THE EFFECTS OF AIR POLLUTION ON IDIOPATHIC PULMONARY FIBROSIS
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Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive form of interstitial lung disease of unclear etiology. There are few effective therapies and the disease is uniformly fatal. Progression of the disease is classically characterized by episodic periods of rapid clinical decline, termed “acute exacerbations”. These exacerbations result in a decline of lung function, respiratory failure, and even death. The triggers and the pathophysiologic mechanism for these devastating events remain unknown. Past studies in Salt Lake County have shown that particulate pollution is associated with increased respiratory symptoms and decreased lung function in individuals with chronic obstructive pulmonary disease.

The relationship between air pollution and symptoms, quality of life, exacerbations, lung function, and biomarkers of inflammation and oxidative stress remains largely unexplored in patients with IPF and has yet to be studied. Air quality along the Wasatch Front of Utah during winter undergoes dramatic and predictable swings. Temperature inversions lead to multi-day periods of high particulate pollution levels considered unhealthy for sensitive groups by the EPA. These factors make Utah a unique place to investigate the effect of pollutants on IPF.

Our study initiates research investigating the impact of air pollution on IPF. We hypothesize that increased short term levels of indoor and outdoor air pollution will be associated with increased respiratory symptoms, decreased quality of life, and decreased lung function in patients with IPF.

To assess the effects of pollution with IPF, an eight-week study was conducted during winter months on patients living along the Wasatch-front. We measured several important health outcome measures including daily respiratory symptoms, weekly assessment of lung function and quality of life, and biomarkers in serum and exhaled breath condensate. Exposure measurements included indoor and outdoor air pollution exposure. Patients self-administered the EXACT-PRO daily questionnaire to assess daily symptoms for eight weeks and outdoor air pollution measurements were obtained for the Salt Lake valley.

Due to the ongoing nature of the study, the only available health outcome measures available for analysis were patient daily scores and outdoor daily PM$_{2.5}$ means. They were compared and patient daily scores did not follow a common trend with PM$_{2.5}$ daily means. The results were inconclusive, and no correlation between patient daily scores and outdoor PM$_{2.5}$ concentrations were observed.

Through future biomarker assay analysis, we will determine specific pollutants that should be avoided, which may be an effective intervention in slowing progression of IPF. Further analysis of association between respiratory symptom scores and PM$_{2.5}$ exposure using distributed lag model, and personal PM$_{2.5}$ exposure estimated from modelling based on DAQ monitors and home addresses and measured indoor pollution levels will also be conducted.