

The Influence Of Firefighting On Pulmonary Function: A Longitudinal Study Of The First Three Years Of Duty

T. Aldrich¹, **F. Ye**², **M. Dinkels**³, **K. Cosenza**², **C. B. Hall**², **H. W. Cohen**⁴, **M. P. Webber**⁵, **J. Gustave**², **M. D. Weiden**⁵, **K. J. Kelly**², **V. Christodoulou**², **D. J. Prezant**⁶

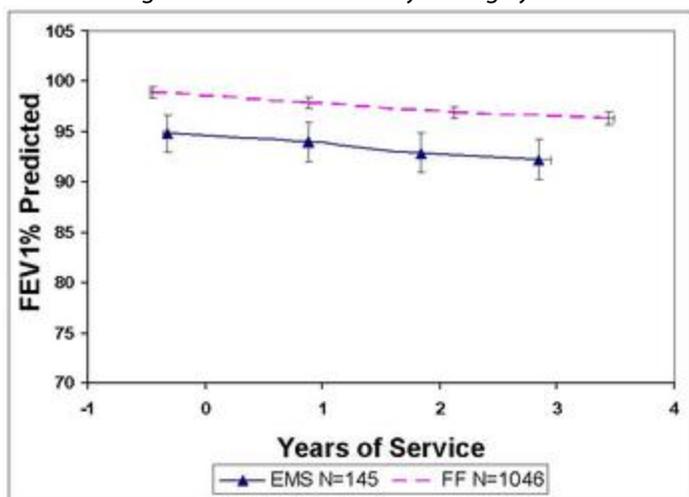
¹Yeshiva University, New York, ²Fire Department of New York City, New York, NY, ³Montefiore Medical Center and Albert Einstein College of Medicine, New York, NY, ⁴Albert Einstein College of Medicine, New York, ⁵New York University Division of Pulmonary and Critical Care, New York, NY, ⁶NYC Fire Department, New York City, NY

Corresponding author's email: taldrich@montefiore.org

RATIONALE: Smoke inhalation has the potential to impair pulmonary function. After short-term exposure, the impairment is largely reversible, but few data are available regarding chronic effects. We explored pulmonary function changes over 3-4 years in a cohort of newly-hired firefighters and Emergency Medical Service (EMS) workers.

METHODS: We examined spirometric data from approximately 6 months pre-hire and over the first 3-4 years post-hire, from all firefighters and EMS workers who had pre-employment spirometries between 1/2003 and 12/2006 and were subsequently hired by FDNY. None had World Trade Center exposure. EMS workers are not routinely exposed to smoke inhalation and served as controls. We focused our analysis on African-American and Caucasian (for whom prediction equations are reliable), male, never-smokers. We calculated percent predicted FEV1 (FEV1%), using NHANES equations.

RESULTS: To date, 1,046 (83.0%) of firefighters and 145 (77.5%) of EMS workers who met our analytic criteria have had at least 3 acceptable post-hire spirometries. Baseline (pre-hire) FEV1% averaged higher for firefighters than EMS workers 98.9; (95% CI 98.3, 99.5) vs. 94.8; (93.0, 96.7) ($p < 0.01$), reflecting more stringent fitness and pulmonary function job entry criteria. FEV1% declined by 0.68; (0.59, 0.78) percentage points/year over 3.89; (3.84, 3.94) years for firefighters and 0.81; (0.45, 1.17) percentage points/year over 3.17; (3.06, 3.27) years for EMS workers ($p = 0.50$) (see figure). The percentage of persons with FEV1 < lower limit of normal (<LLN) was 3.3% for firefighters vs. 9.0% for EMS workers before hire ($p < 0.01$), increasing to 6.6% for firefighters vs. 15.9% for EMS ($p < 0.001$) at the 4th spirometry. The proportions of firefighters and EMS workers who developed abnormal spirometry (<LLN) over the course of the study did not differ significantly ($p = 0.10$). Plot of average FEV1% at each visit by average years of service for EMS and Fire



CONCLUSION: During the first 3 years of duty, firefighters do not show significantly greater longitudinal decline in lung function than is observed among EMS controls. The observed declines in average FEV1% and increases in percentages <LLN in both groups are consistent with regression toward the mean in populations initially selected for relatively good lung function.

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