Specialty Visits and Testing Patterns Prior to IPF Diagnosis in Medicare Patients

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PURPOSE

- Idiopathic pulmonary fibrosis (IPF) is a deadly, progressive, fibrotic lung disease.[1]
- Establishing accurate diagnosis of IPF is challenging.
  - Median delay to diagnosis is 2.2 years.[2]
  - Delayed access to a tertiary care center and accurate diagnosis is associated with higher mortality rates in IPF, independent of disease severity.[2]
  - Recent advances make early treatment (and diagnosis) crucial, as anti-fibrotic treatments have been shown to slow disease progression.

OBJECTIVE

- To describe patterns of pulmonologist visits and testing, both proxies for respiratory symptoms, experienced by Medicare patients prior to receiving a claim-based diagnosis of IPF.

METHODS

Study Design and Data Source

- Retrospective cohort study of Medicare enrollees diagnosed with IPF in 2012. Medicare Research Identifiable Files (RIF – 100% sample) were analyzed for this study.

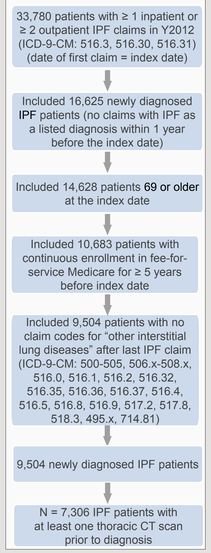
Patient Population

- Diagnosis of IPF was determined based on the presence of ICD-9-CM codes for IPF (and absence of other interstitial lung disease) in the claims and, the occurrence of chest computerized tomography (CT, including high-resolution chest CT [HRCT])[a], per ATS guidelines.[3]
- Inclusion criteria listed in **Figure 1**.

Study Measures

- Patient demographics, time to event, and cumulative proportions of IPF patients receiving first respiratory test and first pulmonologist visit within 5 baseline years preceding IPF diagnosis.
- Tests included chest X-ray, pulmonary function testing (e.g. spirometry), oxygen saturation, anti-nuclear antibodies (ANA)[b], six-minute walk test, arterial blood gas, fiberoptic bronchoscopy, lung biopsy, precipitin panel, and cardiopulmonary exercise testing.
- Distribution of CT scans per patient to show temporal patterns, such as repeated occurrence of tests before diagnosis and time frame of those tests.

Figure 1. Patient Population (N=7,306)



Statistical Analysis

- Descriptive statistics
- Kaplan-Meier curves showed proportions of first test/visit over time and time from test/visit until IPF diagnosis.

RESULTS

Demographics

- We identified 7,306 Medicare patients newly diagnosed with IPF in 2012 (**Figure 1**).
- Mean (SD) age was 80.8 (6.2) years; 48.7% were female; and all geographic regions were represented in the sample (**Table 1**).
- The majority of patients were White (94.4%) followed by Black, Hispanic, Asian, and other/unknown patients (**Table 1**).

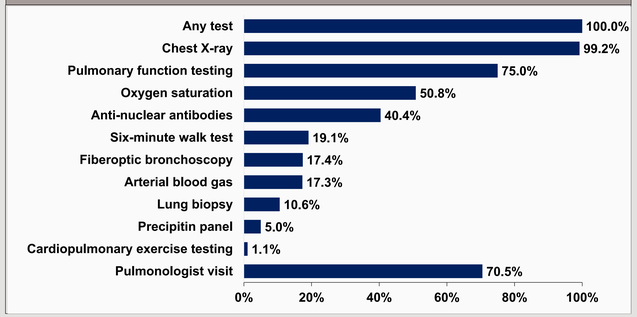
Table 1. Patient Demographics of Newly Diagnosed IPF Patients in Y2012 (N=7,306)

Age (y), mean (SD) [Median]	80.8 (6.2) [81]
Female, n (%)	3,559 (48.7)
Region, n (%)	
Midwest	1,880 (25.7)
Northeast	1,412 (19.3)
South	2,962 (40.5)
West/Other/ Unknown	1,052 (14.4)
Race, n (%)	
White	6,894 (94.4)
Black	212 (2.9)
Hispanic	56 (0.8)
Asian	40 (0.5)
Other/Unknown	104 (1.4)

Frequency of Testing and Visits prior to IPF Diagnosis

- All patients had at least 1 test of interest in the 5 years leading up to and including the date of diagnosis (**Figure 2**).
- Chest X-rays were the most common test (99.2%), followed by pulmonary function testing (75.0%), oxygen saturation (50.8%), ANA (40.4%), six-minute walk tests (19.1%), fiberoptic bronchoscopies (17.4%), arterial blood gas (17.3%), and lung biopsies (10.6%) (**Figure 2**).
- The majority of patients (N=5,154; 70.5%) saw a pulmonologist in an outpatient setting at least once within 5 years prior to diagnosis (**Figure 2**).
  - Of these 5,154 patients, 56.9% (N=2,933) had their initial pulmonologist visit more than a year prior to their first IPF diagnosis, and 34.7% (N=1,788) had the first visit more than 3 years prior to diagnosis (data not shown).

