Supplementary Material

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Association between air pollution exposure and mental health service use in dementia: A retrospective cohort study

Contents

Supplementary Methods

Multiple imputation by chained equations. Complete case analyses were conducted on people with dementia without missing covariate data in Model 3 (N=5024). Multiple imputation by chained equations (MICE) was then performed for these missing covariate data within Stata v15.1 ("mi impute chained") for all patients with valid postcode information who resided in the four-borough catchment area, had air pollution data available (N=866 observations dropped), and who were aged ≥65 years at first face-to-face contact (N=304 observations dropped) leading to a sample of 5272. 4.7% (N=248) of the sample had missing covariate data in Model 3. Imputations were performed for all analysis variables with missing values: ethnicity and social fragmentation. For imputations, ethnicity was specified as multinomial using "mlogit", and social fragmentation was specified as continuous using "regress". Variables with no missing values were included in MICE, including quarterly measures of NO_2, $PM_{2.5}$, and PM_{10}, CMHT events at Year 1, 5, and 9, active SLaM days, year of first face-to-face contact, season of first face-to-face contact, age at first face-to-face contact, gender, marital status, number of mental health comorbidities, Index of Multiple Deprivation (IMD), and population density. We imputed 5 datasets using a random seed of 1234. There were 66 values and 185 values imputed for ethnicity and social fragmentation, respectively.

Population attributable fractions. Population attributable fractions (PAFs) were calculated using formulae detailed in Braithwaite et al. (2019) [1] for two separate exposure scenarios – London, and UK urban traffic areas. We assumed causality and a log-linear exposure-response function (i.e. that relative risk remains constant per unit increase in exposure at all concentrations) [2]. We estimated PAFs by assuming 100% exposure prevalence at a population-weighted annual mean of $PM_{2.5}$ and NO_2 exposure levels for London (2019) [3] and UK urban traffic areas (2021) [4]. The counterfactual scenarios we used were the World Health Organisation's (WHO) recommended limit for annual mean $PM_{2.5}$ (5μg/m^3) and NO_2 (10μg/m^3) [5]. As strongest associations were observed between air pollution and CMHT events at Year 1, we used fully adjusted data (model 3) from this timepoint to calculate PAFs. We selected $PM_{2.5}$ and NO_2 as these were most consistently associated with CMHT events at all timepoints.

