Exposure To Polycyclic Aromatic Hydrocarbons In Aluminum Pot Operators Is Associated With Increased Annual Decline In Fev1

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We conducted a ten-year prospective study in aluminum potroom workers (n=4,546) from seven Norwegian plants. The objective of the study was to investigate the association between exposure to dust, fluorides and polycyclic aromatic hydrocarbons (PAH) and annual decline in lung function (dFEV1).
At each annual examination, participants reported their smoking habits and completed spirometry, and the pot operators reported their job according to a predefined classification system. A total of 22,070 spirometric measurements were available for the analyses.
Concurrent with the annual examinations, the seven aluminum plants measured exposure to total dust (n=8,109), total fluorides (n=6,734) and PAH (n=3,524). Interval exposure, i.e. the product of current exposure and time elapsed between two consecutive follow-ups, and cumulative exposure, i.e. the sum of interval exposures were used as indices of exposure to total dust, fluorides and PAH.
During the follow-up the median current exposure to total dust, fluorides and PAH was 1.77 mg/m3, 0.33 mg/m3 and 19.6 µg/m3, respectively. It turned out that the interval exposure between the second last and the fourth last examination regarding PAH, was the strongest determinant for dFEV1. In this time interval the association between dFEV1 and PAH exposure was 8.3 ml/year/(x10 -2µgxyear/m3) in current smokers and 7.1 ml/year/(x10 -2µgxyear/m3) in never smokers ($p<0.0001$ for both).
In conclusion, exposure to PAH in aluminum pot operators was associated with accelerated dFEV1.

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