

Montana COPD

Impact of home NIV
in COPD patients^{1,2}

Context

Although COPD is the most common indication for long-term domiciliary non-invasive ventilation (NIV), there is a lack of clear recommendations on the optimal timing of NIV initiation for different COPD phenotypes. The MONTANA COPD study explores COPD patients' pre-NIV trajectories and the impact that continuing or stopping home NIV therapy had on mortality and exacerbations.^{1,2}

Study details



Population

- COPD patients receiving home NIV in France during the study period, n=54,545. This is the largest cohort of COPD patients treated with NIV ever to be analysed.
- Inclusion criteria: COPD patients aged ≥ 40 years with ≥ 1 reimbursement for NIV between 1 January 2015 and 31 December 2019.
- The study population was elderly (median age 70 years) with multiple comorbidities.



Objectives

- Quantify and describe patients who use NIV at home in order to understand their care trajectories before NIV treatment.¹
- Estimate the impact of therapy continuation versus cessation on mortality and severe exacerbation risk.²



Methodology

- Machine learning and clustering methodology were used to identify patient clusters.
- Study data was drawn from the French national health insurance reimbursement system database (SDNS), a large, unbiased, well-anonymised claims database that covers >99% of the French population and holds data on nearly 68 million individuals.



Investigators

- **Prof. Jean-Louis Pépin** (University Hospital Grenoble)
- **Dr Arnaud Prigent** (Saint Laurent private hospital, Rennes)
- **Dr Alain Palot** (Saint-Joseph private hospital, Marseille)

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Why choose the National Health Data System (SNDS)?

SNDS brings together the data of a population of nearly 68 million individuals. It is a valuable resource for a range of stakeholders, including industry and research and academic institutions. It enables them to conduct a wide range of studies, risk assessments, impact analyses and targeted prevention campaigns related to healthcare.

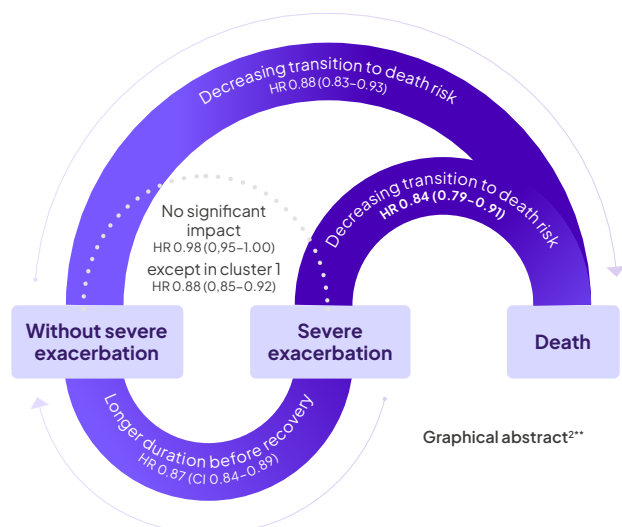
Results and interpretation

The first analysis¹ generated, **four clusters of COPD patients** receiving home NIV. These clusters differed in terms of age, sex, comorbidities, pre-NIV investigations and the prescriber/location of NIV initiation.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
% of cohort	66%	12%	21%	1%
Timing of NIV initiation	In ambulatory settings or after no more than one hospitalisation for severe exacerbation	After two or more hospitalisations for severe exacerbation in the previous 6 months	After frequent hospitalisations for severe COPD exacerbation in the previous year	After many long-lasting hospitalisations
Consultations and assessments	Pulmonary function tests (59.8%) Sleep assessment (25.5%) Pneumologist consultation (12.0%)	Pulmonary function tests (67.2%) Sleep assessment (25.4%) Pneumologist consultation (12.9%)	Pulmonary function tests (69.1%) Sleep assessment (25.1%) Pneumologist consultation (15.1%)	Pulmonary function tests (67.3%) Sleep assessment (14.3%) Pneumologist consultation (13.0%)
Treatment	Bronchodilators (15.3%) Oxygen therapy before NIV (42.3%)	Bronchodilators (20.2%) Oxygen therapy before NIV (59.0%)	Bronchodilators (22.4%) Oxygen therapy before NIV (63.6%)	Bronchodilators (23.3%) Oxygen therapy before NIV (77.8%)

The second analysis² described the likelihood of transitioning from one state to another (without severe exacerbation, severe exacerbation and death). **A 15% greater chance of survival was observed in patients who continued NIV, with or without the presence of severe disease exacerbation, versus those who stopped therapy. Also, early therapy initiation (after ≤ 1 severe exacerbation) prevented transitions to severe exacerbation in less severe COPD (i.e. Cluster 1).**

There is now new evidence that long-term domiciliary NIV therapy has a beneficial effect on all-cause mortality risk in individuals with hypercapnic COPD, and that early initiation of home NIV reduces the number of severe exacerbations.²



This content is intended for health professionals only.

****Impact of therapy continuation on risk of transitioning from one state to another (total cohort analysis)**

1. J.-L. Pepin, P. Lemeille, H. Denis, A. Jossereau, F. Lavergne, A. Panes, S. Bailly, A. Palot, A. Prigent, Health trajectories before initiation of non-invasive ventilation for chronic obstructive pulmonary disease: a French nationwide database analysis, *The Lancet Regional Health - Europe*, 2023, 100717, ISSN 2666-7762, <https://doi.org/10.1016/j.lanepe.2023.100717>.
2. Pépin JL, Herquelot E, Denis H, et al. Impact of long-term non-invasive ventilation on severe exacerbations and survival in COPD: a French nationwide cohort study using multistate models. *Thorax* Published Online First: 19 May 2025. doi: 10.1136/thorax-2024-222392
3. Macrea M and al. Long-Term Noninvasive Ventilation in Chronic Stable Hypercapnic Chronic Obstructive Pulmonary Disease. An Official American Thoracic Society Clinical Practice Guideline. *Am J Respir Crit Care Med*. 2020 Aug 15;202(4):e74–e87. doi: 10.1164/rccm.202006-2382ST.

Other perspectives

UNDER-DIAGNOSIS

The large number of patients in Cluster 1 who started on NIV within a few weeks of visiting a respiratory physician, as well as the low rates of bronchodilator use, probably indicates a high rate of under-diagnosis of COPD.

LOW OSA SCREENING

The study identified a low rate of OSA screening with polygraphy or polysomnography in the year before NIV initiation, even though current ATS guidelines recommend OSA screening before initiating long-term NIV in stable COPD.³

EARLY THERAPY INITIATION

The study has shown that 66% of COPD patients in France were initiated with home NIV early, after no more than one hospitalisation following acute exacerbation. It also observed positive outcomes on mortality and prevention of severe exacerbations. Could it stimulate earlier treatment strategies in other European countries?