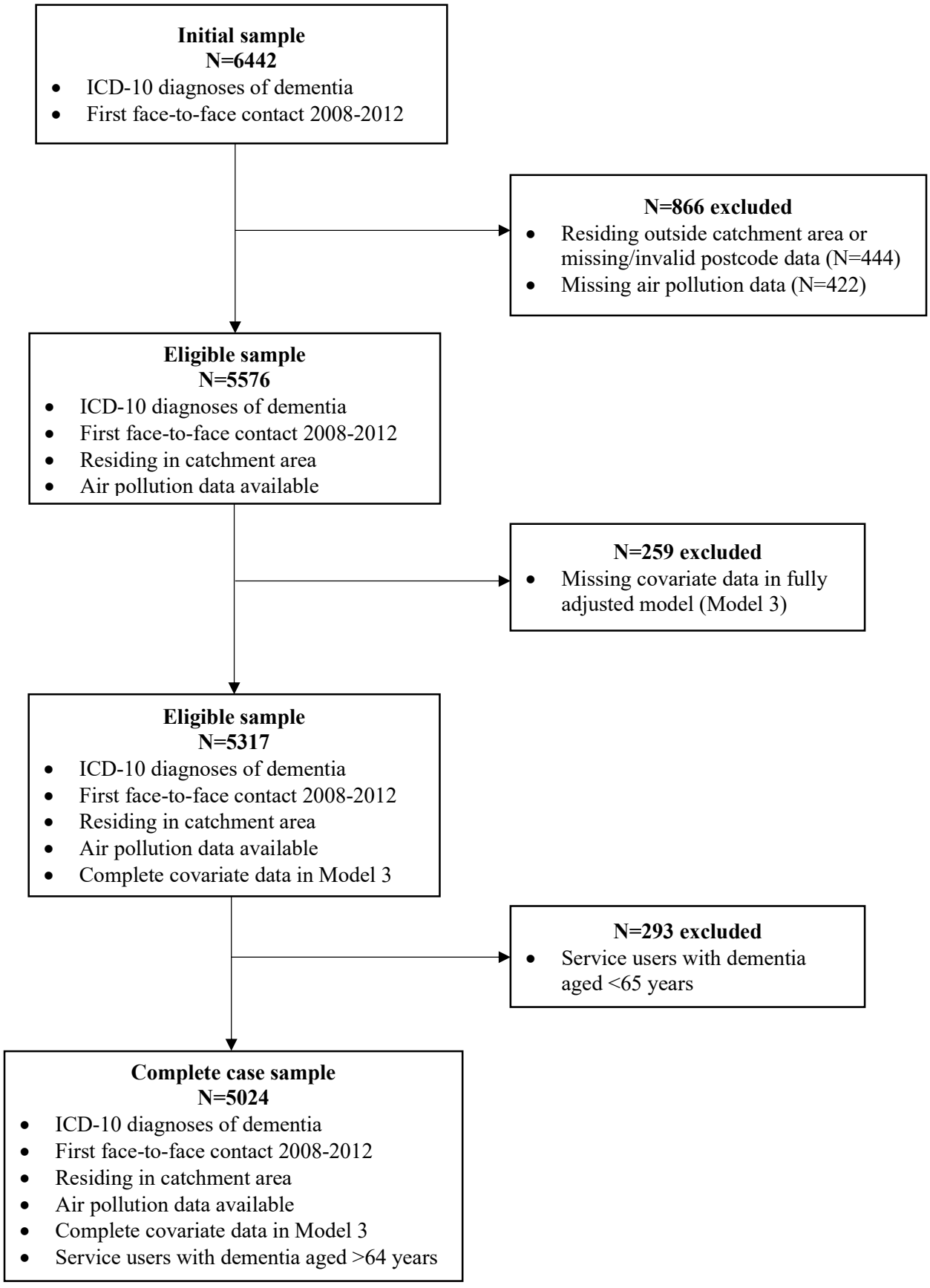

Figure S1. Sample selection flowchart

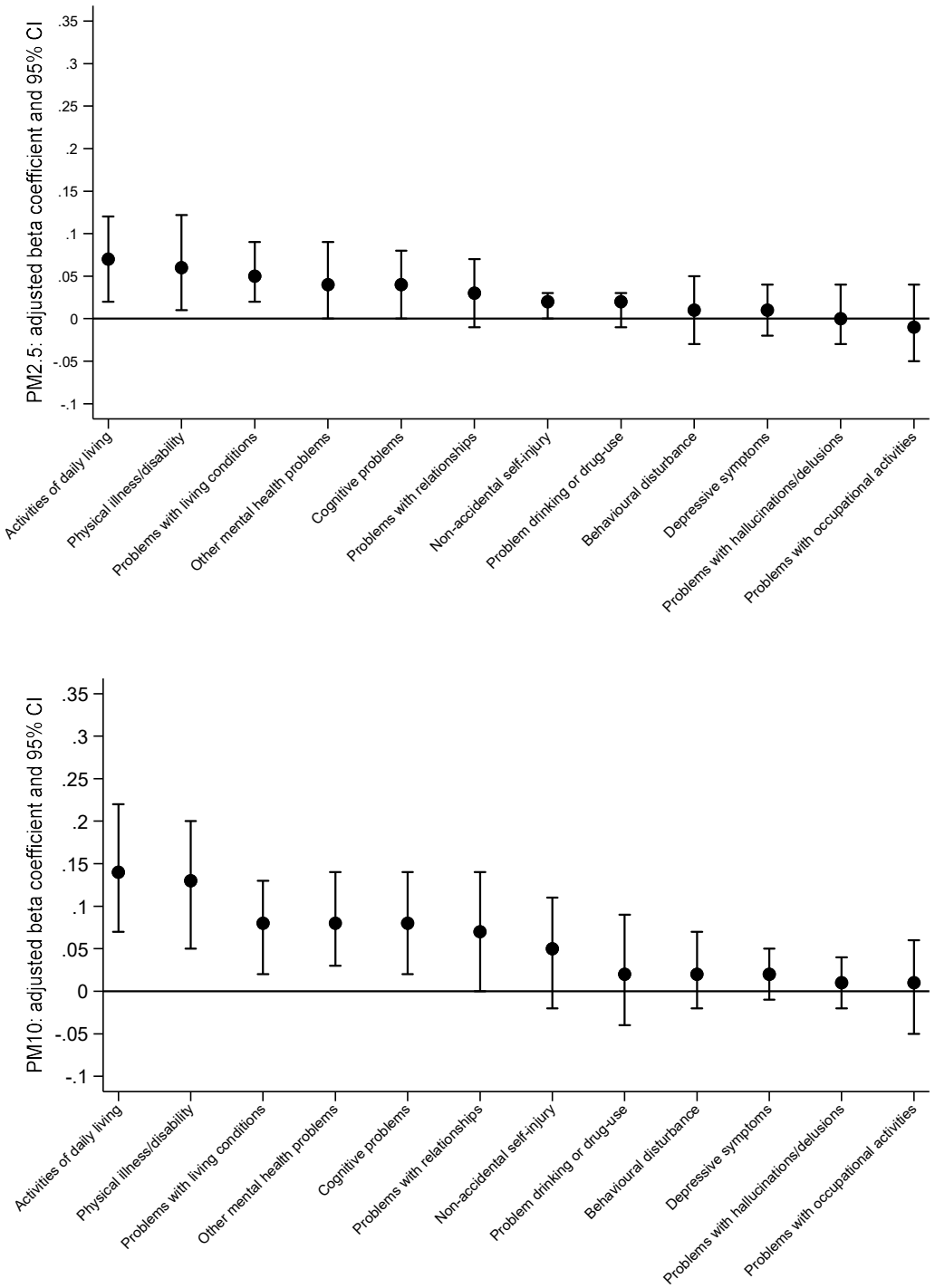

Figure S2. Adjusted beta coefficients and their corresponding 95% confidence intervals (CI) from logistic regressions examining associations between $PM_{2.5}$ (upper panel) and PM_{10} (lower panel) exposure and scores on individual HoNOS65+ subscales within 12 months of first face-to-face contact with SLaM services. All models are adjusted for season, year, age, sex, ethnicity, marital status, number of comorbid mental health conditions, neighbourhood deprivation, social fragmentation, and population density.

Table S1. Associations between air pollution and CMHT events at 1-, 5-, and 9-years in patients with dementia (N=5024)						
1-year follow-up						
	Model 1		Model 2		Model 3	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2						
1	Reference		Reference		Reference	
2	1.18 (1.10 to 1.28)	<0.001	1.18 (1.09 to 1.27)	<0.001	1.09 (1.01 to 1.18)	0.030
3	1.34 (1.21 to 1.48)	<0.001	1.31 (1.19 to 1.45)	<0.001	1.15 (1.03 to 1.29)	0.010
4	1.61 (1.44 to 1.80)	<0.001	1.53 (1.37 to 1.71)	<0.001	1.27 (1.11 to 1.45)	0.001
NO_2 (IQR)	*1.35 (1.27 to 1.44)*	*<0.001*	*1.31 (1.23 to 1.40)*	*<0.001*	*1.18 (1.09 to 1.28)*	*<0.001*
$PM_{2.5}$						
1	Reference		Reference		Reference	
2	1.15 (1.04 to 1.28)	0.007	1.13 (1.02 to 1.25)	0.020	1.07 (0.97 to 1.19)	0.177
3	1.27 (1.12 to 1.43)	<0.001	1.26 (1.12 to 1.42)	<0.001	1.14 (1.01 to 1.29)	0.032
4	1.54 (1.35 to 1.77)	<0.001	1.50 (1.31 to 1.72)	<0.001	1.33 (1.16 to 1.53)	<0.001
$PM_{2.5}$ (IQR)	*1.16 (1.11 to 1.21)*	*<0.001*	*1.15 (1.10 to 1.20)*	*<0.001*	*1.11 (1.06 to 1.16)*	*<0.001*
PM_{10}						
1	Reference		Reference		Reference	
2	1.07 (0.98 to 1.17)	0.123	1.04 (0.96 to 1.14)	0.305	1.01 (0.93 to 1.10)	0.773
3	1.22 (1.09 to 1.36)	<0.001	1.18 (1.06 to 1.32)	0.002	1.09 (0.98 to 1.22)	0.115
4	1.49 (1.32 to 1.69)	<0.001	1.43 (1.26 to 1.61)	<0.001	1.26 (1.10 to 1.43)	<0.001
PM_{10} (IQR)	*1.25 (1.17 to 1.33)*	*<0.001*	*1.22 (1.15 to 1.30)*	*<0.001*	*1.15 (1.07 to 1.22)*	*<0.001*
5-year follow-up						
	Model 1		Model 2		Model 3	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2						
1	Reference		Reference		Reference	
2	1.12 (1.01 to 1.24)	0.030	1.10 (1.00 to 1.22)	0.060	1.01 (0.91 to 1.13)	0.781
3	1.67 (1.45 to 1.91)	<0.001	1.55 (1.35 to 1.77)	<0.001	1.35 (1.16 to 1.57)	<0.001
4	1.85 (1.59 to 2.16)	<0.001	1.63 (1.40 to 1.90)	<0.001	1.34 (1.12 to 1.60)	0.001
NO_2 (IQR)	*1.34 (1.26 to 1.42)*	*<0.001*	*1.30 (1.22 to 1.38)*	*<0.001*	*1.18 (1.10 to 1.28)*	*<0.001*
$PM_{2.5}$						
1	Reference		Reference		Reference	
2	1.28 (1.11 to 1.47)	0.001	1.25 (1.08 to 1.43)	0.002	1.17 (1.02 to 1.35)	0.025
3	1.46 (1.24 to 1.73)	<0.001	1.46 (1.24 to 1.71)	<0.001	1.30 (1.10 to 1.54)	0.002
4	1.80 (1.50 to 2.17)	<0.001	1.66 (1.38 to 2.00)	<0.001	1.45 (1.20 to 1.75)	<0.001
$PM_{2.5}$ (IQR)	*1.14 (1.10 to 1.19)*	*<0.001*	*1.13 (1.08 to 1.17)*	*<0.001*	*1.09 (1.05 to 1.14)*	*<0.001*
PM_{10}						
1	Reference		Reference		Reference	
2	1.02 (0.91 to 1.15)	0.676	0.96 (0.86 to 1.08)	0.506	0.95 (0.84 to 1.06)	0.366
3	1.36 (1.16 to 1.59)	<0.001	1.23 (1.06 to 1.43)	0.007	1.15 (0.98 to 1.34)	0.080
4	1.56 (1.31 to 1.85)	<0.001	1.36 (1.15 to 1.61)	<0.001	1.20 (1.01 to 1.43)	0.036
PM_{10} (IQR)	*1.24 (1.17 to 1.32)*	*<0.001*	*1.21 (1.14 to 1.29)*	*<0.001*	*1.14 (1.07 to 1.21)*	*<0.001*
9-year follow-up						
	Model 1		Model 2		Model 3	

