

# PATIENTS WITH COPD WHO INITIATE ROFLUMILAST IN SWEDEN

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## BACKGROUND

In Sweden roflumilast has been on market since July 2010. The reimbursement for roflumilast is limited to eligible patients with severe to very severe chronic obstructive pulmonary disease (COPD) intolerant to inhaled corticosteroid (ICS) therapy. Owing to this requirement, patients treated with roflumilast in Sweden may differ by their characteristics in comparison to patients treated with roflumilast in other countries.

## AIM

Our aim was to characterize COPD patients prescribed roflumilast in Sweden at time of their first prescription in the year 2011.

## METHODS

Patients with diagnoses of COPD or chronic bronchitis (CB) who initiated use of roflumilast at age of  $\geq 40$  years in 2011 were identified from the Swedish Hospital Discharge Registers and Swedish Prescribed Drug Register (Figure 1). Summary statistics were calculated for demographic and disease characteristics at the time of first prescription. The Charlson's comorbidity index (CCI) [1,2] was used to score the presence of comorbidities.

## RESULTS

During the study period 1,161 patients (42.9% male) with COPD/CB initiated roflumilast. Mean age at time of the first prescription was 70.8 years. Mean time since first COPD/CB diagnosis was 6.1 years. Of these patients 55.1% were hospitalized for any cause at least once and 8.5% had  $\geq 5$  any cause hospitalizations during the previous year. 37.2% of patients had a CCI score  $\geq 3$  at the time of the first roflumilast prescription (Table 1). All 94.1% of the patients used ICS together with LABA and/or LAMA prior to initiation of roflumilast (Table 2). Over 89% of the patients purchased at least one prescription of systemic corticosteroids or systemic antibiotics during the previous year (Table 3). Hypertension, cardiovascular disease, and asthma were the most common comorbidities (Table 4).

**Table 2: Use of COPD medication within one year prior to initiation of roflumilast**

COPD medication	N (%)
SABA and/or SAMA only	10 (0.9%)
ICS	9 (0.8%)
LAMA	28 (2.4%)
LABA	7 (0.6%)
LABA + LAMA	7 (0.6%)
ICS + LAMA	15 (1.3%)
ICS + LABA	191 (16.5%)
ICS + LABA + LAMA	887 (76.4%)
None	7 (0.6%)

Abbreviations: SABA, inhaled short-acting beta-2-agonist; SAMA, inhaled short-acting muscarinic antagonist; LAMA, long-acting muscarinic antagonist; LABA, long-acting beta agonist;

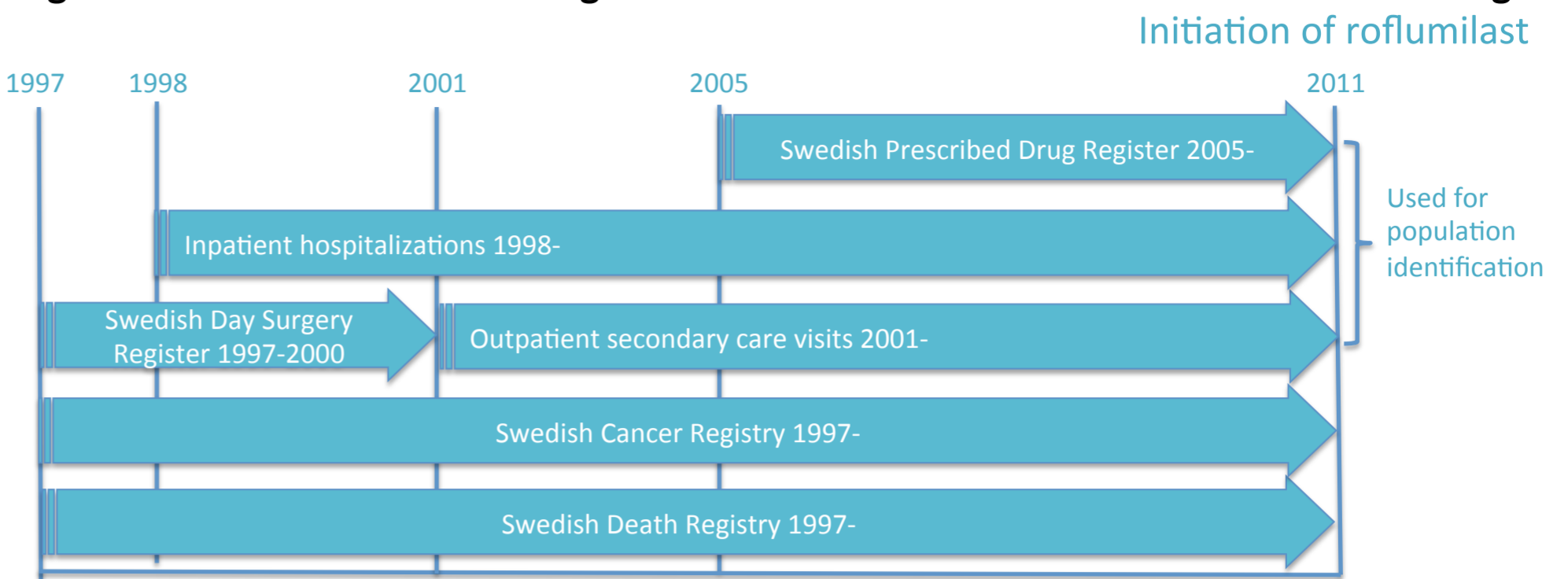
- 1102 (94.9%) patients purchased ICS during the previous year.
- 1100 (94.7%) patients were on combination therapy during the previous year.

