

PERSONAL EXPOSURE OF PARISIAN OFFICE WORKERS TO BENZENE

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In France, only few data on personal exposure to benzene are available and these measurements were performed prior to the new regulation on benzene concentration in gasoline, in force since January 2000. They were to assess the personal exposures of a randomised sample of 100 non-smoking Paris office workers to benzene and then to identify and quantify their micro-environmental determinants. 24 hour samplings took place between January 2000 and June 2001. Each participant was equipped with two active devices in order to assess total personal exposure over 24 hours and exposure during transportation. In-house and in-office fixed measurements were only performed when the subject was present at these microenvironments. Benzene was collected on a sorbent tube thermally desorbed and analysed by gas chromatography and flame ionization detection. Measurements were supplemented by questionnaires related to residential and occupational environments, mean of transportation used and time activity patterns during the 24 hour sampling period. On average, benzene personal exposure was 4.6 $\mu\text{g.m}^{-3}$ (percentiles 50, 75 and 90 are respectively equal to 3.2, 5.1 and 7.4 $\mu\text{g.m}^{-3}$). Highest levels were observed during transportation (mean 8.6 $\mu\text{g.m}^{-3}$) while in-house and in-office concentrations were respectively equal to 4.1 and 3.5 $\mu\text{g.m}^{-3}$. Linear multiple regressions show that in-house, in-office and in-transit exposures explain 95% of variations in personal exposure to benzene. Finally, in this study, direct and indirect methods to assess personal exposure to benzene are in good agreement; only few measurements show some noticeable differences in relation to atypic situations.