

Restrictive Disease Excess In Flavoring Manufacturing Workers

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Introduction: Flavoring-exposed workers have risk of bronchiolitis obliterans and fixed obstruction from inhalation of diacetyl used in butter and other flavorings. Whether asthma and restriction are in the spectrum of occupational lung disease in flavor-exposed workers remains unclear.

Methods: A flavoring manufacturing company provided spirometry data on 84 current and 4 former production workers as part of a health hazard evaluation requested by employees. We evaluated spirometry quality, classified abnormal tests as obstructive, restrictive or both; and graded abnormalities as mild to very severe. For 62 workers, we compared serial changes in FEV1 to upper fifth percentiles for FEV1 decline in working populations over six month to ten year periods.

Results: Of the most recent spirometries, 86% had A-C quality showing adequate technique and repeatability. Of 84 current workers, 27 (32%) had abnormal results, of which 25 (30%) had a restrictive pattern (18 mild, 5 moderate, and 2 moderately severe abnormality). One current worker had mild obstruction and another had a very severe mixed pattern of obstruction and restriction. Of 4 former workers, 1 had moderate obstruction and 1 had mild restriction. Of 62 workers with interpretable serial spirometry, 20 (32%) had excessive FEV1 decline on pair-wise comparisons, 12 of whom remained within the normal range of FEV1. Of 7 workers with declines over periods of up to 6 months, declines ranged to 730 ml or 20.3%. Of 15 with declines over longer periods up to 9 years, annual declines ranged to 368 ml/year or 14.7%/year. Of 88 workers with spirometry tests, 47% had abnormal recent spirometry, excessive decline in serial FEV1 results, or both. No clinical evaluations were sought by the company to assess bronchodilator responsiveness of obstructed workers or lung volumes in restricted workers.

Conclusions: The excess of cross-sectional and serial spirometry abnormalities in these flavoring-exposed workers requires follow-up to assess whether occupational exposures, areas, and processes are associated with these abnormalities, as would be expected if occupational causes exist for these high rates of abnormalities. Workers with spirometric abnormalities need systematic clinical evaluation to better define any pulmonary conditions associated with abnormal spirometry or decline.

This abstract is funded by: NIOSH

Am J Respir Crit Care Med 181;2010:A4690

Internet address: www.atsjournals.org

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