Figure 2. Cumulative Proportions of Patients Receiving First Test and First Pulmonologist Visit during the 5 Years prior to IPF Diagnosis (N=7,306)



IPF: idiopathic pulmonary fibrosis.

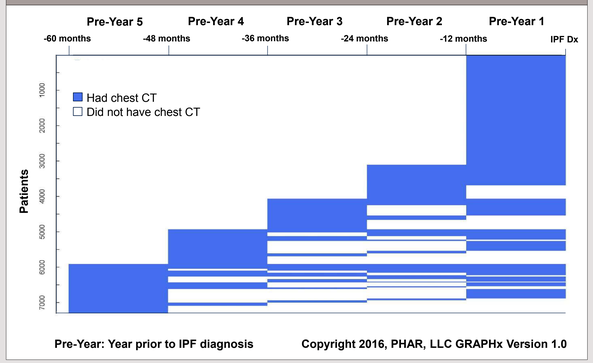
CT Scan

- By definition, all patients received a CT scan prior to a claims-based diagnosis of IPF, as a CT scan (+/- lung biopsy) is essential to establishing an IPF diagnosis in clinical practice.
  - The initial CT scans occurred throughout the 5 years prior to diagnosis, with 57.5% of first scans occurring more than 1 year prior to diagnosis, and 32.5% more than 3 years before diagnosis.
  - Repeated scans (i.e., from year-to-year or following yearly gaps) were common over the years prior to a diagnosis (**Figure 3**).

Time from Testing and Visit to IPF Diagnosis

- The use of all respiratory-related tests increased immediately prior to diagnosis (**Figure 4**).
- The median was reached earliest for chest X-rays (48.1 months prior to diagnosis), followed by chest CTs (18.7 months prior to diagnosis), PFTs (10.7 months prior to diagnosis), and pulmonologist visits (3.4 months). Median time to any test was 51.5 months. (**Figure 4**).

Figure 3. Distribution of Chest CT Prior to IPF Diagnosis, by Patient (N=7,306)

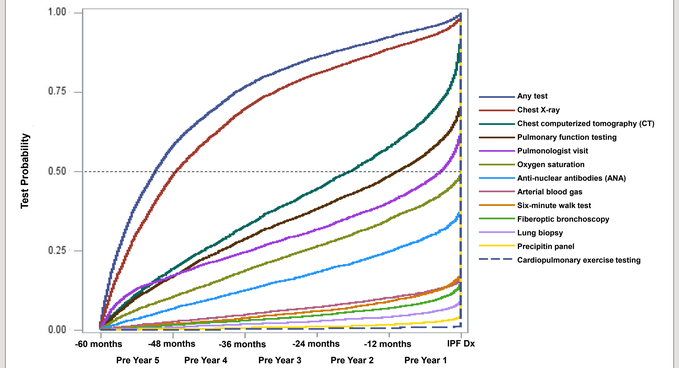


CT: computerized tomography; IPF: idiopathic pulmonary fibrosis; Dx: diagnosis.

LIMITATIONS

- Due to changes in classification and diagnosis codes, some interstitial lung diseases may be inaccurately classified; however, prior studies have used the proposed codes and algorithms to identify IPF cases based on claims data.[1]
- This study was limited to fee-for-service Medicare enrollees, and thus may not be generalizable to other types of insurance and age groups. However, patients 70 and older represent the largest proportion of IPF cases.
- There is no specific procedure code for HRCT of the chest.

Figure 4. Time from First Test and First Pulmonologist Visit to IPF Diagnosis (N=7,306)



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CONCLUSION AND CLINICAL IMPLICATIONS

- Chest imaging, PFTs, and visits with pulmonologists – all proxies for respiratory symptoms – were commonly performed in the five years before the first diagnostic code for IPF appears in a large, nationally representative sample of elderly IPF patients who received a chest CT.
- Median length of time from CT scan to diagnosis was 1 ½ years, with nearly ⅓ of patients receiving their first scan more than three years before diagnosis.
- By three years before diagnosis, more than ⅕ of patients had seen a pulmonologist.
- Findings suggest there are opportunities for earlier confirmation of the diagnosis of IPF, especially with chest CT scans, permitting earlier intervention and offering the potential for improved patient outcomes. All CT scans prior to diagnosis over these many years represent a potential missed opportunity to establish the diagnosis earlier.
- We are currently conducting an analysis with data covering the period following the introduction of anti-fibrotics. These data were not available at the time of the current study.

REFERENCES

1. Raghu G, et al. *Lancet Respir Med*. 2014;2(7):566-572.
2. Lamas DJ, et al. *Am J Respir Crit Care Med*. 2011;184(7):842-847.
3. Raghu G, et al. *Am J Respir Crit Care Med*. 2011;183(6):788-824.

[a] Procedure codes for high-resolution and routine CT are the same. [b] Includes ANA, Rheumatoid Factor, DNA (DS) Antibodies, Sm and Sm/RNP Antibodies, Scleroderma Antibodies (Anti-SCL-70), and Sjögren's Antibodies (SSA, SSB).

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