

Results Exposure to fibres throughout the range of length and diameter was significantly associated with increased risk of lung cancer. The best model fits were obtained for fibres $>5\ \mu\text{m}$ long and $<0.25\ \mu\text{m}$ in diameter. The strongest association with lung cancer was seen for fibres $5\text{--}10\ \mu\text{m}$ long and $<0.25\ \mu\text{m}$ in diameter (excess RR 4% per intraquartile range, $p < 0.001$). When indicators of mean fibre length and diameter were modelled simultaneously, length was positively associated with lung cancer while diameter was negatively associated.

Conclusions Our findings support the hypothesis that long, thin fibres are more carcinogenic than short, wide fibres.

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LONGER, THINNER FIBRES ARE ASSOCIATED WITH INCREASED LUNG CANCER MORTALITY AMONG ASBESTOS TEXTILE WORKERS

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Objectives Animal and limited human data suggest that the carcinogenicity of asbestos fibres may be a function of their size and shape. We investigated the effects of fibre length and diameter on lung cancer risk in a combined cohort of workers at 4 asbestos textile plants in North Carolina (NC) and South Carolina (SC), USA.

Methods The cohort included men and women who worked ≥ 30 days in production departments and were employed between 1.01.1950 and 31.12.1973 in NC or 1.01.1940 and 31.12.1965 in SC and followed through the end of 2003 (2001 for SC). Fibre numbers and dimensions were determined by analysis of 160 historical samples using transmission electron microscopy. Department-specific exposures were estimated using regression models and adjustment factors. Associations of lung cancer with cumulative fibre exposures were estimated by Poisson regression with adjustment for age, sex, race and calendar year.