Supplemental Material

Table S1. Descriptive statistics for the excluded and included participants in the Danish Nurse Cohort

Variables	Total	Excluded	Included	P-value
	N = 28,698	N = 6,509	N = 22,189	
Age, mean ± SD	53.9 ± 8.5	58.2 ± 9.7	52.6 ± 7.7	<0.001
HF cases, n (%)	768 (2.7)	284 (4.4)	484 (2.2)	<0.001
Marital status, n (%)				<0.001
Married	19,871 (69.2)	4,215 (64.8)	15,656 (70.6)	
Separated	459 (1.6)	75 (1.2)	384 (1.7)	
Divorced	3,127 (10.9)	534 (8.2)	2,593 (11.7)	
Single	2,910 (10.1)	686 (10.5)	2,224 (10.0)	
Widowed	2,085 (7.3)	753 (11.6)	1,332 (6.0)	
Body mass index (kg/m^2), mean ± SD	23.7 ± 3.5	23.7 ± 3.6	23.7 ± 3.5	0.354
Body mass index (kg/m^2), n (%)				<0.001
Underweight (< 18.5)	750 (2.6)	208 (3.2)	542 (2.4)	
Normal weight (18.5-25)	19,467 (67.8)	4,101 (63.0)	15,366 (69.3)	
Overweight (25-30)	6,532 (22.8)	1,500 (23.0)	5,032 (22.7)	
Obese (≥ 30)	1,591 (5.5)	342 (5.3)	1,249 (5.6)	
Smoking status, n (%)				<0.001
Never	9,428 (32.9)	1,704 (26.2)	7,724 (34.8)	
Former	8,485 (29.6)	1,750 (26.9)	6,735 (30.4)	
Current	9,825 (34.2)	2,095 (32.2)	7,730 (34.8)	
Alcohol consumption, n (%)				<0.001
None (0 drinks/week)	4,589 (16.0)	1,244 (19.1)	3,345 (15.1)	
Moderate (1-15 drinks/week)	16,965 (59.1)	3,239 (49.8)	13,726 (61.9)	
Heavy (> 15 drinks/week)	6,285 (21.9)	1,167 (17.9)	5,118 (23.1)	
Physical activity, n (%)				<0.001
Low	2,044 (7.1)	599 (9.2)	1,445 (6.5)	
Medium	18,801 (65.5)	3,999 (61.4)	14,802 (66.7)	
High	7,496 (26.1)	1,554 (23.9)	5,942 (26.8)	

Diagnosis or medication - Hypertension, n (%)				<0.001
No	24,756 (86.3)	5,344 (82.1)	19,412 (87.5)	
Yes	3,899 (13.6)	1,149 (17.7)	2,750 (12.4)	
Diagnosis or medication - Diabetes, n (%)				<0.001
No	28,065 (97.8)	6,298 (96.8)	21,767 (98.1)	
Yes	374 (1.3)	117 (1.8)	257 (1.2)	
Hormone therapy use, n (%)				<0.001
Never	20,334 (70.9)	4,064 (62.4)	16,270 (73.3)	
Past	2,947 (10.3)	811 (12.5)	2,136 (9.6)	
Current	4,914 (17.1)	1,131 (17.4)	3,783 (17.0)	
Oral contraceptive use, n (%)				<0.001
Never	12,332 (43.0)	3,663 (56.3)	8,669 (39.1)	
Ever	16,188 (56.4)	2,668 (41.0)	13,520 (60.9)	
Employment status, n (%)				<0.001
Actively working	21,231 (74.0)	3,330 (51.2)	17,901 (80.7)	
Home-maker	525 (1.8)	146 (2.2)	379 (1.7)	
Retired	5,841 (20.4)	2,259 (34.7)	3,582 (16.1)	
Unemployed/rehabilitation	192 (0.7)	50 (0.8)	142 (0.6)	
Other	241 (0.8)	56 (0.9)	185 (0.8)	
Urbanization level, n (%)				0.821
Urban	8,827 (30.8)	2,000 (30.7)	6,827 (30.8)	
Suburban	6,606 (23.0)	1,512 (23.2)	5,094 (23.0)	
Rural	13,248 (46.2)	2,980 (45.8)	10,268 (46.3)	
Average municipality income (1,000 Danish Kroner (DKK), mean ± SD	158.8 ± 22.0	158.8 ± 22.0	160.6 ± 24.0	0.999

P-value for the difference between excluded versus included participants (chi-square test for categorical variables and t-test for continuous variables)

Table S2. Distribution of 1- and 23- year running means of air pollutants and road traffic noise at the cohort baseline in 1993 or 1999 and Spearman's rank correlation coefficients (ρ) between the exposure levels

