Direct Economic Impact of Idiopathic Pulmonary Fibrosis on the Brazilian Private Healthcare System: A Real-World Data Analysis

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Introduction

• Idiopathic Pulmonary Fibrosis (IPF) is a rare, progressive, and ultimately fatal form of chronic interstitial lung disease (ILD) characterized by irreversible scarring of the lung parenchyma and gradual loss of pulmonary function. (Raghu et al., 2011; Selman et al., 2016)[1].

• From an epidemiological perspective, IPF has a variable but increasing global incidence, ranging from 3 to 9 per 100,000 person-years in North America and Europe (Hutchinson et al., 2015; Wijsenbeek & Cottin, 2020)[2]. In Brazil, a 2015 estimate by Baddini-Martinez and Pereira[3] suggested a national prevalence of approximately 13,000–18,000 cases; however, actual numbers may be significantly higher due to underreporting and misclassification.

• IPF burden in Brazil also remains poorly defined. Currently, no Clinical Protocol and Therapeutic Guideline (PCDT) for IPF is available, which leaves patients to be treated only on symptomatic management strategies rather than access to disease-modifying antifibrotic treatments that are not available in the public healthcare system nor reimbursed by supplementary healthcare.

Objective

Idiopathic pulmonary fibrosis (IPF) have poor prognosis and significant healthcare demands. In Brazil, the absence of national clinical guidelines for IPF treatment within the public health system contributes to variability in care pathways, especially in the private sector.

This study aimed to assess the direct economic impact of IPF on the Brazilian private healthcare system by analyzing healthcare utilization, hospitalization rates, health resource utilization, and associated costs.

Methods

• A retrospective cohort study was conducted using real-world data from a private administrative claims database (Orizon) , representing approximately 23%of Brazil's supplementary healthcare insured population, which includes over 11.9 million beneficiaries as of 2023.

• The study population included all beneficiaries with at least one recorded event of Idiopathic Pulmonary Fibrosis (as ICD-10 code J84.1) between January 1, 2012, and December 31, 2022. The overall data extraction window extended from January 1, 2010, to December 31, 2023, allowing sufficient follow-up time to assess clinical outcomes and economic burden.

• Patients with incomplete records, alternate fibrotic ILDs, or diagnoses made outside the inclusion period were excluded.

• Data sources included billing records submitted through Orizon system, which captures and standardizes claims data from healthcare providers post-service delivery, allowing tracking of healthcare resource utilization (HCRU), including hospitalizations, intensive care unit (ICU) stays, oxygen therapy, outpatient visits, and the use of medications, procedures, and diagnostic exams.

• Demographic variables included age (categorized per the National Supplementary Health Agency—ANS—segmentation), sex, and geographic location by state and region.

• Clinical and cost-related variables included: Length and frequency of hospital and ICU admissions, use of elective vs. emergency outpatient consultations, readmissions within 30 days of discharge, utilization of oxygen therapy (inpatient and readmission phases), most frequent diagnostic tests and pharmacological agents, secondary ICD-10 codes recorded during hospitalization, discharge status and mortality outcomes.

• Cost analyses were conducted from the payer perspective. All monetary values were adjusted to December 2023 using the Brazil's official inflation index (IPCA).

• Both total and per-patient costs were calculated for the full observation window, as well as stratified by specific events (e.g., hospitalization, ICU stay, oxygen therapy, readmission).

Results

• A total of 1,376 patients presented idiopathic pulmonary fibrosis events (ICD-10: J84.1) were included in the final study population, based on eligibility and inclusion criteria applied to a 10-year observation window. The overall prevalence across the dataset was estimated at 1.6 per 100,000 beneficiaries, with relatively stable case identification rates after 2015. The majority of patients (80%) were over 40 years old, consistent with global IPF epidemiology, although data completeness for sex was limited, with approximately 60% of records lacking this field—likely due to this information is not mandatory

• Geographically, the Southeast region accounted for the majority of cases (64%), followed by the Northeast (24%) and South (6%). When adjusted for population size, the Northeast showed the highest relative prevalence. São Paulo was the most represented state, contributing 51% of cases.

• Across the observation window, hospitalization rates were high: 86% of all patients experienced at least one inpatient episode during their disease journey with an average of 5 and a median of 4 days.

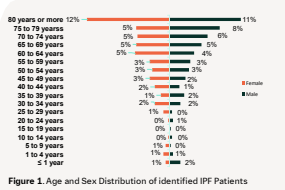

Figure 1. Age and Sex Distribution of identified IPF Patients

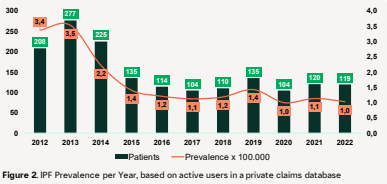

Figure 2. IPF Prevalence per Year, based on active users in a private claims database

• During the journey, a total of 1,179 hospitalized beneficiaries had at least one hospitalization during the entire journey, ICU utilization was also frequent: 41% of the total cohort (n=560) required at least one ICU admission, with an average ICU stay of 23 days (median: 10 days). Among the subgroup of IPF-specific cases, 21% of patients used ICU resources, with an average stay of 19 days and a median of 8 days. The average ICU-related cost was BRL 49,796 per patient (BRL 40,452 for IPF-specific ICU stays).