	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2						
1	Reference		Reference		Reference	
2	1.05 (0.94 to 1.18)	0.386	1.05 (0.94 to 1.17)	0.419	0.95 (0.85 to 1.07)	0.422
3	1.63 (1.40 to 1.89)	<0.001	1.49 (1.29 to 1.73)	<0.001	1.27 (1.08 to 1.49)	0.003
4	1.86 (1.57 to 2020)	<0.001	1.56 (1.32 to 1.84)	<0.001	1.24 (1.03 to 1.51)	0.026
NO_2 (IQR)	*1.33 (1.26 to 1.42)*	*<0.001*	*1.29 (1.22 to 1.37)*	*<0.001*	*1.18 (1.10 to 1.27)*	*<0.001*
$PM_{2.5}$						
1	Reference		Reference		Reference	
2	1.15 (0.98 to 1.35)	0.086	1.17 (1.01 to 1.37)	0.042	1.11 (0.95 to 1.30)	0.176
3	1.41 (1.17 to 1.70)	<0.001	1.45 (1.21 to 1.73)	<0.001	1.30 (1.08 to 1.56)	0.005
4	1.78 (1.45 to 2.19)	<0.001	1.67 (1.37 to 2.04)	<0.001	1.46 (1.19 to 1.80)	<0.001
$PM_{2.5}$ (IQR)	*1.14 (1.10 to 1.19)*	*<0.001*	*1.13 (1.08 to 1.17)*	*<0.001*	*1.09 (1.05 to 1.14)*	*<0.001*
PM_{10}						
1	Reference		Reference		Reference	
2	1.02 (0.89 to 1.16)	0.801	0.93 (0.82 to 1.05)	0.237	0.91 (0.80 to 1.03)	0.139
3	1.44 (1.21 to 1.71)	<0.001	1.22 (1.04 to 1.45)	0.016	1.14 (0.96 to 1.35)	0.128
4	1.68 (1.39 to 2.04)	<0.001	1.34 (1.12 to 1.61)	0.001	1.18 (0.98 to 1.42)	0.081
PM_{10} (IQR)	*1.24 (1.17 to 1.32)*	*<0.001*	*1.21 (1.14 to 1.28)*	*<0.001*	*1.14 (1.07 to 1.21)*	*<0.001*

CI=confidence interval; CMHT=community mental health team; IQR=interquartile range; IRR=incident risk ratio; NO_2, nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5μm; PM_{10}=particulate matter <10μm
Model 1: Season and year
Model 2: Model 1 + age, gender, ethnicity, marital status, comorbid mental health conditions
Model 3: Model 2 + neighbourhood deprivation, population density, social fragmentation

Table S2a. Fully adjusted (model 3) associations between $PM_{2.5}$ and CMHT events with E-values at Year 1, 5, and 9												
	Year 1				**Year 5**				**Year 9**			
	IRR (95% CI)	*p value*	*E-value*	*Lower CI limit**	*IRR (95% CI)*	*p value*	*E-value*	*Lower CI limit**	*IRR (95% CI)*	*p value*	*E-value*	*Lower CI limit**
$PM_{2.5}$												
Q1	Reference				Reference				Reference			
Q2	1.07 (0.97 to 1.19)	0.177	1.34	1.00	1.17 (1.02 to 1.35)	0.025	1.62	1.16	1.11 (0.95 to 1.30)	0.176	1.46	1.00
Q3	1.14 (1.01 to 1.29)	0.032	1.54	1.11	1.30 (1.10 to 1.54)	0.002	1.92	1.43	1.30 (1.08 to 1.56)	0.005	1.92	1.37
Q4	1.33 (1.16 to 1.53)	<0.001	1.99	1.59	1.45 (1.20 to 1.75)	<0.001	2.26	1.69	1.46 (1.19 to 1.80)	<0.001	2.28	1.66
$PM_{2.5\ (IQR)}$	*1.11 (1.06 to 1.16)*	*<0.001*	1.46	1.31	*1.09 (1.05 to 1.14)*	*<0.001*	1.40	1.28	*1.09 (1.05 to 1.14)*	*<0.001*	1.40	1.28
Start year												
2008	Reference				Reference				Reference			
2009	0.91 (0.84 to 0.99)	0.021			0.95 (0.88 to 1.03)	0.237			0.98 (0.91 to 1.05)	0.577		
2010	0.98 (0.90 to 1.06)	0.579			1.00 (0.93 to 1.08)	0.901			1.02 (0.95 to 1.10)	0.508		
2011	0.84 (0.78 to 0.92)	<0.001			0.86 (0.79 to 0.93)	<0.001			0.89 (0.82 to 0.96)	0.003		
2012	0.76 (0.70 to 0.83)	<0.001			0.82 (0.76 to 0.88)	<0.001			0.87 (0.81 to 0.94)	<0.001		
Season												
Winter	Reference				Reference				Reference			
Spring	1.15 (1.05 to 1.26)	0.003			1.17 (1.07 to 1.27)	<0.001			1.16 (1.07 to 1.27)	<0.001		
Summer	1.39 (1.22 to 1.58)	<0.001			1.34 (1.19 to 1.52)	<0.001			1.33 (1.18 to 1.50)	<0.001		
Autumn	1.13 (1.03 to 1.25)	0.012			1.11 (1.01 to 1.22)	0.025			1.09 (1.00 to 1.20)	0.060		
Age	1.01 (1.00 to 1.01)	0.001			0.98 (0.98 to 0.99)	<0.001			0.96 (0.96 to 0.97)	<0.001		
Sex	0.89 (0.84 to 0.94)	<0.001			0.93 (0.86 to 1.00)	0.043			0.86 (0.79 to 0.93)	<0.001		
Ethnicity												
White	Reference				Reference				Reference			
Mixed	0.90 (0.64 to 1.27)	0.555			0.60 (0.52 to 0.69)	<0.001			0.60 (0.52 to 0.69)	<0.001		
Asian	0.70 (0.63 to 0.78)	<0.001			0.90 (0.81 to 0.99)	0.038			0.90 (0.81 to 0.99)	0.038		
Black	0.93 (0.87 to 1.00)	0.063			0.57 (0.43 to 0.75)	<0.001			0.57 (0.43 to 0.75)	<0.001		

Other	0.73 (0.59 to 0.91)	0.005			0.82 (0.36 to 1.85)	0.637			0.82 (0.36 to 1.85)	0.637		
Marital status												
Married/cohabiting	Reference				Reference				Reference			
Divorced/separated	1.13 (1.02 to 1.27)	0.022			1.36 (1.17 to 1.59)	<0.001			0.87 (0.56 to 1.38)	0.568		
Widowed	1.16 (0.98 to 1.38)	0.081			1.13 (0.90 to 1.42)	0.298			1.36 (1.17 to 1.59)	<0.001		
Single	1.11 (1.04 to 1.18)	0.001			1.09 (1.00 to 1.18)	0.052			1.13 (0.90 to 1.42)	0.298		
Not disclosed	1.21 (1.12 to 1.31)	<0.0011			1.34 (1.20 to 1.50)	<0.001			1.09 (1.00 to 1.18)	0.052		
Mental health comorbidities	1.38 (1.29 to 1.48)	<0.00			1.91 (1.72 to 2.11)	<0.001			1.91 (1.72 to 2.11)	<0.001		
Neighbourhood deprivation												
1	Reference				Reference				Reference			
2	1.00 (0.92 to 1.09)	0.958			1.20 (1.07 to.1.36)	0.002			1.20 (1.07 to 1.36)	0.002		
3	1.13 (1.02 to 1.25)	0.013			1.23 (1.08 to 1.40)	0.002			1.23 (1.08 to 1.40)	0.002		
4	1.17 (1.06 to 1.29)	0.001			1.26 (1.11 to 1.43)	<0.001			1.26 (1.11 to 1.43)	<0.001		
5	1.18 (1.07 to 1.30)	0.001			1.41 (1.24 to 1.60)	<0.001			1.41 (1.24 to 1.60)	<0.001		
Population density	1.00 (1.00 to 1.00)	0.748			1.00 (1.00 to 1.00)	0.002			1.00 (1.00 to 1.00)	0.002		
Social fragmentation	1.02 (1.01 to 1.04)	0.005			0.98 (0.97 to 1.01)	0.165			0.98 (0.97 to 1.01)	0.165		

