Abstract
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Hospital Burden of Pulmonary Arterial Hypertension in France: a Real-World Study Using the French Hospitalization Database (PMSI)

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Background and Objectives

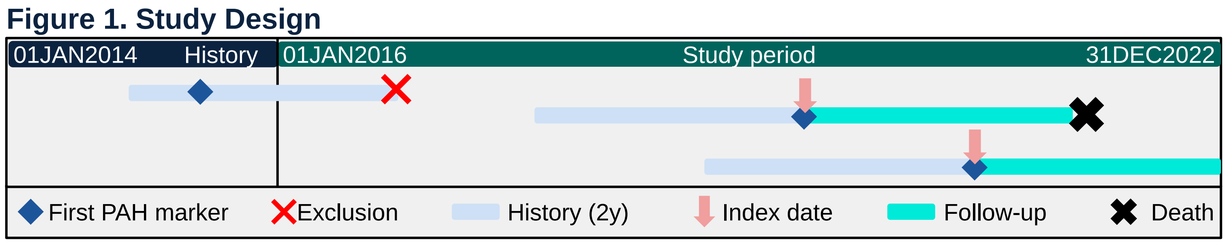
- **Pulmonary arterial hypertension (PAH)** - pulmonary hypertension (PH) group 1 in the PH classification - is a rare chronic pulmonary disease that leads to progressive right heart failure. PAH is a rare disease that is mostly diagnosed among women aged between 30 and 50 years (1).
- PAH **incidence was estimated between 1.5 and 32 cases/million/year**. Incidence is difficult to evaluate since PAH is rare, and symptoms are common with other groups of PH (2,3).
- There is a notable lack of real-world data on PAH epidemiology and management in France. This study aimed to assess the **number of patients hospitalized for PAH**, and to describe **PAH hospital management and costs** in France, using claims data from PMSI.

Methods

Design

- This was an observational retrospective claims study, using secondary data from **French hospitalization database** (PMSI). Adult patients with a **PAH hospital marker** identified between January 1st, 2016, and December 31st, 2022, were selected. PAH hospital markers comprised hospital dispensations of P**AH-specific drugs, PH-related hospitalizations, and right heart catheterization** (RHC).
- Patients were followed from **index date to end of study or in-hospital death**, for a maximum of 7 years. **Index date** was defined as the first PAH hospital marker (PAH drug, PH hospitalization, RHC) during selection period. Medical history and comorbidities were assessed over a two-year period before index date (Figure 1).

Figure 1. Study Design



Study population

- As no PAH-specific code exists to identify the targeted population in PMSI, a selection algorithm was developed based on literature and discussed with clinical experts (Figure 2). PAH-specific drugs identifiable in PMSI are **epoprostenol, iloprost, treprostinil, selexipag, bosentan, and riociguat.** These therapies are almost exclusively dispensed during hospital visits.