	Running mean year(s)	Mean ± SD	Interquartile Range	Percentile					Spearman's rank correlation coefficients (ρ)	
				5th	25th	50th	75th	95th	$PM_{2.5}$	NO_2
$PM_{2.5}$, $\mu g/m^3$	1	19.4 ± 3.9	6.0	13.0	16.6	19.2	22.5	25.2		
	23	21.7 ± 3.1	4.5	16.8	19.3	21.8	23.8	26.5		
NO_2, $\mu g/m^3$	1	12.9 ± 8.0	8.2	5.4	7.8	10.5	16.0	27.4	0.50	
	23	12.4 ± 6.5	7.5	5.5	8.0	10.7	15.5	23.7	-	
$L_{den,}$ dB	1	52.7 ± 8.1	9.4	37.0	48.6	53.1	58.0	64.9	0.32	0.61
	23	52.2 ± 6.8	7.7	39.9	48.9	52.7	56.6	62.0	-	0.61

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm (23-year running means are not available); NO_2: nitrogen dioxide; L_{den}: 24-hour weighted average road traffic noise level

Table S3. Mean exposure levels at cohort entry (1993 or 1999) by heart failure (HF) status, mean ± standard deviation

Exposure	Running mean year(s)	Total	No incident HF	Incident HF	P-value[§]
		N = 22,189	N = 21,705	N = 484	
$PM_{2.5}$, $\mu g/m^3$	1	19.4 ± 3.9	19.3 ± 3.9	21.5 ± 3.7	<0.001
	3	21.0 ± 3.5	21.0 ± 3.5	22.7 ± 3.5	<0.001
	23	21.7 ± 3.1	21.7 ± 3.1	23.0 ± 3.3	<0.001
NO_2, $\mu g/m^3$	1	12.9 ± 8.0	12.9 ± 7.9	14.4 ± 9.8	<0.001
	3	13.5 ± 8.1	13.5 ± 8.1	15.1 ± 10.1	<0.001
	23	12.4 ± 6.5	12.4 ± 6.4	13.4 ± 7.8	0.004
L_{den}, dB	1	52.7 ± 8.1	52.6 ± 8.1	54.2 ± 7.9	<0.001
	3	52.6 ± 8.0	52.6 ± 8.0	54.2 ± 7.9	<0.001
	23	52.2 ± 6.8	52.2 ± 6.8	53.2 ± 7.1	0.002

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm; NO_2: nitrogen dioxide; L_{den}: 24-hour weighted average road traffic noise level

[§]*P-value* for differences of exposure levels by HF status (incident versus no incident HF)

Table S4. Hazard ratios of incident heart failure (HF) associated with an interquartile range (IQR) increase in three-year mean exposures to $PM_{2.5}$, NO_2, and L_{den} in the Danish Nurse Cohort (N = 22,189): with adjustment of calendar year

	Crude model	Fully adjusted model	Two-pollutant model			Three-pollutant model
	Model 1	Model 2	Model 2 + $PM_{2.5}$	Model 2 + NO_2	Model 2 + L_{den}	Model 2 + $PM_{2.5}$, NO_2, and L_{den}
Exposure	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)
$PM_{2.5}$	1.45 (1.19, 1.76)*	1.35 (1.09, 1.67) *	-	1.44 (1.06, 1.95) *	1.30 (1.04, 1.64) *	1.44 (1.06, 1.96) *
NO_2	1.15 (1.05, 1.26)*	1.09 (0.98, 1.22)	0.96 (0.82, 1.12)	-	1.05 (0.92, 1.20)	0.92 (0.77, 1.09)
L_{den}	1.18 (1.05, 1.32)*	1.11 (0.99, 1.26)#	1.05 (0.93, 1.20)	1.08 (0.94, 1.25)	-	1.09 (0.94, 1.25)

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm (IQR: 5.1 μg/m^3); NO_2: nitrogen dioxide (IQR: 8.6 μg/m^3); L_{den}: 24-hour weighted average road traffic noise level (9.3 dB)

Model 1 adjusting for age (underlying time), a strata term of year of cohort entry (1993/1999), and a penalty spline term of calendar year

Model 2 adjusting for individual- and area-level covariates in addition to the covariates in Model 1

*: P-value < 0.05; #: P-value < 0.1

Table S5. Inverse probability weight (IPW)-adjusted hazard ratios of incident heart failure associated with an interquartile range (IQR) increase in 3-year exposure to air pollution and road traffic noise in the Danish Nurse Cohort study (N = 22,189)

	Crude model	Fully adjusted model	Two-pollutant model			Three-pollutant model
	Model 1	Model 2	Model 2 + $PM_{2.5}$	Model 2 + NO_2	Model 2 + L_{den}	Model 2 + $PM_{2.5}$, NO_2, and L_{den}
Exposure	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)
$PM_{2.5}$	1.36 (1.22, 1.50)*	1.18 (1.05, 1.33)*	-	1.15 (0.99, 1.34)	1.15 (1.02, 1.30)#	1.17 (1.00, 1.36)
NO_2	1.17 (1.09, 1.26)*	1.10 (1.01, 1.19)#	1.03 (0.92, 1.15)	-	1.05 (0.95, 1.17)	0.98 (0.86, 1.11)
L_{den}	1.18 (1.08, 1.30)*	1.12 (1.02, 1.24)#	1.09 (0.98, 1.21)	1.09 (0.97, 1.23)	-	1.10 (0.98, 1.24)

