

Longitudinal Decline in FEV1 by GOLD Stage in Workers in a Spirometry Surveillance Program.

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Rationale: The natural history of airflow obstruction is unclear, particularly in workplace settings. Few longitudinal cohort studies have compared longitudinal changes in FEV₁ in different GOLD stages. **Methods:** A retrospective longitudinal cohort study of U.S. primary aluminum industry workers enrolled in a spirometry surveillance program was performed. Information regarding age, sex, ethnicity, smoking status, work environment (smelter vs. no smelter), and duration of employment was obtained. Baseline and follow up spirometry data was evaluated over a mean time period of 11.0 years. A multivariate mixed effects model was performed to calculate the annual decline in FEV₁ for each of the GOLD stages. **Results:** 6.0% (232 of 3897) of workers had evidence of obstruction. A mean number of 4.8 spirometries over a mean 11.0 year period were evaluated. Over 85% of workers were Caucasian male, 31% were aluminum smelter workers. More workers with obstruction (88% vs. 58%) had a smoking history (current or ever). The percentage of the 232 workers with obstruction using GOLD staging was as follows: Stage I 44.8%; Stage II 50.4%; Stage III 4.7%. The annual decline in FEV₁ slope was as follows: No obstruction 41.0 ml/yr; Stage I 50.1 ml/yr Stage II 51.0 ml/yr; Stage III 83.8 ml/yr. **Conclusion:** Workers with obstruction had accelerated declines in FEV₁ over time compared to workers with no obstruction at baseline ($p<0.001$). The annual decline of FEV₁ in workers in Stage I and Stage II was similar. Workers with Stage III obstruction at baseline had the largest annual declines in FEV₁.

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