**Table 3: Use of systemic corticosteroids and antibiotics within one year prior to initiation of roflumilast**

Systemic corticosteroids N (%)	
None	288 (24.8%)
1-2	343 (29.5%)
3-5	315 (27.1%)
Over 5	215 (18.5%)
Systemic antibiotics N (%)	
None	214 (18.4%)
1-2	366 (31.5%)
Over 2	581 (50.0%)
Systemic corticosteroids and/or antibiotics N(%)	
None	125 (10.8%)
1 or over	1036 (89.2%)

- 873 (75.2%) patients purchased systemic corticosteroids during the previous year.
- 947 (81.6%) patients purchased systemic antibiotics during the previous year.

**Figure 1: Nationwide Swedish registers utilized as data sources and their time coverage**



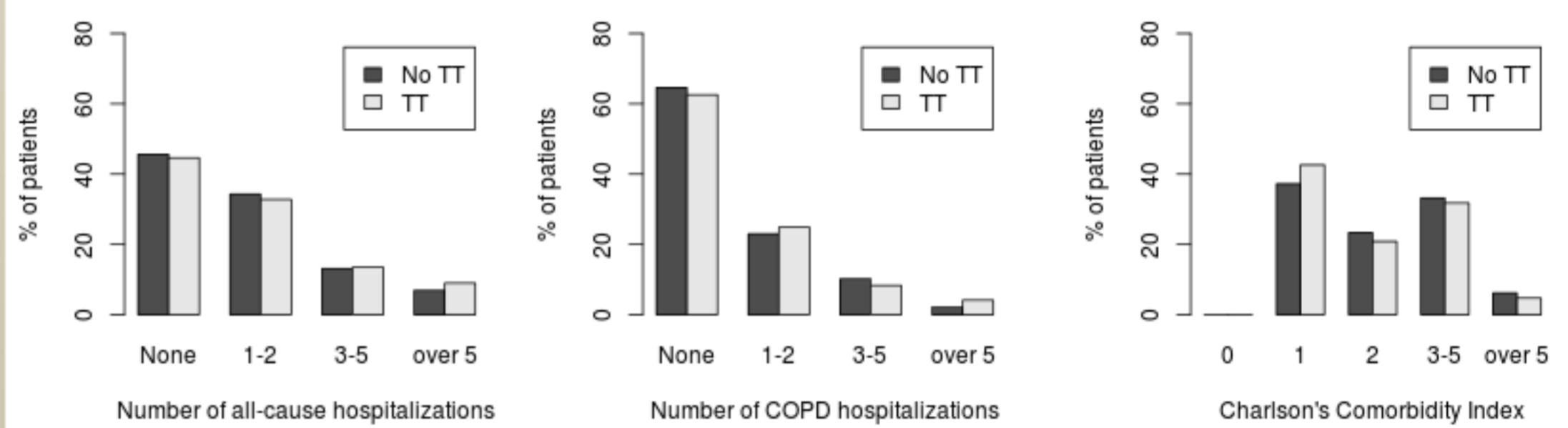
- Data from different registers were linked on patient level based on the unique personal identification numbers. After linkage the personal identification number was replaced with a dummy study ID.

