



Soldiering on the Job When Ill: Productivity Costs in Connective Tissue Disease–associated Interstitial Lung Disease

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Interstitial lung diseases (ILDs) are responsible for substantial health and financial costs worldwide each year. Given the considerable increase in the prevalence rate of ILDs during the last several decades (1–4), it is likely that people with ILDs of different etiologies will enter the labor market or develop the disease, typically occurring during peak working years, while on the job in growing numbers.

ILDs can undermine labor productivity, which is an important yardstick of a nation's labor market and economic health, in a variety of ways and create economic costs not only to society at large (e.g., forgone productivity because of early retirement or loss of paid employment) but also, more specifically, to companies in the form of productivity loss. Besides potentially generating an increase in a business's direct costs, such as employer-sponsored insurance premiums and workers' compensation claims, ILDs can increase indirect costs if workers reduce their routine work time or experience episodic absences because of the illness.



Employer investment in a healthy workforce, one whose productivity isn't completely impaired by disorders such as an ILD, to help improve business performance and more than pay themselves through gains in work output and quality of work by their employees in the long term is somewhat incontrovertible. Still, knowledge of the prevalence and characteristics of employees with ILDs who are more at risk for work impairment and ways to estimate the economic loss and combat that loss with cost-effective interventions remains understudied.

The footprints of health-related productivity losses are equally traceable for both workers showing up at work and those choosing not to (5). Specifically, employers may incur costs related to absenteeism—employees being away from work because of poor health. However, the often much costlier counterpart of absenteeism and the less visible contributor to workplace productivity loss is presenteeism—being on the job, but because of illness, not fully functioning. Indeed, a recent study by Algamdi and colleagues using data from a six-center Canadian Registry for Pulmonary Fibrosis (CARE-PF) showed that among 650 patients with idiopathic fibrotic ILD (FILD), chronic hypersensitivity pneumonitis, and unclassifiable FILD, only 148 (23%) were employed (6). Productivity loss was reported by 55% of employed patients, with absenteeism affecting 14% and presenteeism affecting 52% of patients. The estimated annual cost was 11,610 CAD or 8,940 USD per employee. Dyspnea and cough severity were independently associated with workplace productivity loss, highlighting the importance of symptom-based management.

In this issue of *AnnalsATS* (pp. 1077–1084), the observations of the costs of workplace productivity loss because of nonconnective tissue disease (CTD) FILDs are extended by Algamdi and colleagues to CTD-associated FILDs (7). Investigating work performance in patients with CTD-ILD is particularly

relevant because this ailment can affect people of all races, sex, and working age.

The authors hypothesized that workplace productivity loss in patients with CTD-FILD would be associated with dyspnea and cough after adjusting for physiologic ILD severity, age, sex, and smoking pack-years. Because CTD can cause adverse severe clinical manifestations that go well beyond the lungs, the authors also hypothesized that workplace productivity loss would be higher in CTD-FILD compared with non-CTD FILD.

Using the CARE-PF, of 1,285 patients with ILD accrued between 2015 and 2017, 375 (29%) had an adjudicated diagnosis of CTD-FILD. Only 113 (30%) were employed. The rate of employment among patients with CTD-FILD between 25 and 54 years of age and ≥ 55 years of age was 27% and 17% lower than age- and sex-matched rates reported in the general Canadian population, respectively.

Similar to the findings in patients with non-CTD FILD (6), productivity loss in patients with CTD-FILD assessed by the Work Productivity and Activity Impairment (WPAI) questionnaire was reported by 59% of employed patients. The analysis demonstrated a substantially more important role of percent productivity loss, hours lost, and cost resulting from presenteeism (51% or 5.5 ± 0.7 hours lost per week or an average annual cost of 7,876 CAD per patient) compared with that driven by absenteeism (24% or 3.9 ± 0.9 hours lost per week or an average annual cost of 5,717 CAD per patient).

The costs of productivity loss were similar in both men and women and across the three most common CTDs: rheumatoid arthritis, scleroderma, and inflammatory myopathies. After adjustment for age, sex, forced vital capacity, and diffusing capacity of the lung for carbon monoxide, productivity loss was comparable between patients with CTD-FILD and non-CTD

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FILD or IPF (9.4 ± 1.2 versus 7.9 ± 1.5 versus 7.7 ± 1.0 hours lost per week, respectively). Unlike patients with non-CTD FILD, there was no association between workplace productivity loss in patients with CTD-FILD and respiratory symptoms or physiology severity. In a subgroup analysis of patients enrolled at the largest CARE-PF center, ILD and/or CTD was the reason for long-term or permanent disability in 14 of 60 (23%) unemployed patients ≤ 70 years old.

