

Supplemental materials

Table S1. Model performance (AIC and BIC) of moving average of black carbon at different time windows on all-cause mortality using extended Cox models (adjusted for age at inception, sex, smoking intensity in cumulative pack-years, deprivation index, marital status, BMI, alcohol use, areas of residence and frequency of fruit and vegetable intake). Variables AIC BIC 3-year average 5-year average 10-year average 15-year average 20-year average

Table S2. Mortality risk (hazard ratio and 95% confidence interval) for moving

Variables	Black carbon	Residuals of black carbon
3-year average	1.09 (1.01, 1.17)	1.08 (1.02, 1.15)
5-year average	1.10 (1.02, 1.18)	1.09 (1.03, 1.17)
10-year average	1.11 (1.04, 1.19)	1.12 (1.05, 1.19)
15-year average	1.13 (1.06, 1.21)	1.15 (1.08, 1.22)

10 average of black carbon at different time windows on all-cause mortality.

Note: Hazard ratios were calculated as per IQR increase for black carbon; Interquartile range (IQR) of 3-year, 5-year, 10-year and 15-year average of BC was 0.70 10⁻⁵/m, 0.74 10⁻⁵/m, 0.79 10⁻⁵/m and 0.83 10⁻⁵/m, respectively; and the corresponding IQR of residuals of BC was 0.45 10⁻⁵/m, 0.46 10⁻⁵/m, 0.49 10⁻⁵/m and 0.53 10⁻⁵/m, respectively. Cox models adjusted for age at inception, sex, smoking intensity in cumulative pack-years, deprivation index, marital status, BMI, alcohol use, areas of residence and frequency of fruit and vegetable intake.

21 **Table S3.** Hazard ratio (95%CI) per IQR increase and quintiles in 20-year moving

22 average of black carbon on all-cause mortality using the cohort data between

23 1989-2014.

Variables	Black carbon	Residual of black carbon
Quintile 1	Ref	Ref
Quintile 2	0.95 (0.84,1.07)	1.21 (1.04,1.42)
Quintile 3	0.86 (0.75, 0.99)	1.24 (1.06,1.45)
Quintile 4	1.15 (1.00,1.33)	1.17 (1.00,1.38)
Quintile 5	1.27 (1.08,1.50)	1.40 (1.18,1.66)
Per IQR	1.19 (1.12,1.28)	1.15 (1.08,1.23)

Note: Interquartile range (IQR) of BC and residuals of BC was 0.89 10⁻⁵/m and 0.59 10⁻⁵/m, respectively. Cox models adjusted for age at inception, sex, smoking intensity in cumulative pack-years, deprivation index, marital status, BMI, alcohol use, areas of residence and frequency of fruit and vegetable intake.

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Figure S1. The dose-response association between residuals of 20-year moving average of black carbon and all-cause mortality using a natural cubic spline with two degrees of freedom. Cox model adjusted for age at inception, sex, smoking intensity in cumulative pack-years, deprivation index, marital status, BMI, alcohol use, areas of residence and frequency of fruit and vegetable intake.



Figure S2. The dose-response association between 20-year moving average of black carbon and cardiovascular mortality using a natural cubic spline with two degrees of freedom. Cox model adjusted for age at inception, sex, smoking intensity in cumulative pack-years, deprivation index, marital status, BMI, alcohol use, areas of residence and frequency of fruit and vegetable intake.

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Figure S3. The dose-response association between residuals of 20-year moving average of black carbon and cardiovascular mortality using a natural cubic spline with two degrees of freedom. Cox model adjusted for age at inception, sex, smoking intensity in cumulative pack-years, deprivation index, marital status, BMI, alcohol use, areas of residence and frequency of fruit and vegetable intake.