*E-values do not include p-values but the lower CI is above 1 (i.e., robust)
CI=confidence interval; CMHT=community mental health teams; IQR=interquartile range; IRR: Incidence rate ratio; PM=particulate matter

Table S2b. Fully adjusted (model 3) associations between PM_{10} and CMHT events with E-values at Year 1, 5, and 9

	Year 1				**Year 5**				**Year 9**			
	IRR (95% CI)	*p value*	*E-value*	*Lower CI limit**	*IRR (95% CI)*	*p value*	*E-value*	*Lower CI limit**	*IRR (95% CI)*	*p value*	*E-value*	*Lower CI limit**
PM_{10}												
Q1	Reference				Reference				Reference			
Q2	1.01 (0.93 to 1.10)	0.773	1.11	1.00	0.95 (0.84 to 1.06)	0.366	1.29	1.00	0.91 (0.80 to 1.03)	0.139	1.43	1.00
Q3	1.09 (0.98 to 1.22)	0.115	1.40	1.00	1.15 (0.98 to 1.34)	0.080	1.56	1.00	1.14 (0.96 to 1.35)	0.128	1.54	1.00
Q4	1.26 (1.10 to 1.43)	<0.001	1.83	1.43	1.20 (1.01 to 1.43)	0.036	1.69	1.11	1.18 (0.98 to 1.42)	0.081	1.64	1.00
$PM_{10\ (IQR)}$	*1.15 (1.07 to 1.22)*	*<0.001*	1.56	1.34	*1.14 (1.07 to 1.21)*	*<0.001*	1.54	1.34	*1.14 (1.07 to 1.21)*	*<0.001*	1.54	1.34
Start year												
2008	Reference				Reference				Reference			
2009	0.91 (0.84 to 0.99)	0.028			0.96 (0.88 to 1.03)	0.258			0.98 (0.91 to 1.06)	0.615		
2010	1.03 (0.95 to 1.13)	0.438			1.06 (0.98 to 1.15)	0.157			1.08 (1.00 to 1.17)	0.049		
2011	0.97 (0.89 to 1.05)	0.478			0.97 (0.90 to 1.05)	0.535			1.00 (0.93 to 1.08)	0.912		
2012	0.83 (0.77 to 0.90)	<0.001			0.88 (0.82 to 0.96)	0.002			0.94 (0.87 to 1.02)	0.155		
Season												
Winter	Reference				Reference				Reference			
Spring	1.11 (1.02 to 1.22)	0.017			1.16 (1.06 to 1.26)	0.001			1.15 (1.05 to 1.25)	0.001		
Summer	1.31 (1.16 to 1.49)	<0.001			1.31 (1.16 to 1.47)	<0.001			1.29 (1.15 to 1.45)	<0.001		
Autumn	1.11 (1.00 to 1.22)	0.045			1.10 (1.00 to 1.21)	0.039			1.08 (0.99 to 1.19)	0.091		
Age	1.01 (1.00 to 1.01)	0.003			0.98 (0.98 to 0.99)	<0.001			0.96 (0.96 to 0.97)	<0.001		
Sex	0.89 (0.84 to 0.94)	<0.001			0.93 (0.86 to 1.00)	0.056			0.86 (0.80 to 0.94)	<0.001		
Ethnicity												
White	Reference				Reference				Reference			
Mixed	0.91 (0.65 to 1.29)	0.615			0.60 (0.51 to 0.69)	<0.001			0.56 (0.47 to 0.65)	<0.001		
Asian	0.70 (0.62 to 0.78)	<0.001			0.90 (0.81 to 1.00)	0.045			0.85 (0.76 to 0.94)	0.003		
Black	0.93 (0.87 to 1.00)	0.068			0.57 (0.43 to 0.75)	<0.001			0.99 (0.70 to 1.39)	0.948		

Other	0.73 (0.59 to 0.90)	0.004			0.81 (0.36 to 1.82)	0.612			0.84 (0.35 to 1.98)	0.689		
Marital status												
Married/cohabiting	Reference				Reference				Reference			
Divorced/separated	1.14 (1.02 to 1.27)	0.021			1.38 (1.18 to 1.61)	<0.001			1.02 (0.63 to 1.65)	0.945		
Widowed	1.17 (0.98 to 1.38)	0.076			1.13 (0.90 to 1.42)	0.302			1.45 (1.23 to 1.71)	<0.001		
Single	1.11 (1.04 to 1.18)	0.002			1.08 (0.99 to 1.18)	0.067			1.11 (0.86 to 1.43)	0.412		
Not disclosed	1.21 (.111 to 1.31)	<0.001			1.33 (1.19 to 1.49)	<0.001			1.24 (1.13 to 1.36)	<0.001		
Mental health comorbidities	1.38 (1.29 to 1.48)	<0.001			1.89 (1.71 to 2.09)	<0.001			1.50 (1.33 to 1.69)	<0.001		
Neighbourhood deprivation												
1	Reference				Reference				Reference			
2	1.00 (0.92 to 1.09)	0.961			1.19 (1.06 to 1.34)	0.004			1.19 (1.04 to 1.35)	0.010		
3	1.13 (1.03 to 1.25)	0.013			1.23 (1.08 to 1.40)	0.002			1.09 (0.95 to 1.25)	0.232		
4	1.17 (1.06 to 1.28)	0.002			1.25 (1.10 to 1.42)	0.001			1.09 (0.95 to 1.26)	0.204		
5	1.18 (1.07 to 1.29)	0.0011			1.41 (1.24 to 1.60)	<0.001			1.34 (1.16 to 1.54)	<0.001		
Population density	1.00 (1.00 to 1.00)	0.759			1.00 (1.00 to 1.00)	0.001			1.00 (0.98 to 1.03)	0.005		
Social fragmentation	1.02 (1.01 to 1.04)	0.006			0.99 (0.97 to 1.01)	0.211			1.00 (0.98 to 1.03)	0.731		

*E-values do not include p-values but the lower CI is above 1 (i.e., robust)

CI=confidence interval; CMHT=Community mental health teams; IQR=interquartile range; IRR: Incidence rate ratio; PM=particulate matter

