

## **IRON AND STEEL FOUNDRY (Group 1)**

### **A. Evidence for carcinogenicity to humans (*sufficient*)**

Analytical cohort epidemiological studies of foundry workers conducted in a number of countries have typically noted risks of lung cancer elevated between 1.5 and 2.5 fold<sup>1,2</sup>. Proportionate mortality studies have also shown the proportion of deaths from lung cancer

to be 1.5- to 1.8-fold greater than that in the general population. Associations between foundry work and lung cancer have similarly been observed in studies of mortality statistics<sup>1</sup>.

In two studies in which site-specific cancer deaths among iron and steel foundry workers were compared with corresponding rates for the general population, significantly increased risks for cancer of the digestive system were observed; in one, the elevated risk was for cancers in the 'digestive system', in the other, it was for 'stomach cancer'<sup>1</sup>.

Results of studies of a single cohort of steel foundry workers in the USA showed a significantly elevated risk of cancer of the genito-urinary system when compared with the entire steel worker population under study, the risk being significantly elevated also for some specific sites (prostate and kidney)<sup>1</sup>.

Elevated lung cancer risks have also been reported in a grey-iron foundry<sup>2</sup>, in steel foundries<sup>3</sup>, in iron and steel foundries<sup>2</sup> and among persons living near steel foundries<sup>4</sup>. No consistent excess of lung cancer, however, was reported among foundrymen employed in a nickel-chromium alloy foundry<sup>5</sup>. Other cancer excesses reported have included leukaemia, stomach cancer and urogenital cancer<sup>2</sup>. Despite the absence of information to specify definitely the carcinogenic substances in the work environment (e.g., polynuclear aromatic hydrocarbons, silica [see p. 341], metal fumes, formaldehyde [see p. 211]), the consistency of the excess in studies from around the world shows that certain exposures in iron and steel founding can cause lung cancer in humans. Most studies lacked information on smoking, but, when it was available, it did not appear that tobacco use could explain the lung cancer excess.

## B. Other relevant data

Antigenicity against benzo[*a*]pyrene diol epoxide-DNA adducts has been demonstrated in peripheral lymphocytes of foundry workers<sup>5</sup>.

## References

<sup>1</sup>IARC *Monographs*, 34, 133-190, 1984

<sup>2</sup>IARC *Monographs*, 42, 39-143, 1987

<sup>3</sup>Fletcher, A.C. & Ades, A. (1984) Lung cancer mortality in a cohort of English foundry workers. *Scand. J. Work Environ. Health*, 10, 7-16

<sup>4</sup>Lloyd, O.L., Smith, G., Lloyd, M.M., Holland, Y. & Gailey, F. (1985) Raised mortality from lung cancer and high sex ratios of births associated with industrial pollution. *Br. J. ind. Med.*, 42, 475-480

<sup>5</sup>Cornell, R.G. & Landris, J.R. (1984) *Mortality patterns among nickel/chromium alloy foundry workers*. In: Sunderman, F.W., Jr, ed., *Nickel in the Human Environment (IARC Scientific Publications No. 53)*, Lyon, International Agency for Research on Cancer, pp. 87-93

<sup>6</sup>IARC *Monographs, Suppl. 6*, 344, 1987