**Table 1: Patient characteristics at initiation of roflumilast stratified by use of triple COPD therapy, ICS + LABA + LAMA<sup>1</sup>**

– detailed distributions given in separate graphs

	TT N=887	No TT N=274	Total N=1161
Age (years), mean ( $\pm$ SD)	70.7 ( $\pm$ 8.1)	70.9 ( $\pm$ 9.1)	70.8 ( $\pm$ 8.3)
Time since COPD/CB diagnose (years), mean ( $\pm$ SD)	6.1 ( $\pm$ 3.8)	6.3 ( $\pm$ 3.9)	6.1 ( $\pm$ 3.8)
$\geq 1$ hospitalization <sup>1</sup> (any cause), N (%)	491 (55.4%)	149 (54.4%)	640 (55.1%)
$\geq 1$ hospitalization <sup>1</sup> due to COPD, N (%)	332 (37.4%)	97 (35.4%)	429 (37.0%)
CCI $\geq 3$ , N (%)	324 (36.5%)	108 (39.4%)	432 (37.2%)

Abbreviations: TT, patients with triple COPD therapy, ICS + LABA + LAMA; SD, standard deviation  
<sup>1</sup> During one year prior to initiation of roflumilast



- Of the patients 640 (55.1%) had at least one hospitalization and 429 (37.0%) had at least one hospitalization due to COPD in the one year period prior to the initiation of roflumilast.
- No difference was observed in the number of hospitalizations in patients on triple therapy compared to those not on triple therapy.

**Table 4: Comorbidity<sup>1</sup> history at initiation of roflumilast by gender**

	Female N (%) N=663	Male N (%) N=498	Total N (%) N=1161
Hypertension	262 (39.5%)	187 (37.6%)	449 (38.7%)
Cardiovascular disease*	215 (32.4%)	228 (45.8%)	443 (38.2%)
Congestive heart failure	132 (19.9%)	121 (24.3%)	253 (21.8%)
Coronary heart disease*	99 (14.9%)	127 (25.5%)	226 (19.5%)
Myocardial infarction*	69 (10.4%)	88 (17.7%)	157 (13.5%)
Atrial fibrillation*	67 (10.1%)	75 (15.1%)	142 (12.2%)
Asthma*	179 (27.0%)	91 (18.3%)	270 (23.3%)
Any malignancy <sup>2</sup>	116 (17.5%)	102 (20.5%)	218 (18.8%)
Lung cancer	22 (3.3%)	17 (3.4%)	39 (3.4%)
Diabetes*	75 (11.3%)	90 (18.1%)	165 (14.2%)
Cerebrovascular disease	59 (8.9%)	54 (10.8%)	113 (9.7%)
Mood disorder*	71 (10.7%)	35 (7.0%)	106 (9.1%)
Peripheral vascular disease*	41 (6.2%)	59 (11.8%)	100 (8.6%)
Peptic ulcer disease	27 (4.1%)	23 (4.6%)	50 (4.3%)
Rheumatic disease*	35 (5.3%)	12 (2.4%)	47 (4.0%)
Renal diseases	15 (2.3%)	15 (3.0%)	30 (2.6%)
Hemiplegia and/or paraplegia	8 (1.2%)	5 (1.0%)	13 (1.1%)

<sup>1</sup> Selected comorbidities were defined based on ICD-10 diagnosis codes

<sup>2</sup> Includes lymphoma and leukemia except malignant neoplasm of skin

\* Statistically significant difference between male and female (p-value < 0.05)

- Most common comorbidities were hypertension, cardiovascular disease, and asthma.
- Asthma and mood disorders were more common in women than in men.
- Cardiovascular diseases and diabetes were more common in men than in women.

## CONCLUSIONS

Patients who are prescribed roflumilast carry a very severe disease burden. Prior to initiation of roflumilast most patients (94%) were on combination therapy including use of ICS. Within a year prior to initiation over 76% of patients had prescriptions for ICS, LAMA and LABA. Compared to all COPD patients, roflumilast initiators had higher use of COPD medication and combination therapy [3]. They had also more hospitalizations for COPD and for any cause [3]. Appropriate methodology should be used to take into account COPD severity when making comparisons between COPD patients who are exposed to roflumilast to those who are not, in future studies using register based data in Sweden.

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