated rate of severe AECOPD and hospitalization (**Table 1**).

Clinical Prognosis

- Compared to other cohorts, **severe AECOPD group** displayed a pronounced **increase in rate of severe AECOPD**, rehospitalization and emergency readmission, and mortality (**Figure 4**).
- For severe AECOPD group, the proportion of patients who had severe AECOPD in second year (24.4%) far exceeded that in only moderate AECOPD group (8.5%) and non-AECOPD group (5.7%) (**Figure 5**).

Health Care Resource Utilization and Cost

- **Severe AECOPD group** had **higher utilization of medical resources** (**Figure 6**) and **higher medical costs** (All-cause first year total medical cost: **¥45,580** vs ¥29,414 vs ¥15,729).

Conclusion

- Severe AECOPD in China would make more severe disease burden, indicated by higher number of severe AECOPD, resource utilization and total costs.

Discussion

- Compared to other countries, The disease burden of COPD patients in China was more severe than that in the United States^[11] and Canada^[12], as evidenced by a higher incidence of AECOPD (1.4 vs 0.3 vs 0.5).
- Moreover, compared to other chronic diseases such as diabetes^[13] and hypertension^[14], the annual treatment costs for COPD patients are significantly higher (COPD vs diabetes vs hypertension: 14229¥ vs 1610¥ vs 2275¥), and the costs for patients with severe AECOPD will further increase.
- Given the heavy disease burden that COPD brings to Chinese patients, we should give more attention and policy support to COPD, and control the adverse event of acute exacerbation, thereby delaying the progression of the disease and improving the quality of life of patients.

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