Analyses

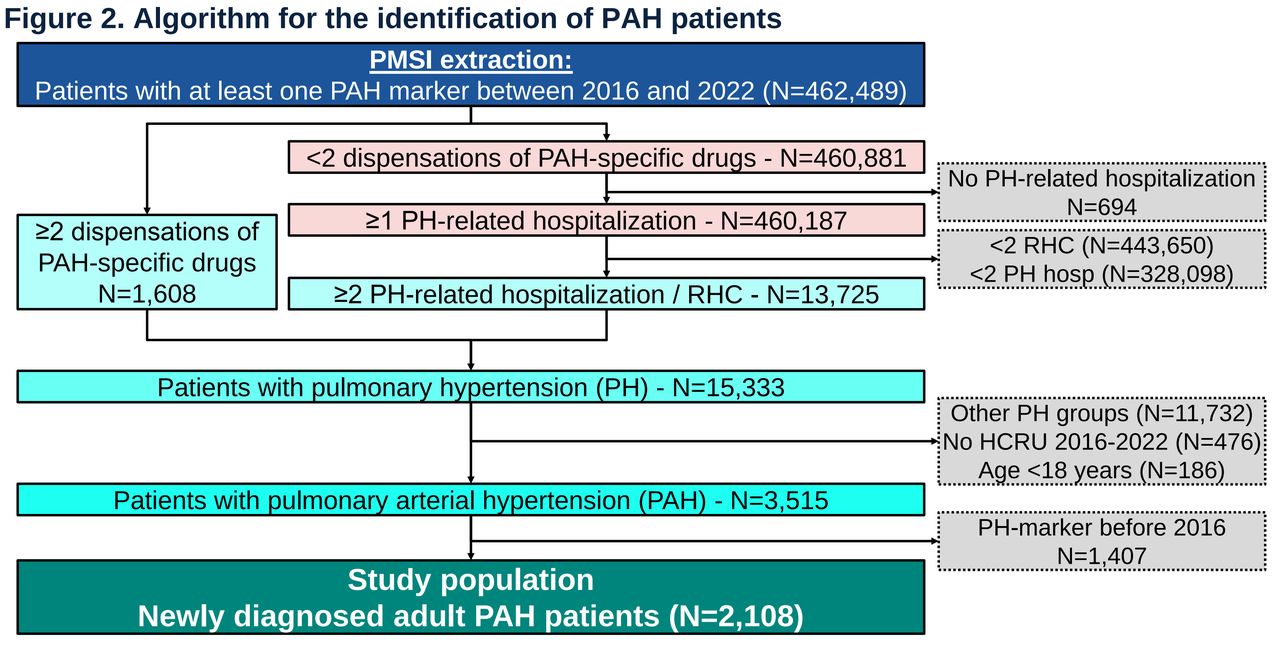
- Outcomes included **patient characteristics**, hospital-related healthcare resource use (**HCRU**) and related **costs**, as well as **transplantation**.
- Patient characteristics included age, sex, comorbidities (diabetes, arterial hypertension, severe obesity, ischemic heart disease, severe chronic renal failure, systemic sclerosis, lupus, portal hypertension).
- HCRU included **hospitalizations** (all-cause and PH-related), **Emergency Room (ER) visits**, **PAH treatments**, **RHC** and **imaging exams**. HCRU and costs were described overall, for the first, second and third year of follow-up among patients with sufficient follow-up.
- Transplantation rate was calculated as a number per 1,000 person-years.

Results (1/2)

Study population and Characteristics

- Among the 462,489 patients with ≥1 PAH marker between 2016 and 2022, 1,601 had ≥2 dispensations of PAH drugs. Among the 460,881 with <2 dispensations, 460,187 had a PH-related hospitalization, and 13,725 had less ≥2 RHC and/or PH hospitalizations.
- The PH population included 15,533, of whom 12,018 had an exclusion criteria, leaving **3,515 PAH patients**. Among them, **2,108 were newly diagnosed with PAH and constituted the study population** (figure 2)**.**

Figure 2. Algorithm for the identification of PAH patients



- Median (Q1-Q3) age was 64.0 (53.0–72.0) years, with 39% of men (Table 1). Median follow-up duration was 4.8 (2.4–6.9) years.

Table 1. Sociodemographic and clinical characteristics of PAH patients

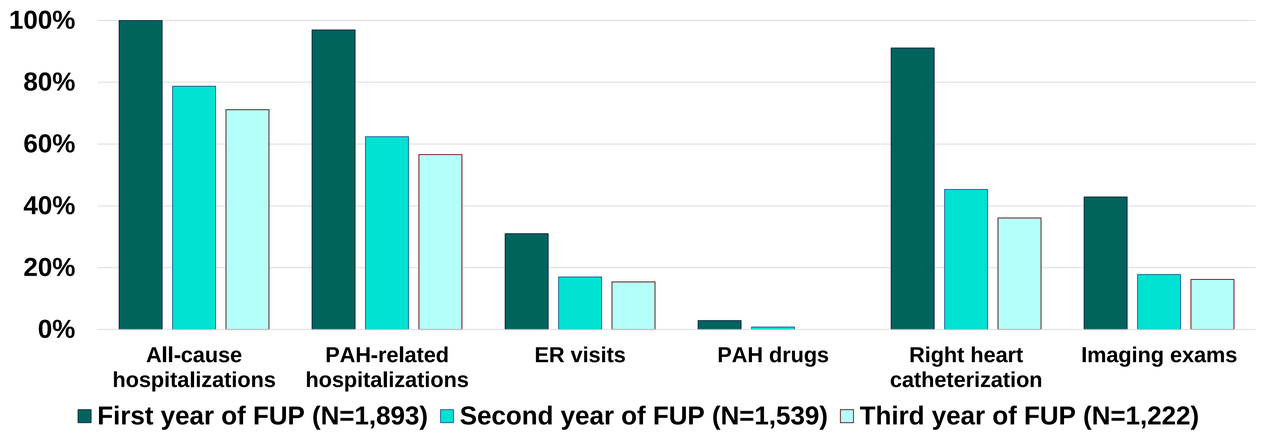
	Study population (N=2,108)
Sociodemographic characteristics	
Age (years)	
Mean (SD)	61.1 (15.1)
Median (Q1-Q3)	64.0 (53.0 - 72.0)
Sex	
Female, n (%)	1,290 (61.2%)
Comorbidities of interest	
Diabetes, n (%)	240 (11.4%)
Arterial hypertension, n (%)	452 (21.4%)
Severe obesity, n (%)	197 (9.3%)
Ischemic heart disease, n (%)	151 (7.2%)
Severe chronic renal failure, n (%)	75 (3.6%)
Systemic sclerosis, n (%)	121 (5.7%)
Lupus, n (%)	26 (1.2%)
Portal hypertension, n (%)	87 (4.1%)

