

Figure S1: Flow diagram showing the number of exclusions resulting in the final analytical dataset.

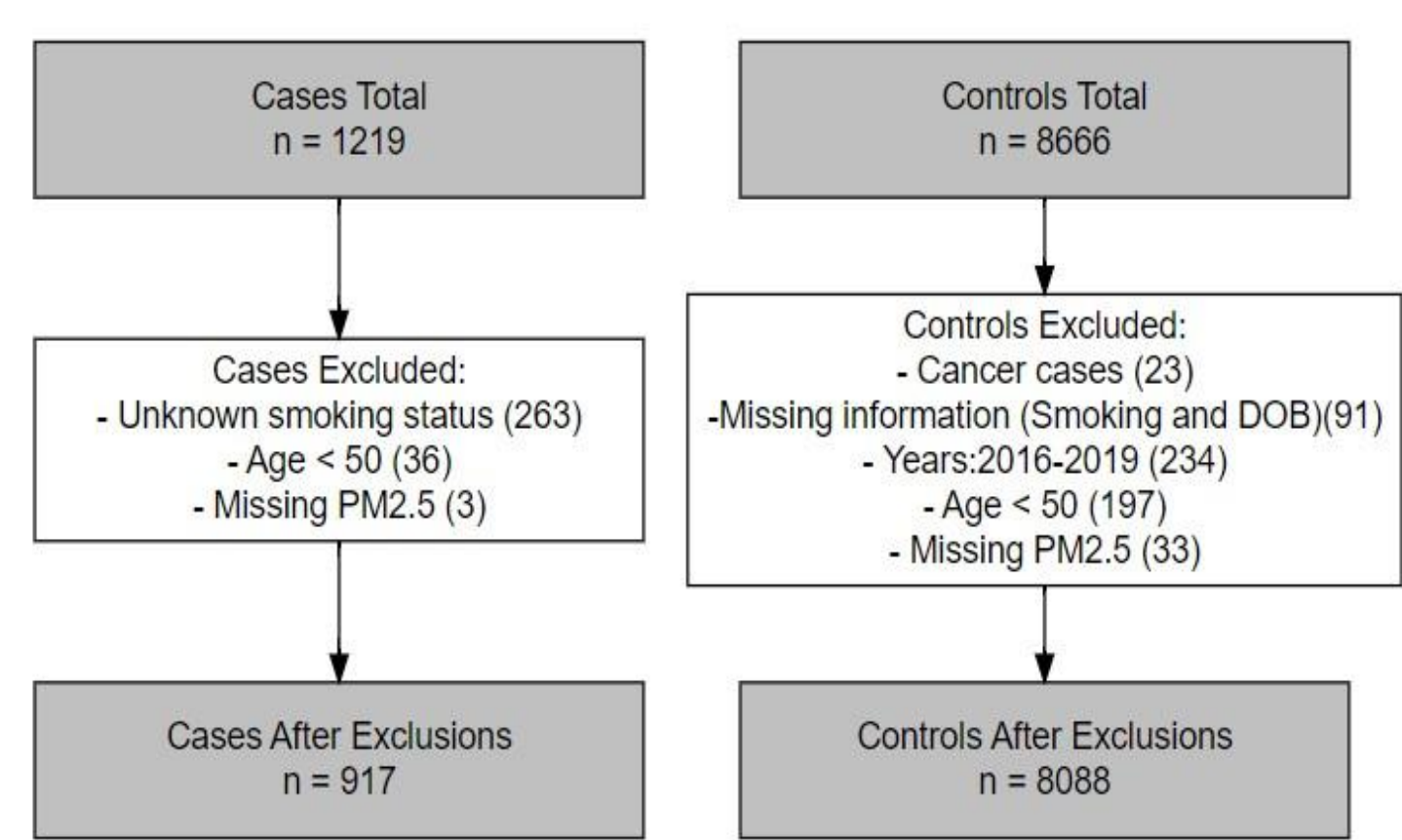


Figure S2: Forest plot showing the association between particulate matter (PM) exposure and the risk of lung cancer in an individually matched analysis by age and sex. This plot presents the ORs and 95% CIs for the association between PM exposure and lung cancer risk, assessed across crude, minimal adjustment, and fully adjusted models.