Table S2c. Fully adjusted (model 3) associations between NO_2 and CMHT events with E-values at Year 1, 5, and 9												
	Year 1				**Year 5**				**Year 9**			
	IRR (95% CI)	*p value*	*E-value*	*Lower CI limit**	*IRR (95% CI)*	*p value*	*E-value*	*Lower CI limit**	*IRR (95% CI)*	*p value*	*E-value*	*Lower CI limit**
NO_2												
Q1	Reference				Reference				Reference			
Q2	1.09 (1.01 to 1.18)	0.030	1.40	1.11	1.01 (0.91 to 1.13)	0.781	1.11	1.00	0.95 (0.85 to 1.07)	0.422	1.29	1.00
Q3	1.15 (1.03 to 1.29)	0.010	1.57	1.21	1.35 (1.16 to 1.57)	<0.001	2.04	1.59	1.27 (1.08 to 1.49)	0.003	1.86	1.37
Q4	1.27 (1.11 to 1.45)	0.001	1.86	1.46	1.34 (1.12 to 1.60)	0.001	2.01	1.49	1.24 (1.03 to 1.51)	0.026	1.79	1.21
$NO_{2\ (IQR)}$	*1.18 (1.09 to 1.28)*	*<0.001*	1.64	1.40	*1.18 (1.10 to 1.28)*	*<0.001*	1.64	1.43	*1.18 (1.10 to 1.27)*	*<0.001*	1.64	1.43
Start year												
2008	Reference				Reference				Reference			
2009	0.91 (0.84 to 0.98)	0.018			0.95 (0.88 to 1.02)	0.182			0.97 (0.90 to 1.05)	0.473		
2010	0.98 (0.91 to 1.06)	0.680			1.01 (0.94 to 1.09)	0.741			1.03 (0.96 to 1.11)	0.385		
2011	0.97 (0.89 to 1.05)	0.401			0.97 (0.90 to 1.05)	0.505			1.00 (0.93 to 1.08)	0.955		
2012	0.81 (0.75 to 0.87)	<0.001			0.86 (0.80 to 0.93)	<0.001			0.92 (0.85 to 0.99)	0.032		
Season												
Winter	Reference				Reference				Reference			
Spring	1.16 (1.05 to 1.29)	0.004			1.21 (1.10 to 1.33)	<0.001			1.20 (1.09 to 1.32)	<0.001		
Summer	1.27 (1.14 to 1.41)	<0.001			1.27 (1.15 to 1.41)	<0.001			1.25 (1.13 to 1.39)	<0.001		
Autumn	0.97 (0.90 to 1.04)	0.369			0.97 (0.91 to 1.04)	0.412			0.95 (0.89 to 1.01)	0.134		
Age	1.01 (1.00 to 1.01)	0.004			0.98 (0.97 to 0.98)	<0.001			0.96 (0.96 to 0.97)	<0.001		
Sex	0.89 (0.85 to 0.94)	<0.001			0.93 (0.86 to 1.00)	0.063			0.87 (0.80 to 0.94)	0.001		
Ethnicity												
White	Reference				Reference				Reference			
Mixed	0.93 (0.65 to 1.31)	0.666			0.60 (0.52 to 0.69)	<0.001			0.56 (0.48 to 0.66)	<0.001		
Asian	0.70 (0.62 to 0.78)	<0.001			0.89 (0.81 to 0.99)	0.034			0.84 (0.75 to 0.94)	0.003		
Black	0.93 (0.86 to 1.00)	0.050			0.56 (0.42 to 0.74)	<0.001			0.96 (0.68 to 1.36)	0.825		

Other	0.72 (0.58 to 0.90)	0.003			0.83 (0.37 to 1.86)	0.647			0.87 (0.37 to 2.04)	0.743		
Marital status												
Married/cohabiting	Reference				Reference				Reference			
Divorced/separated	0.79 (0.55 to 1.14)	0.213			0.89 (0.56 to 1.40)	0.616			1.09 (0.67 to 1.7)	0.723		
Widowed	1.14 (1.02 to 1.27)	0.017			1.37 (1.18 to 1.60)	<0.001			1.43 (1.21 to 1.69)	<0.001		
Single	1.17 (0.98 to 1.38)	0.074			1.11 (0.89 to 1.40)	0.350			1.09 (0.85 to 1.40)	0.481		
Not disclosed	1.11 (1.04 to 1.18)	0.001			1.08 (0.99 to 1.18)	0.062			1.24 (1.13 to 1.36)	<0.001		
Mental health comorbidities	1.37 (1.28 to 1.47)	<0.001			1.87 (1.69 to 2.07)	<0.001			1.51 (1.34 to 1.71)	<0.001		
Neighbourhood deprivation												
1	Reference				Reference				Reference			
2	1.00 (0.92 to 1.10)	0.926			1.22 (1.08 to 1.37)	0.001			1.20 (1.06 to 1.37)	0.005		
3	1.12 (1.02 to 1.24)	0.017			1.25 (1.09 to 1.42)	0.001			1.11 (0.96 to 1.28)	0.154		
4	1.16 (1.06 to 1.28)	0.002			1.28 (1.12 to 1.45)	<0.001			1.12 (0.97 to 1.28)	0.121		
5	1.17 (1.06 to 1.29)	0.001			1.42 (1.24 to 1.61)	<0.001			1.36 (1.18 to 1.56)	<0.001		
Population density	1.00 (1.00 to 1.01)	0.976			1.00 (1.00 to 1.00)	0.008			1.00 (1.00 to 1.00)	0.019		
Social fragmentation	1.02 (1.00 to 1.03)	0.031			0.98 (0.96 to 1.00)	0.081			1.00 (0.98 to 1.02)	0.950		

*E-values do not include p-values but the lower CI is above 1 (i.e., robust)

CI=confidence interval; CMHT=Community mental health teams; IQR=interquartile range; IRR: Incidence rate ratio; NO_2=nitrogen dioxide

Table S3. Population attributable fractions (PAF) and relative risk calculations associated with current versus counterfactual air pollution exposure

Association of air pollutant with CMHT events			**Scenario: London**				**Scenario: all UK urban traffic areas**			
			Mean population weighted exposure (µg/m^3) in 2019				Mean urban traffic (µg/m^3) in 2021			
	Study levels (2008-2012)	RR (95% CI)	Current[a]	Counterfactual[b]	RR (95% CI)[c]	PAF (%)[d] (95% CI)	Current[a]	Counterfactual[b]	RR (95% CI)[c]	PAF (%)[d] (95% CI)
$PM_{2.5}$	14.4µg/m^3	1.11 (1.06 to 1.16)	11.6µg/m^3	5µg/m^3	1.15 (1.08 to 1.22)	13% (7% to 18%)	8.3µg/m^3	5µg/m^3	1.07 (1.04 to 1.10)	6% (4% to 9%)
NO_2	38.6µg/m^3	1.18 (1.09 to 1.28)	39.0µg/m^3	10µg/m^3	1.62 (1.28 to 2.05)	38% (22% to 51%)	24.8µg/m^3	10µg/m^3	1.28 (1.14 to 1.44)	22% (12% to 30%)

Note: [a]Most recent average concentrations (average London levels for 2019: https://www.london.gov.uk/sites/default/files/air_pollution_monitoring_data_in_london_2016_to_2020_feb2020.pdf, and average UK levels from urban traffic areas: https://www.gov.uk/government/statistics/air-quality-statistics/ntrogen-dioxide); [b]World Health Organization's annual exposure threshold; [c]Current vs counterfactual; [d](RR-1)/RR (95% CI)

CI=confidence interval; CMHT=community mental health teams; PAF=population attributable fraction; RR=relative risk; NO_2, nitrogen dioxide; $PM_{2.5}$=particulate matter with a diameter of <2.5µm