This first report on workplace productivity loss in patients with CTD-FILD from a nationally representative cohort of ILD patients—the CARE-PF—raises the bar for other ongoing patient ILD registries across the globe to also capture workplace productivity data (8). Such data can be used to monitor regional and national trends and patterns of differences in ILD types on worker performance and provide insight on the effect of therapeutic interventions on modifying the costs and drivers of on-the-job productivity loss over time. This could ultimately serve as a springboard for future

prospective cost-effective analyses in the era of coronavirus disease (COVID-19).

The investigators provide pivotal data on the value of screening for workplace productivity loss and job performance in all patients with CTD-ILD, even if the ILD component is not advanced. However, the authors also provide detailed acknowledgment of the limitations of the study. Despite controlling for a variety of extraneous variables, the results of the regression analysis failed to show an association between workplace productivity loss and respiratory symptoms. This may still be subject to unmeasured individual and employment-related confounding by, for example, comorbidity, type and number of employments, and the tenure and wages in these jobs. Another limitation is that the WPAI does not capture data on hidden drivers of productivity loss, such as the role of job insecurity or patient choices to reduce work hours unrelated to illness. Furthermore, the

instrument estimates of absenteeism and presenteeism do not measure the overall CTD impact on different specific aspects of work. Lastly, the cross-sectional data collection from WPAI and other questionnaires limit drawing causal inferences.

The author's findings complement earlier studies on the epidemic cannibalism of presenteeism over absenteeism on workplace productivity (5, 9, 10) and the potential effect of CTD on labor costs to organizations (11, 12). The study underscores that absenteeism and disability costs incompletely gauge the total loss of productivity resulting from CTD-FILD and reminds us about the significance of screening and stopping the detrimental effects of presenteeism on employee patients' well-being and work engagement before it starts. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

References

- Raimundo K, Solomon JJ, Olson AL, Kong AM, Cole AL, Fischer A, et al. Rheumatoid arthritis-interstitial lung disease in the United States: prevalence, incidence, and healthcare costs and mortality. *J Rheumatol* 2019;46:360–369.
- Fernández Pérez ER, Kong AM, Raimundo K, Koelsch TL, Kulkarni R, Cole AL. Epidemiology of hypersensitivity pneumonitis among an insured population in the United States: a claims-based cohort analysis. *Ann Am Thorac Soc* 2018;15:460–469.
- Ferrara G, Arnheim-Dahlström L, Bartley K, Janson C, Kirchgässler KU, Levine A, et al. Epidemiology of pulmonary fibrosis: a cohort study using healthcare data in Sweden. *Pulm Ther* 2019;5:55–68.
- Collaborators GBDChronic Respiratory Disease Collaborators. Prevalence and attributable health burden of chronic respiratory diseases, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet Respir Med* 2020;8:585–596.
- Gosselin E, Lemyre L, Corneil W. Presenteeism and absenteeism: differentiated understanding of related phenomena. *J Occup Health Psychol* 2013;18:75–86.
- Algamdi M, Sadatsafavi M, Fisher JH, Morisset J, Johannson KA, Fell CD, et al. Costs of workplace productivity loss in patients with fibrotic interstitial lung disease. *Chest* 2019;156:887–895.
- Algamdi M, Sadatsafavi M, Fisher JH, Morisset J, Johannson KA, Fell CD, et al. Costs of workplace productivity loss in patients with connective tissue disease-associated interstitial lung disease. *Ann Am Thorac Soc* 2020;17:1077–1084.
- Culver DA, Behr J, Belperio JA, Corte TJ, de Andrade JA, Flaherty KR, et al. Patient registries in idiopathic pulmonary fibrosis. *Am J Respir Crit Care Med* 2019;200:160–167.
- Schultz AB, Edington DW. Employee health and presenteeism: a systematic review. *J Occup Rehabil* 2007;17:547–579.
- Kigozi J, Jowett S, Lewis M, Barton P, Coast J. The estimation and inclusion of presenteeism costs in applied economic evaluation: a systematic review. *Value Health* 2017;20:496–506.
- Zhou Z, Fan Y, Tang W, Liu X, Thomason D, Zhou ZY, et al. Economic burden among commercially insured patients with systemic sclerosis in the United States. *J Rheumatol* 2019;46:920–927.
- Xavier RM, Zerbini CAF, Pollak DF, Morales-Torres JLA, Chalem P, Restrepo JFM, et al. Burden of rheumatoid arthritis on patients' work productivity and quality of life. *Adv Rheumatol* 2019;59:47.

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