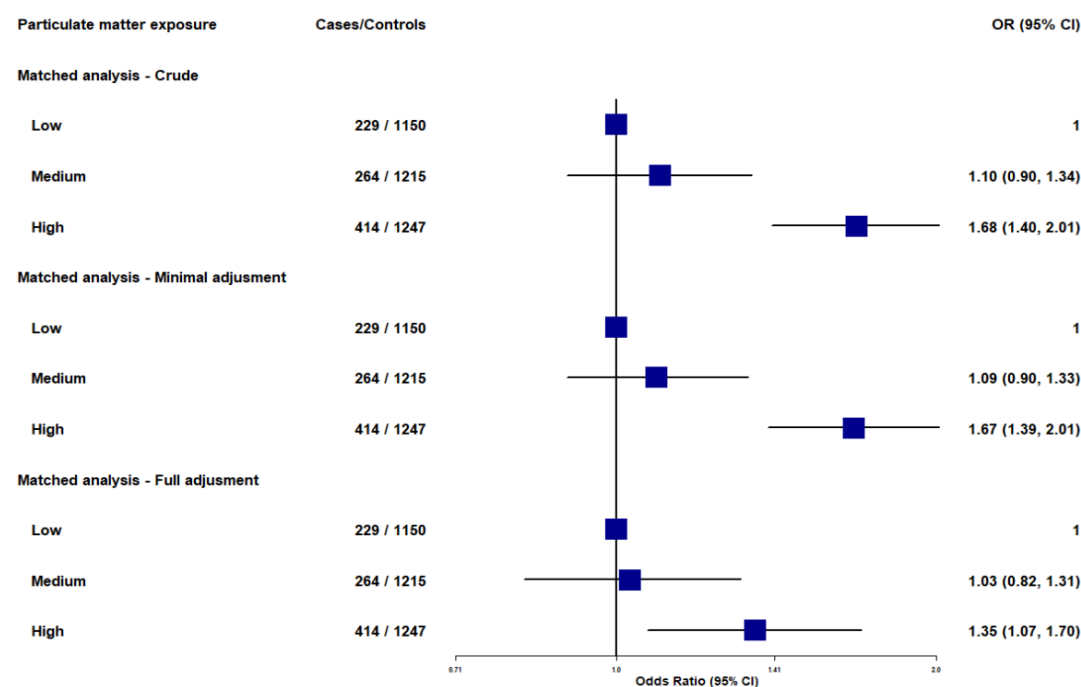


Table S1: To examine the possibility of bias in the context of PM_{2.5} exposure, the representativeness of NICOLA controls used in the present study was assessed by comparing their PM_{2.5} exposure distribution, and mean value, to those of the background Northern Irish population. This was done by expanding the region’s Central Postcode Directory by the number of occupants at each residential postcode and joining postcodes to background PM_{2.5} maps in the same manner described for cases and controls (see *Methods - PM_{2.5} exposure characterisation*). This exercise identified no major bias in PM_{2.5} among the sample of controls relative to the population background, supporting their representative. Controls and the background population shared similar means of 8-year average annual PM_{2.5} – 8.8 and 8.9 µg/m³, respectively, Controls and the background population shared similar means of 8-year average annual PM_{2.5} – 8.8 and 8.9 µg/m³, respectively, compared to 9.4 among lung cancer cases. Furthermore, the crude odds ratio calculated for ‘high’ compared to ‘low’ PM_{2.5} exposure was higher when lung cancer cases were compared to the background population (1.99) instead of NICOLA controls (1.73).

Sample group	8-year average annual PM _{2.5} distribution, <i>n</i> (%)			Mean 8-year average annual PM _{2.5} (µg/m ³)
	Low (<7.42 µg/m ³)	Medium (7.42-9.62 µg/m ³)	High (>9.62 µg/m ³)	
Cases (<i>n</i> =917)	238 (26.0%)	264 (28.9)	415 (45.3)	9.4
Controls (<i>n</i> =8,088)	2,691 (33.3 %)	2,690 (33.3%)	2,707 (33.5%)	8.8
NI background (<i>n</i> =1,587,229)	494,956 (31.2%)	557,948 (35.2%)	534,325 (33.7%)	8.9

Table S2: PM_{2.5} tertiles in controls, overall and by potential confounding factors.

Category	8-year average annual PM _{2.5} , n (%)			p-value (Chi-square test)
	Low (<7.42 µg/m³)	Medium (7.42-9.62 µg/m³)	High (>9.62 µg/m³)	
All	2691 (33.5)	2690 (33.6)	2707 (33.9)	
Age (years) at interview				0.02
50-54	419 (15.6)	455 (16.9)	426 (15.7)	
55-59	500 (18.6)	472 (17.5)	474 (17.5)	
60-64	477 (17.7)	465 (17.3)	420 (15.5)	
65-69	478 (17.8)	426 (15.8)	468 (17.3)	
70-74	368 (13.7)	334 (12.4)	360 (13.3)	
75-79	230 (8.5)	248 (9.2)	251 (9.3)	
80-84	129 (4.8)	181 (6.7)	178 (6.6)	
85-89	63 (2.3)	82 (3.0)	95 (3.5)	
90-94	25 (0.9)	23 (0.9)	31 (1.1)	
95-99	2 (0.1)	4 (0.1)	4 (0.1)	
Sex				0.75
Male	1224 (45.5)	1202 (44.7)	1236 (45.7)	
Female	1467 (54.5)	1488 (55.3)	1471 (54.3)	
Smoking status				<0.001
Current	386 (14.3)	442 (16.4)	522 (19.2)	
Ex-smoker	953 (35.4)	957 (35.6)	911 (33.7)	
Never	1352 (50.2)	1291 (48.0)	1274 (47.1)	
Deprivation class				<0.001
Quintile 1 (Least deprived)	136 (5.1)	790 (29.4)	847 (31.3)	
Quintile 2	660 (24.5)	687 (25.5)	402 (14.6)	
Quintile 3	1101 (40.9)	373 (13.9)	332 (12.3)	
Quintile 4	684 (25.4)	484 (18.0)	401 (14.9)	
Quintile 5 (Most deprived)	110 (4.1)	356 (13.2)	725 (26.8)	