Table S4. Fully adjusted associations between air pollutants and HoNOS65+ items at Year 1 (N=4076)						
	NO_2		*$PM_{2.5}$*		*PM_{10}*	
	β (95% CI)	*p value*	*β (95% CI)*	*p value*	*β (95% CI)*	*p value*
Activities of daily living	**0.23 (0.14 to 0.32)**	**<0.001**	**0.07 (0.02 to 0.12)**	**0.003**	**0.14 (0.07 to 0.22)**	**<0.001**
Physical illness/disability	**0.21 (0.12 to 0.30)**	**<0.001**	**0.06 (0.01 to 0.11)**	**0.016**	**0.13 (0.05 to 0.20)**	**0.001**
Problems with relationships	**0.19 (0.12 to 0.25)**	**<0.001**	0.03 (-0.01 to 0.07)	0.106	**0.08 (0.02 to 0.13)**	**0.010**
Problems with living conditions	**0.17 (0.10 to 0.23)**	**<0.001**	**0.05 (0.02 to 0.09)**	**0.002**	**0.08 (0.03 to 0.14)**	**0.002**
Other mental health problems	**0.15 (0.07 to 0.23)**	**<0.001**	**0.04 (0.00 to 0.09)**	**0.049**	**0.07 (0.00 to 0.14)**	**0.047**
Cognitive problems	**0.13 (0.06 to 0.20)**	**<0.001**	**0.04 (0.00 to 0.08)**	**0.039**	**0.08 (0.02 to 0.14)**	**0.006**
Behavioural disturbance	**0.12 (0.04 to 0.19)**	**0.002**	0.01 (-0.03 to 0.05)	0.584	0.05 (-0.02 to 0.11)	0.176
Problems with occupational activities	**0.11 (0.03 to 0.19)**	**0.007**	-0.01 (-0.05 to 0.04)	0.803	0.02 (-0.04 to 0.09)	0.505
Depressive symptoms	**0.08 (0.02 to 0.13)**	**0.008**	0.01 (-0.02 to 0.04)	0.507	0.02 (-0.02 to 0.07)	0.296
Non-accidental self-injury	**0.05 (0.02 to 0.08)**	**0.002**	**0.02 (0.00 to 0.03)**	**0.040**	0.02 (-0.01 to 0.05)	0.084
Problem drinking or drug-use	0.02 (-0.02 to 0.06)	0.253	0.01 (-0.01 to 0.03)	0.386	0.01 (-0.02 to 0.04)	0.694
Problems with hallucinations/delusions	-0.01 (-0.08 to 0.06)	0.724	0.00 (-0.03 to 0.04)	0.936	0.01 (-0.05 to 0.06)	0.830

CI=confidence interval; HoNOS=Health of the Nation Outcome Scale; NO_2 =nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5μm; PM_{10}=particulate matter <10μm
Covariates: Season, year, age, gender, ethnicity, marital status, comorbid mental health conditions, IMD (Index of Multiple Deprivation), population density, social fragmentation

Table S5. Difference between analytical and excluded samples			
	Analytical sample (N=5024)	Excluded sample (N=1418)	
	M±SD, N(%)	*M±SD, N(%)*	*p value*
Dementia diagnosis			<0.001
Alzheimer's disease	2676 (53.3)	574 (40.5)	
Vascular dementia	1018 (20.3)	365 (25.7)	
Other/unspecified dementia	1330 (26.5)	479 (33.8)	
Age	81.4±7.2	74.6±14.0	<0.001
Female	3132 (62.3)	799 (56.8)	<0.001
Ethnicity			0.172
White	3934 (78.3)	1020 (77.3)	
Mixed	31 (0.6)	13 (1.0)	
Asian	262 (5.2)	57 (4.3)	
Black	718 (14.3)	200 (15.1)	
Other	69 (1.4)	25 (1.9)	
Not stated	10 (0.2)	5 (0.4)	
Marital status			<0.001
Married/cohabiting	1696 (33.8)	405 (28.8)	
Divorced/separated	396 (7.9)	138 (9.8)	
Widowed	2034 (40.5)	431 (30.6)	
Single	740 (14.7)	309 (22.0)	
Not disclosed	158 (3.1)	123 (8.7)	
Mental health comorbidities *(Median (IQR))*	0 (0 to 0) Range:0 to 3	0 (0 to 0) Range: 0 to 4	<0.001
Neighbourhood deprivation	26.0±11.6	26.8±12.0	0.017
Population density	92.7±52.7	98.0±49.8	0.004
Social fragmentation	2.3±2.5	3.0±2.3	<0.001
CMHT events			
Year 1 (Median (IQR))	4 (2 to 8.5)	4 (2 to 7)	<0.001
Year 5 (Median (IQR))	8 (3 to 17)	6 (3 to 15)	<0.001
Year 9 (Median (IQR))	9 (4 to 19)	7 (3 to 18)	<0.001
Active SLaM days			
Year 1 (Median (IQR))	246 (87.5 to 366)	169 (28 to 366)	<0.001
Year 5 (Median (IQR))	394.5 (140.5 to 899)	269 (41 to 800)	<0.001
Year 9 (Median (IQR))	428 (151 to 960.5)	301.5 (46 to 935)	<0.001
NO_2 ($\mu g/m^3$)	38.6±10.2	39.7±10.1	0.012
$PM_{2.5}$ ($\mu g/m^3$)	14.4±3.0	14.4±2.8	0.792
PM_{10} ($\mu g/m^3$)	21.1±4.3	21.4±4.2	0.115

CMHT=community mental health teams; IQR=interquartile range; M=mean; NO_2=nitrogen dioxide; $PM_{2.5}$=particulate matter with a diameter of <2.5µm; PM_{10}=particulate matter with a diameter of <10µm; SD=standard deviation; SLaM=South London and the Maudsley NHS Foundation Trust
Neighbourhood deprivation: Index of Multiple Deprivation (IMD) score; population density: persons per hectare; social fragmentation: z-scored composite of unmarried adults, single-person households, housing tenure and population turnover.

Table S6. Examining the impact of missing data by assessing associations between air pollution and CMHT events at 1-, 5-, and 9-years in patients with dementia using multiple imputation by chained equations (N=5272)

