Exploring the Economic Burden Associated With COPD Due to AATD: A Systematic Literature Review

Crossley, O; Knott C; Tang M. Nexus Values, London, United Kingdom

EE458

Introduction

- AATD is a rare genetic condition associated with increased risk of developing lung disease such as COPD[1].
- In healthy individuals, the protein alpha-1 antitrypsin protects the lungs from damage caused by inflammation[2]. Therefore, deficiency of alpha-1 antitrypsin means AATD patients can experience lung exacerbations which require additional treatment[1].
- Compared to non-AATD-associated COPD (COPD only), AATD-COPD presents with the same symptoms including breathlessness and chronic cough though generally has a younger onset[1].
- Understanding the economic implications of AATD-COPD is important for clinical decision making and development of targeted interventions for this subset of patients.

Methods and Searches

- A broad SLR was conducted in Embase in February 2025 to evaluate the direct and indirect costs associated with AATD.
- Studies of interest were full text papers published in 2008-2025 or conference proceedings published in 2020-2025 presenting data on HCRU or disease-related direct or indirect costs.
- This sub-analysis was focused on AATD-COPD, where economic data associated with caregiving were extracted from included studies.

Results

The SLR yielded 6 papers with data on the economic burden of AATD-COPD. An additional study was found via grey literature searching.

Healthcare costs for AATD-COPD

- Annual healthcare costs for AATD-COPD were higher in the US compared to Europe, and varied greatly according to treatment[2,3]:

$142,406 to $167,935[3] (2013 USD)

€5,096 to €78,930[2] (2012 Euro)

- AATD-associated COPD had 1.7 to 2-fold greater total healthcare costs compared to COPD only[4,5].
- In the US, total mean hospitalisation cost was higher for AATD-COPD compared to COPD only ($60,149.58 vs $49,482.25)[6]. Patients with AATD-COPD in the US had a greater mean inpatient cost than patients with COPD only (+$1,487)[7].

HCRU for AATD-COPD

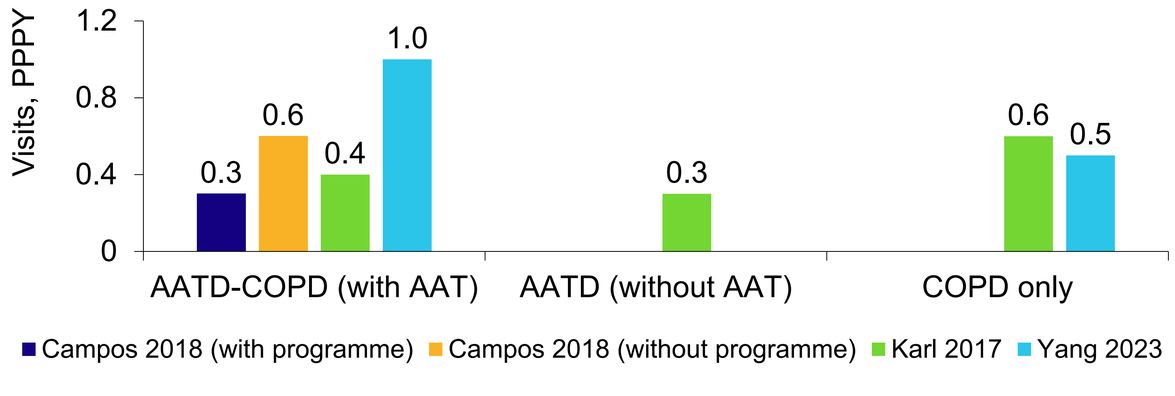
Overall

- Higher HCRU costs were reported for AATD-COPD 12 months before and after their initial COPD diagnosis, that were double the cost of patients with COPD only[4].

Inpatient

- Proportion of patients with AATD-COPD requiring ≥1 annual inpatient stay was 24%-32%, with greater inpatient burden in COPD only (27%-39%)[2,5].
- Generally, inpatient visits were more frequent in patients with COPD-only compared to patients with AATD not receiving AAT (Figure 1)[2,3,5].

Figure 1: Inpatient visits PPPY



Note: The programme described in Campos 2018 was a Prolastin® disease management programme which included education and support services provided by AlphaNet®.

Outpatient visits

- Outpatient visits were generally more frequent with AATD-COPD compared to COPD only with some variation according to AAT use (Table 1). Outpatient visits were also more costly for patients with AATD-COPD (€2,160 vs €938 [COPD])[2].