• Regarding readmissions, 137 patients (17%) were rehospitalized within 30 days of discharge. The mean readmission duration was 35 days (median: 14 days), and the average cost per event was BRL 123,887. Of these patients, 50 required ICU care, generating BRL 1.5 million in total costs, with a mean ICU-related readmission cost of BRL 30,098.

• In terms of outpatient resource utilization, 68% of patients (n=934) had at least one elective consultation, accounting for over 10,000 total visits (average: 11 per patient). Additionally, 82% of patients (n=1,122) visited the emergency department at least once, with an average of 10 visits per patient in the whole period

• Oxygen therapy was utilized by a substantial proportion of patients. Among the entire cohort, 827 patients (60%) received oxygen at least once during hospitalization, while 36% of IPF-specific patients did so. During the readmission phase, 53% of rehospitalized patients used oxygen therapy. The total cost of oxygen use was estimated at BRL 17.7 million during the main disease journey and BRL 969 thousand during readmissions. These costs included both oxygen delivery systems and procedural fees.

• A ranking of the 30 most frequent procedures and medications revealed that care was dominated by routine medical practices. Common procedures included complete blood count (CBC), liver function tests (ALT, AST), and other general biochemical exams. Most frequently used medications included pantoprazole sodium, enoxaparin, and prednisone—the latter likely reflecting symptomatic management with corticosteroids in the absence of antifibrotic therapy.

• Total direct medical costs for the full cohort reached BRL 487,4 M, of which BRL 136,6M (28%) were directly associated with care episodes linked to IPF. The average cost per patient was BRL 354,247 across the entire disease journey, while IPF-specific care incurred a mean cost of BRL 99,318 per patient. Hospitalizations alone accounted for the bulk of costs, totaling BRL 374 million, including BRL 132.6 million for IPF-specific admissions. ICU care added another BRL 27.9 million to the global burden, including BRL 11.6 million for confirmed IPF cases.

	Total Cohort Patients			IPF Events only	
Year	Overall Patients	In hospitalization Average	Average Length of Stay	Patients	Average Length of Stay
2010	117	2	11	9	8
2011	157	2	11	8	6
2012	208	2	17	18	13
2013	246	2	17	55	12
2014	279	2	18	56	21
2015	264	2	20	56	28
2016	292	2	30	99	34
2017	327	2	36	103	53
2018	319	2	38	110	53
2019	286	2	47	135	45
2020	240	2	54	104	68
2021	238	2	62	120	67
2022	218	2	63	119	62
2023	111	2	55	24	126
Total	1,179	5	97	820	61

Table 1. Hospitalized patients and average length of stay

Year	Overall Patients	IPF Specific Patients	ICU Costs	Average ICU Cost
2010	7	1	BRL 1.968	BRL 1.968
2011	10	0	BRL 0	BRL 0
2012	13	3	BRL 21.739	BRL 7.246
2013	14	4	BRL 21.104	BRL 5.276
2014	37	7	BRL123.584	BRL 17.656
2015	73	24	BRL501.546	BRL 20.898
2016	125	43	BRL 1.156.735	BRL 26.901
2017	143	50	BRL 1.577.837	BRL 31.557
2018	122	50	BRL 2.607.498	BRL 52.150
2019	116	56	BRL 1.653.043	BRL 29.535
2020	85	36	BRL829.296	BRL 23.036
2021	68	29	BRL 1.447.805	BRL 49.924
2022	74	33	BRL 1.446.001	BRL 43.818
2023	33	7	BRL261.075	BRL 37.296
Total	560	288	BRL 11.650.141	BRL 40.452

Table 2. ICU usage and length of stay in average per IPF event patients

Research Limitations

• An important limitation of this study lies in the inherent difficulty of accurately identifying patients with idiopathic pulmonary fibrosis (IPF). The ICD-10 classification system, in which IPF is coded as J84.1, groups multiple interstitial lung diseases with overlapping features, making it challenging to distinguish IPF from other fibrotic or inflammatory pulmonary conditions. This diagnostic ambiguity can lead to both underestimation and misclassification of true IPF cases.

• Additionally relevant limitation concerns the heterogeneity in diagnostic access across the country. IPF diagnosis requires high-resolution computed tomography (HRCT), specialized pulmonary evaluation— with that, patients may be misdiagnosed or remain undiagnosed until advanced disease stages.

• .Finally, as only administrative claims databases were studied, it wasn't possible to capture disease severity, clinical progression, or treatment response, that may be critical to a more in-depth evaluation.

Conclusions

• Despite its relative rarity, IPF imposes a substantial economic burden on the Brazilian private healthcare system, primarily driven by hospitalizations and ICU stays, leading to high per-patient and system-wide costs. The lack of national guidelines and standardized pathways contributes to delayed diagnoses and fragmented care, aggravating health outcomes and costs.

• These findings underscore the need for early diagnosis, optimized disease management, and efficient healthcare resource allocation to mitigate the high direct costs associated with IPF.

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Disclosures

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