1-year follow-up						
	Model 1		Model 2		Model 3	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2						
1	Reference		Reference		Reference	
2	1.20 (1.11 to 1.29)	<0.001	1.19 (1.11 to 1.29)	<0.001	1.10 (1.02 to 1.19)	0.014
3	1.28 (1.16 to 1.41)	<0.001	1.26 (1.14 to 1.39)	<0.001	1.10 (0.99 to 1.23)	0.078
4	1.56 (1.39 to 1.74)	<0.001	1.50 (1.34 to 1.68)	<0.001	1.24 (1.09 to 1.41)	0.001
NO_2 (IQR)	*1.32 (1.24 to 1.40)*	*<0.001*	*1.28 (1.20 to 1.36)*	*<0.001*	*1.16 (1.07 to 1.25)*	*<0.001*
$PM_{2.5}$						
1	Reference		Reference		Reference	
2	1.17 (1.05 to 1.29)	0.003	1.15 (1.04 to 1.27)	0.008	1.09 (0.9 to 1.21)	0.085
3	1.29 (1.14 to 1.45)	<0.001	1.29 (1.15 to 1.46)	<0.001	1.17 (1.04 to 1.32)	0.011
4	1.55 (1.35 to 1.78)	<0.001	1.52 (1.33 to 1.74)	<0.001	1.35 (1.17 to 1.55)	<0.001
$PM_{2.5}$ (IQR)	*1.16 (1.11 to 1.21)*	*<0.001*	*1.14 (1.10 to 1.19)*	*<0.001*	*1.11 (1.06 to 1.15)*	*<0.001*
PM_{10}						
1	Reference		Reference		Reference	
2	1.04 (0.96 to 1.14)	0.320	1.03 (0.94 to 1.12)	0.518	0.99 (0.91 to 1.08)	0.917
3	1.22 (1.09 to 1.36)	<0.001	1.19 (1.06 to 1.32)	0.002	1.09 (0.98 to 1.22)	0.115
4	1.42 (1.25 to 1.61)	<0.001	1.37 (1.21 to 1.55)	<0.001	1.21 (1.07 to 1.37)	0.003
PM_{10} (IQR)	*1.24 (1.16 to 1.32)*	*<0.001*	*1.21 (1.14 to 1.29)*	*<0.001*	*1.14 (1.07 to 1.21)*	*<0.001*
5-year follow-up						
	Model 1		Model 2		Model 3	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2						
1	Reference		Reference		Reference	
2	1.13 (1.02 to 1.25)	0.014	1.12 (1.01 to 1.23)	0.028	1.01 (0.91 to 1.13)	0.770
3	1.49 (1.29 to 1.71)	<0.001	1.41 (1.23 to 1.61)	<0.001	1.19 (1.03 to 1.38)	0.020
4	1.65 (1.42 to 1.93)	<0.001	1.51 (1.30 to 1.75)	<0.001	1.20 (1.01 to 1.43)	0.041
NO_2 (IQR)	*1.44 (1.32 to 1.57)*	*<0.001*	*1.33 (1.22 to 1.45)*	*<0.001*	*1.19 (1.07 to 1.31)*	*0.001*
$PM_{2.5}$						
1	Reference		Reference		Reference	
2	1.26 (1.09 to 1.44)	0.001	1.24 (1.08 to 1.42)	0.002	1.17 (1.02 to 1.34)	0.029
3	1.46 (1.24 to 1.71)	<0.001	1.46 (1.24 to 1.71)	<0.001	1.29 (1.09 to 1.52)	0.003
4	1.76 (1.46 to 2.12)	<0.001	1.66 (1.39 to 2.00)	<0.001	1.44 (1.19 to 1.73)	<0.001
$PM_{2.5}$ (IQR)	*1.15 (1.08 to 1.21)*	*<0.001*	*1.12 (1.06 to 1.18)*	*<0.001*	*1.08 (1.02 to 1.14)*	*0.005*
PM_{10}						
1	Reference		Reference		Reference	
2	1.00 (0.89 to 1.12)	0.969	0.95 (0.85 to 1.07)	0.420	0.94 (0.84 to 1.05)	0.275
3	1.33 (1.14 to 1.55)	<0.001	1.23 (1.06 to 1.43)	0.006	1.14 (0.98 to 1.33)	0.088
4	1.42 (1.19 to 1.68)	<0.001	1.28 (1.09 to 1.52)	0.003	1.12 (0.95 to 1.33)	0.177

PM_{10} (IQR)	*1.28 (1.18 to 1.40)*	*<0.001*	*1.22 (1.12 to 1.32)*	*<0.001*	*1.14 (1.04 to 1.24)*	*0.004*
9-year follow-up						
	Model 1		Model 2		Model 3	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2						
1	Reference		Reference		Reference	
2	1.05 (0.94 to 1.18)	0.367	1.05 (0.94 to 1.17)	0.376	0.95 (0.85 to 1.06)	0.384
3	1.46 (1.25 to 1.70)	<0.001	1.34 (1.16 to 1.55)	<0.001	1.12 (0.96 to 1.32)	0.147
4	1.65 (1.40 to 1.95)	<0.001	1.43 (1.22 to 1.68)	<0.001	1.12 (0.93 to 1.35)	0.241
NO_2 (IQR)	*1.44 (1.31 to 1.58)*	*<0.001*	*1.27 (1.16 to 1.39)*	*<0.001*	*1.12 (1.00 to 1.25)*	*0.047*
$PM_{2.5}$						
1	Reference		Reference		Reference	
2	1.13 (0.97 to 1.32)	0.121	1.16 (1.00 to 1.35)	0.052	1.10 (0.95 to 1.28)	0.206
3	1.41 (1.18 to 1.69)	<0.001	1.44 (1.21 to 1.72)	<0.001	1.29 (1.08 to 1.54)	0.006
4	1.75 (1.43 to 2.15)	<0.001	1.65 (1.35 to 2.01)	<0.001	1.44 (1.17 to 1.76)	<0.001
$PM_{2.5}$ (IQR)	*1.13 (1.07 to 1.21)*	*<0.001*	*1.09 (1.03 to 1.16)*	*0.003*	*1.06 (1.00 to 1.12)*	*0.062*
PM_{10}						
1	Reference		Reference		Reference	
2	0.99 (0.87 to 1.12)	0.878	0.92 (0.82 to 1.04)	0.192	0.90 (0.80 to 1.02)	0.106
3	1.41 (1.19 to 1.67)	<0.001	1.21 (1.03 to 1.42)	0.021	1.12 (0.95 to 1.32)	0.174
4	1.54 (1.27 to 1.86)	<0.001	1.27 (1.06 to 1.52)	0.008	1.11 (0.93 to 1.34)	0.251
PM_{10} (IQR)	*1.27 (1.15 to 1.40)*	*<0.001*	*1.17 (1.07 to 1.28)*	*0.001*	*1.09 (1.00 to 1.20)*	*0.059*

CMHT=community mental health team; CI=confidence interval; IQR=interquartile range; IRR=incident risk ratio; NO_2=nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5μm; PM_{10}=particulate matter <10μm
Model 1: Season and year
Model 2: Model 1 + age, gender, ethnicity, marital status, comorbid mental health conditions
Model 3: Model 2 + neighbourhood deprivation, population density, social fragmentation

Table S7. To examine whether associations between air pollution exposure and number of CMHT events were modified by neighbourhood deprivation we included an interaction term with IMD in fully adjusted regression models (N=5024)

	Year 1		Year 5		Year 9	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2*IMD	0.999 (0.995 to 1.003	0.674	0.998 (0.995 to 1.002)	0.419	0.999 (0.996 to 1.002)	0.548
$PM_{2.5}$*IMD	0.999 (0.997 to 1.001)	0.594	1.000 (0.998 to 1.001)	0.675	1.000 (0.998 to 1.002)	0.850
PM_{10}*IMD	1.000 (0.997 to 1.003)	0.863	1.001 (0.998 to 1.004)	0.544	1.14 (0.998 to 1.004)	0.526

CI=confidence interval; CMHT=community mental health team; IMD=Index of Multiple Deprivation; IRR=incident risk ratio; NO_2 =nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5µm; PM_{10}=particulate matter <10µm
Covariates: Season, year, age, gender, ethnicity, marital status, comorbid mental health conditions, population density, social fragmentation

Table S8. To examine whether associations between air pollution exposure and number of CMHT events were modified by borough we included an interaction term with borough in fully adjusted regression models (N=5024)

