Cancer Mortality Risks from Long-term Exposure to Ambient Fine Particle

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Abstract

Background: Few studies have assessed long-term effects of particulate matter (PM) with aerodynamic diameter < 2.5 μm (PM$_{2.5}$) on mortality for causes of cancer other than the lung; we assessed the effects on multiple causes. In Hong Kong, most people live and work in urban or suburban areas with high-rise buildings. This facilitates the estimation of PM$_{2.5}$ exposure of
individuals, taking into account the height of residence above ground level for assessment of the long-term health effects with sufficient statistical power.

Methods: We recruited 66,820 persons who were ≥65 in 1998 to 2001 and followed up for mortality outcomes until 2011. Annual concentrations of PM at their residential addresses were estimated using PM$_{2.5}$ concentrations measured at fixed-site monitors, horizontal–vertical locations, and satellite data. We used Cox regression model to assess the HR of mortality for cancer per 10 μg/m$^3$ increase of PM$_{2.5}$.

Results: PM$_{2.5}$ was associated with increased risk of mortality for all causes of cancer [HR, 1.22 (95% CI, 1.11–1.34)] and for specific cause of cancer in upper digestive tract [1.42 (1.06–1.89)], digestive accessory organs [1.35 (1.06–1.71)] in all subjects; breast [1.80 (1.26–2.55)] in females; and lung [1.36 (1.05–1.77)] in males.

Conclusions: Long-term exposures to PM$_{2.5}$ are associated with elevated risks of cancer in various organs.

Impact: This study is particularly timely in China, where compelling evidence is needed to support the pollution control policy to ameliorate the health damages associated with economic growth. Cancer Epidemiol Biomarkers Prev; 25(5); 1–7. ©2016 AACR.

Footnotes

- Note: Supplementary data for this article are available at Cancer Epidemiology, Biomarkers & Prevention Online (http://cebp.aacrjournals.org/).

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