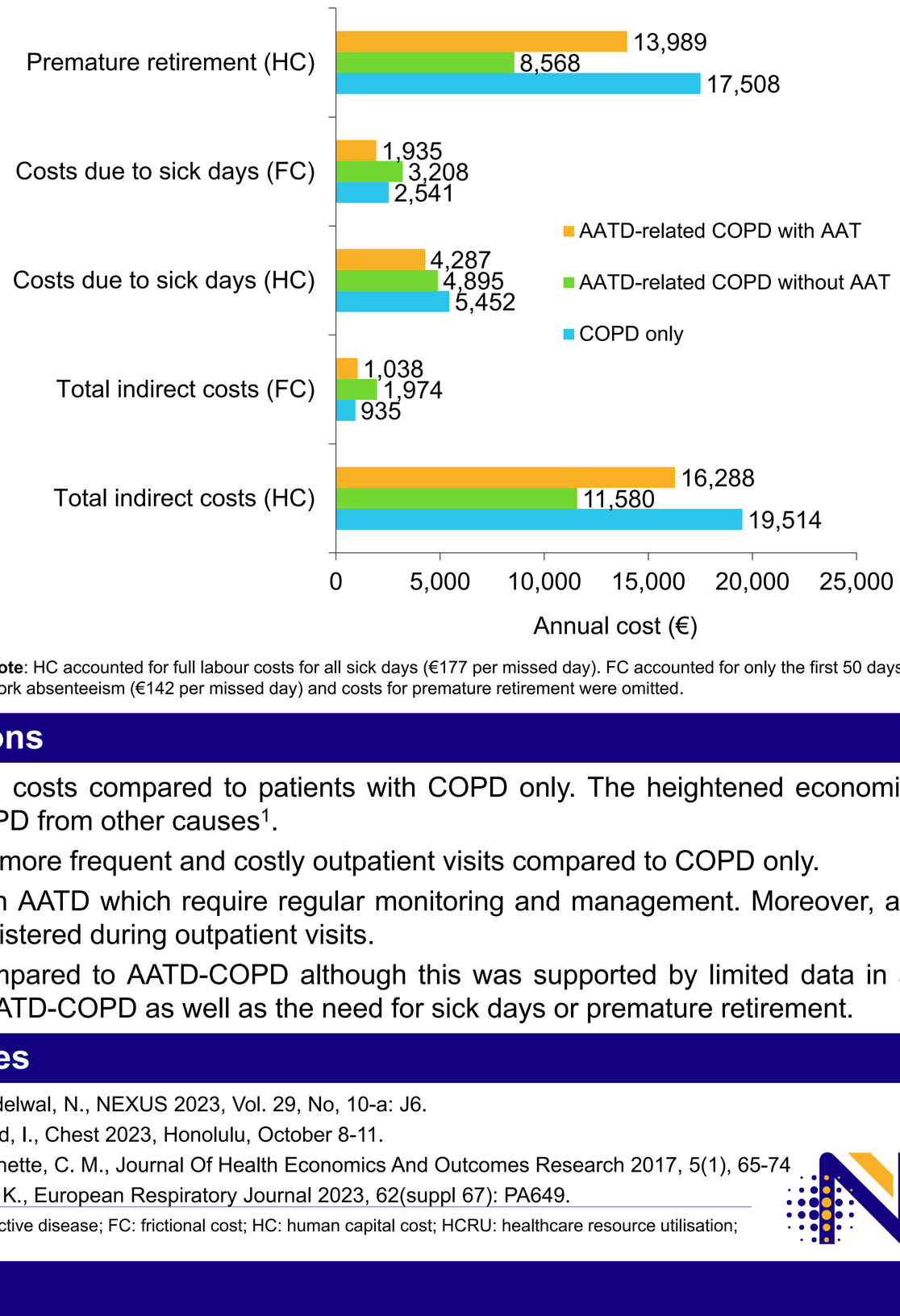
Table 1: Ambulatory visits PPPY

Subgroup	Reference	Visits/year
AATD-COPD (with AAT)	Campos 2018 (US)	24.9-25.4
	Karl 2017 (Germany)	58.0
AATD (without AAT)	Karl 2017 (Germany)	35.2
COPD only	Karl 2017 (Germany)	26.4

Indirect costs

- There was a scarcity of data on indirect costs with only one German study reporting on this category. The study indicated costs due to premature retirement in patients with AATD-COPD (with or without AAT) to be a substantial cost driver (€13,129/year), though lower than with COPD only (€17,508/year) (Figure 2)[2].

Figure 2: Annual indirect costs in AATD-COPD and COPD only



Note: HC accounted for full labour costs for all sick days (€177 per missed day). FC accounted for only the first 50 days of work absenteeism (€142 per missed day) and costs for premature retirement were omitted.

Conclusions

- Patients with AATD-COPD report substantial economic burden with higher total costs compared to patients with COPD only. The heightened economic burden may occur as COPD due to AATD is linked to faster progression than COPD from other causes[1].
- Outpatient visits were a key driver of economic burden in AATD-COPD, reporting more frequent and costly outpatient visits compared to COPD only.
- The more frequent outpatient visits may be attributed to various complications in AATD which require regular monitoring and management. Moreover, as AATD is a genetic condition it requires specialised treatment which is often administered during outpatient visits.
- In contrast inpatient burden and indirect costs were greater for COPD-only compared to AATD-COPD although this was supported by limited data in a single study. Regular outpatient visits may reduce the need for inpatient care in AATD-COPD as well as the need for sick days or premature retirement.

References

1. Smith, D., Chronic Obstructive Pulmonary Diseases, 2021, 8(1), 162–176.
2. Karl, F. M., Respiratory Research 2017, 18(1), 60.
3. Campos, M. A., Advances In Therapy 2018, 35(4), 467-481.
4. Sieluk, J., Orphanet Journal Of Rare Diseases 2021, 15(1): 260.
5. Khandelwal, N., NEXUS 2023, Vol. 29, No, 10-a: J6.
6. Ahmed, I., Chest 2023, Honolulu, October 8-11.
7. Blanchette, C. M., Journal Of Health Economics And Outcomes Research 2017, 5(1), 65-74
8. Yang, K., European Respiratory Journal 2023, 62(suppl 67): PA649.

Abbreviations: AAT: alpha-1 antitrypsin augmentation therapy; AATD: alpha-1 antitrypsin deficiency; COPD: chronic pulmonary obstructive disease; FC: frictional cost; HC: human capital cost; HCRU: healthcare resource utilisation; PPPY: per person per year; SLR: systematic literature review; US: United States; USD: United States Dollar