	Year 1		Year 5		Year 9	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2*Borough						
Southwark	Reference		Reference		Reference	
Lambeth	1.10 (0.97 to 1.24)	0.127	1.03 (0.92 to 1.16)	0.562	1.06 to 0.95 to 1.19)	0.312
Lewisham	**1.21 (1.06 to 1.39)**	**0.005**	**1.15 (1.01 to 1.31)**	**0.036**	**1.16 (1.02 to 1.33)**	**0.020**
Croydon	1.10 (0.98 to 1.24)	0.096	1.06 (0.95 to 1.19)	0.276	1.07 (0.96 to 1.19)	0.207
$PM_{2.5}$*Borough						
Southwark	Reference		Reference		Reference	
Lambeth	1.02 (0.96 to 1.09)	0.508	1.02 (0.96 to 1.09)	0.475	1.03 (0.97 to 1.10)	0.299
Lewisham	1.03 (0.96 to 1.11)	0.402	1.04 90.97 to 1.11)	0.267	1.04 (0.97 to 1.12)	0.212
Croydon	**1.07 (1.00 to 1.13)**	**0.037**	1.05 (0.99 to 1.12)	0.078	1.05 (0.99 to 1.12)	0.070
PM_{10}*Borough						
Southwark	Reference		Reference		Reference	
Lambeth	1.09 (0.98 to 1.21)	0.094	1.05 (0.95 to 1.16)	0.320	1.06 (0.96 to 1.17)	0.210
Lewisham	**1.12 (1.00 to 1.25)**	**0.044**	1.09 (0.98 to 1.21)	0.123	1.09 (0.98 to 1.21)	0.102
Croydon	1.03 (1.00 to 1.25)	0.536	1.00 (0.91 to 1.09)	0.996	1.00 (0.92 to 1.10)	0.925

CI=confidence interval; CMHT=community mental health team; IRR=incident risk ratio; NO_2=nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5µm; PM_{10}=particulate matter <10µm

Covariates: Season, year, age, gender, ethnicity, marital status, comorbid mental health conditions, neighbourhood deprivation, population density, social fragmentation

Table S9. Associations between air pollution and CMHT events stratified by residential Borough (N=5024)						
	Year 1		Year 5		Year 9	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
Southwark (N=893)						
NO_2	1.00 (0.84 to 1.18)	0.966	1.05 (0.89 to 1.23)	0.573	1.03 (0.88 to 1.21)	0.665
$PM_{2.5}$	0.97 (0.88 to 1.06)	0.517	0.95 (0.87 to 1.04)	0.255	0.97 (0.89 to 1.05)	0.430
PM_{10}	0.95 (0.83 to 1.10)	0.515	0.94 (0.82 to 1.07)	0.355	0.95 (0.83 to 1.08)	0.447
Lambeth (N=1101)						
NO_2	1.17 (1.00 to 1.37)	0.049	1.06 (0.91 to 1.24)	0.416	1.09 (0.93 to 1.26)	0.274
$PM_{2.5}$	1.14 (1.05 to 1.24)	0.002	1.11 (1.02 to 1.20)	0.011	1.11 (1.02 to 1.20)	0.011
PM_{10}	1.18 (1.04 to 1.34)	0.010	1.15 (1.02 to 1.30)	0.026	1.15 (1.02 to 1.29)	0.025
Lewisham (N=929)						
NO_2	1.21 (0.95 to 1.52)	0.120	1.31 (1.06 to 1.63)	0.013	1.33 (1.08 to 1.65)	0.007
$PM_{2.5}$	1.17 (1.05 to 1.31)	0.005	1.20 (1.08 to 1.32)	0.001	1.20 (1.09 to 1.32)	<0.001
PM_{10}	1.17 (0.98 to 1.39)	0.088	1.23 (1.04 to 1.45)	0.014	1.24 (1.06 to 1.45)	0.008
Croydon (N=2101)						
NO_2	1.29 (1.12 to 1.48)	<0.001	1.25 (1.09 to 1.43)	0.001	1.24 (1.08 to 1.41)	0.002
$PM_{2.5}$	1.16 (1.09 to 1.24)	<0.001	1.13 (1.06 to 1.20)	<0.001	1.13 (1.06 to 1.20)	<0.001
PM_{10}	1.21 (1.09 to 1.35)	<0.001	1.18 (1.07 to 1.31)	0.001	1.19 (1.08 to 1.31)	0.001

CI=confidence interval; CMHT=community mental health teams; IRR=incident risk ratio; NO_2=nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5μm; PM_{10},=particulate matter <10μm

Covariates: Season, year, age, gender, ethnicity, marital status, comorbid mental health conditions, neighbourhood deprivation; population density, social fragmentation

Table S10. Two-pollutant models of the association between air pollution exposure and number of CMHT events			
	Co-pollutant confounder added to Model 3		
	Year 1		
	NO_2	***$PM_{2.5}$***	***PM_{10}***
	IRR (95% CI)	*IRR (95% CI)*	*IRR (95% CI)*
CMHT events			
NO_2	-	1.07 (0.97 to 1.19)	1.11 (0.99 to 1.24)
$PM_{2.5}$	1.08* (1.02 to 1.14)	-	1.17 (1.05 to 1.30)*
PM_{10}	1.08 (0.98 to 1.18)	0.92 (0.78 to 1.09)	-
	Year 5		
	IRR (95% CI)	*IRR (95% CI)*	*IRR (95% CI)*
NO_2	-	1.11 (1.01 to 1.22)*	1.13 (1.01 to 1.25)*
$PM_{2.5}$	1.05 (1.00 to 1.11)*	-	1.09 (0.98 to 1.21)
PM_{10}	1.06 (0.97 to 1.16)	1.01 (0.86 to 1.18)	-
	Year 9		
	IRR (95% CI)	*IRR (95% CI)*	*IRR (95% CI)*
NO_2	-	1.11 (1.00 to 1.22)*	1.12 (1.01 to 1.25)*
$PM_{2.5}$	1.06 (1.00 to 1.11)*	-	1.09 (0.99 to 1.21)
PM_{10}	1.06 (0.97 to 1.16)	1.00 (0.86 to 1.17)	-

CI=confidence interval; CMHT=community mental health team; IRR=incident risk ratio; NO_2=nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5μm; PM_{10}=particulate matter <10μm
Covariates: Season, year, age, gender, ethnicity, marital status, comorbid mental health conditions, neighbourhood deprivation, population density, social fragmentation
*p<0.005; **p<0.001

Table S11. Associations between air pollution exposure and number of CMHT events clustered by LSOA (random intercept) (N=5024)						
	Year 1		Year 5		Year 9	
	IRR (95% CI)	*P value*	*IRR (95% CI)*	*P value*	*IRR (95% CI)*	*P value*
NO_2	1.17 (1.08 to 1.28)	<0.001	1.16 (1.07 to 1.26)	<0.001	1.16 (1.08 to 1.26)	<0.001
$PM_{2.5}$	1.10 (1.05 to 1.15)	<0.001	1.08 (1.04 to 1.13)	<0.001	1.08 (1.04 to 1.13)	<0.001
PM_{10}	1.13 (1.06 to 1.21)	<0.001	1.12 (1.05 to 1.19)	0.001	1.12 (1.05 to 1.19)	<0.001
CI=confidence interval; CMHT=community mental health team; IMD=Index of Multiple Deprivation; IRR=incident risk ratio; LSOA=lower-layer super output area; NO_2 =nitrogen dioxide; $PM_{2.5}$=particulate matter <2.5μm; PM_{10}=particulate matter <10μm Covariates: Season, year, age, gender, ethnicity, marital status, comorbid mental health conditions, population density, social fragmentation						

Table S12. Correlation matrix of measures of air pollution (N=5024, Pearson correlations)			
Environmental exposure	**Pearson correlation coefficients***		
	NO_2	$PM_{2.5}$	PM_{10}
$NO_{2\ (\mu g/m^3)}$	1.00		
$PM_{2.5\ (\mu g/m^3)}$	0.581	1.00	
$PM_{10\ (\mu g/m^3)}$	0.690	0.863	1.00
NO_2=Nitrogen dioxide; PM=particulate matter *All coefficients have a p-value <0.0001			

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