Results (2/2)

Hospital Resources Used and Related costs

- Over the entire follow-up period, the median (Q1-Q3) number of **all-cause hospitalizations per patient was 8.0 (5.0 – 15.0)**. The number of **PH-related hospitalizations was 5.0 (3.0 - 8.0)**. Patients had a median of 2.0 (1.0 - 3.0) ER visits resulting in a hospitalization. The median number of RHC was 2.0 (2.0 - 4.0) and the median number of PAH drug dispensations was 17.5 (3.0 - 33.0). Finally **median all-cause hospitalization cost was €20,539 (€10,360 - €43,421)**, while cost of PH-related hospitalization was €12,417 (€6,709 - €24,945).
- In the first-year following index date, every patient had at least one all-cause hospitalization. This rate decreased to 78.7% in the second year, and 71.1% in the third year. Rates of patients with RHC showed a more important decrease, from 91.1% of patients in the first year, to 36.1% in the third (Figure 3).

Figure 3. Proportion of patients with at least one HCRU of interest per year



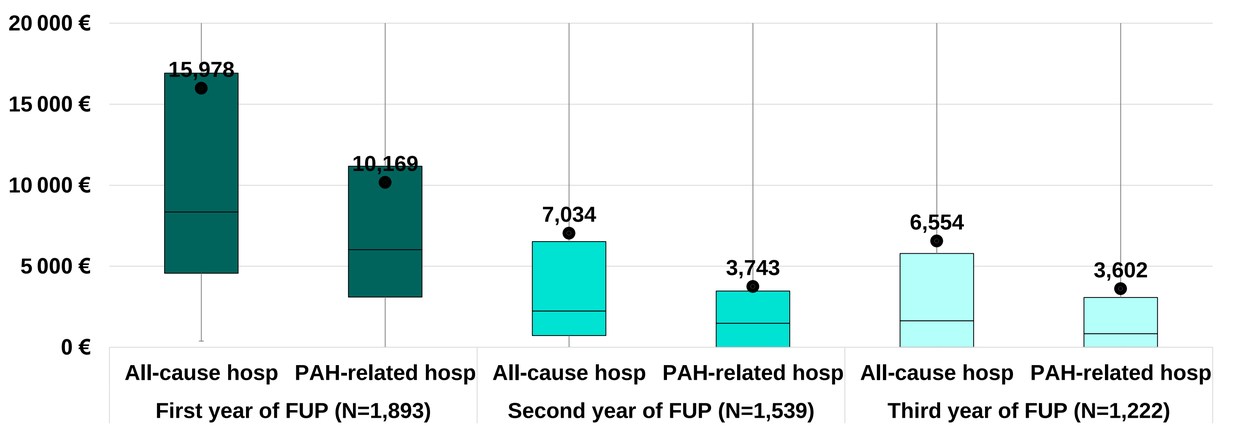
- During the first year following index date, the median (Q1-Q3) number of PAH-related hospitalizations was 3.0 (2.0 - 4.0), **decreasing to 2.0 (1.0 - 3.0) and 2.0 (1.0 - 2.0) in the second and third years**, respectively.
- Similarly, median number ER visits was 1.0 (1.0 - 2.0) in the first year and slightly **decreased with time, with a median still at 1.0 (1.0 - 2.0) in the third year**(Table 2).

Table 2. Number of HCRU of interest per year

	First year of FUP (N=2,108)	Second year of FUP (N=1,539)	Third year of FUP (N=1,222)
All-cause hospitalizations			
Mean (SD)	6.3 (13.0)	5.1 (15.5)	5.4 (16.6)
Median (Q1-Q3)	4.0 (3.0 - 6.0)	2.0 (1.0 - 4.0)	2.0 (1.0 - 4.0)
PAH-related hospitalizations			
Mean (SD)	3.2 (2.0)	2.3 (4.4)	2.1 (1.6)
Median (Q1-Q3)	3.0 (2.0 - 4.0)	2.0 (1.0 - 3.0)	2.0 (1.0 - 2.0)
ER visits with hospitalization			
Mean (SD)	1.5 (0.9)	1.5 (1.1)	1.4 (0.8)
Median (Q1-Q3)	1.0 (1.0 - 2.0)	1.0 (1.0 - 2.0)	1.0 (1.0 - 2.0)
PAH drug dispensations			
Mean (SD)	26.9 (34.1)	29.9 (61.5)	22.1 (18.1)
Median (Q1-Q3)	12.5 (2.0 - 35.0)	8.0 (1.0 - 32.0)	18.5 (6.0 - 33.0)
RHC			
Mean (SD)	1.9 (0.9)	1.2 (0.5)	1.2 (0.6)
Median (Q1-Q3)	2.0 (1.0 - 2.0)	1.0 (1.0 - 1.0)	1.0 (1.0 - 1.0)
Imaging exams			
Mean (SD)	1.5 (0.9)	1.4 (0.8)	1.3 (0.8)
Median (Q1-Q3)	1.0 (1.0 - 2.0)	1.0 (1.0 - 2.0)	1.0 (1.0 - 1.0)

- During the first year, the median (Q1-Q3) all-cause hospitalization cost was €8,349 (€4,566 - €16,919), mostly driven by **PH-related hospitalizations, with a median of €6,023 (€3,096 - €11,173)**. During the second year, a notable drop was observed, with a median of €2,238 (€721 - €6,523) for all-cause hospitalizations, and €1,479 (€0.0 - €3,470) for PAH-related ones (Figure 4).

Figure 4. Costs of all-cause and PAH-related hospitalizations per year



Transplantation rate

- Over the entire follow-up period, transplantation rate [95%CI] was **2.3 [1.3 – 3.7] cases per 1,000 patient-years**. The median (Q1-Q3) time from index date to transplantation was **76.0 (14.0 – 82.0) months**, that is slightly more than 6 years.

Conclusion

- This is the first real-world study to estimate the hospital management and cost of PAH in France.
- For most HCRU as well as for costs, a peak was observed in the first year of follow-up, which was followed by a progressive decrease in the second- and third-year post-diagnosis.
- While being currently the only curative therapy available for PAH, transplantations remained rarely done.

References

1. Leber L, Beaudet A, Muller A. Epidemiology of pulmonary arterial hypertension and chronic thromboembolic pulmonary hypertension: identification of the most accurate estimates from a systematic literature review. Pulm Circ. 2021
2. Humbert M, Sitbon O, Chaouat A, Bertocchi M, Habib G, Gressin V, et al. Pulmonary arterial hypertension in France: results from a national registry. Am J Respir Crit Care Med. 2006
3. Lau EMT, Giannoulatou E, Celermajer DS, Humbert M. Epidemiology and treatment of pulmonary arterial hypertension. Nat Rev Cardiol. 2017
4. Exposto F, Petrică N, Davies E, Beaudet A. Identification of a pulmonary arterial hypertension (PAH) patient cohort and study of its burden of illness in Programme de Médicalisation des Systèmes d'information (PMSI). Int J Cardiol. 2020
5. Angalakuditi M, Edgell E, Beardsworth A, Buysman E, Bancroft T. Treatment patterns and resource utilization and costs among patients with pulmonary arterial hypertension in the United States. J Med Econ. 2010

Disclosures

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