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm (IQR: 5.1 μg/m^3); NO_2: nitrogen dioxide (IQR: 8.6 μg/m^3); L_{den}: 24-hour weighted average road traffic noise level (9.3 dB)

Model 1 adjusting for age (underlying time) and a strata term of year of cohort entry (1993/1999)

Model 2 adjusting for individual- and area-level covariates in addition to the covariates in Model 1

*: P-value < 0.05; #: P-value < 0.1

Table S6. Hazard ratios of incident heart failure associated with an interquartile range (IQR) increase in 1- or 23-year exposure to air pollution and road traffic noise in the Danish Nurse Cohort study (N = 22,189)

		Crude model	Fully adjusted model	Two-pollutant model			Three-pollutant model
		Model 1	Model 2	Model 2 + $PM_{2.5}$	Model 2 + NO_2	Model 2 + L_{den}	Model 2 + $PM_{2.5}$, NO_2, and L_{den}
Exposure		HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)
1-year	$PM_{2.5}$	1.33 (1.15, 1.53)*	1.12 (0.95, 1.32)	-	1.07 (0.88, 1.30)	1.09 (0.92, 1.28)	1.08 (0.89, 1.33)
	NO_2	1.16 (1.07, 1.27)*	1.08 (0.98, 1.20)	1.06 (0.93, 1.20)	-	1.04 (0.92, 1.17)	1.00 (0.86, 1.16)
	L_{den}	1.19 (1.06, 1.33)*	1.12 (0.99, 1.27)#	1.11 (0.98, 1.25)	1.10 (0.95, 1.27)	-	1.11 (0.96, 1.28)
23-year	$PM_{2.5}$	-	-	-	-	-	-
	NO_2	1.14 (1.05, 1.23)*	1.07 (0.97, 1.18)	0.95 (0.83, 1.08)	-	1.02 (0.91, 1.15)	0.90 (0.78, 1.04)
	L_{den}	1.17 (1.06, 1.30)*	1.12 (1.00, 1.25)#	1.06 (0.94, 1.19)	1.10 (0.96, 1.25)	-	1.11 (0.97, 1.26)

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm (IQR: 6.0 μg/m^3); NO_2: nitrogen dioxide (IQR: 8.2 and 7.5 μg/m^3 for 1- and 23-year running means); L_{den}: 24-hour weighted average road traffic noise level (IQR: 9.3 and 7.7.dB 1- and 23-year running means)

-: no results; *: P-value < 0.05; #: P-value < 0.1

Model 1 adjusting for age (underlying time) and a strata term of year of cohort entry (1993/1999)

Model 2 adjusting for individual- and area-level covariates in addition to the covariates in Model 1

Model 3 adjusting for a 3- year running mean of $PM_{2.5}$, NO_2, or L_{den} in addition to the covariates in Model 2

*: P-value < 0.05

Table S7. Multiplicative effect modification of single- and two-co-exposures on the association between three-year exposure to $PM_{2.5}$ and incident heart failure

Co-exposure	Level	Hazard ratio (95% Confidence intervals) per IQR (5.1 $\mu g/m^3$) increase in $PM_{2.5}$	P-value[§]
Single co-exposure			
NO_2	Low	1.20 (0.96, 1.50)	0.45
	High	1.04 (0.80, 1.36)	
L_{den}	Low	1.12 (0.91, 1.38)	0.83
	High	1.13 (0.90, 1.42)	
Two co-exposure			
$NO_2 \times L_{den}$	Low NO_2 – Low L_{den}	1.10 (0.86, 1.40)	0.43
	Low NO_2 – High L_{den}	2.10 (1.19, 3.68)*	
	High NO_2 – Low L_{den}	1.05 (0.56, 1.95)	
	High NO_2 – High L_{den}	1.06 (0.79, 1.43)	

Model adjusting for age (underlying time), a strata term of year of cohort entry (1993/1999), and individual- and area-level covariates

Low and high categories were determined based on the cutoff level of 75% (NO_2: 16.8 $\mu g/m^3$; L_{den}: 57.8 dB)

[§] ifference of estimates between subgroups; *: P-value < 0.05

Table S8. Risk of heart failure (HF) associated with multiple exposures to $PM_{2.5}$, NO_2, and L_{den}

Cutoff level	Exposure to 3-year running mean of $PM_{2.5}$, NO_2, and L_{den}	Person-years	Incident HF	Hazard ratio (95% confidence intervals)
25%	Low-low-low	31,623	29	1.00 (reference)
	One or two high	153,222	172	1.20 (0.80, 1.78)
	High-high-high	223,932	283	1.33 (0.89, 1.99)
50%	Low-low-low	101,993	105	1.00 (reference)
	One or two high	202,169	236	1.12 (0.88, 1.42)
	High-high-high	104,615	143	1.32 (0.98, 1.77)[#]
75%	Low-low-low	223,309	244	1.00 (reference)
	One or two high	153,485	188	1.15 (0.94, 1.41)
	High-high-high	31,983	52	1.43 (1.02, 1.99)[*]

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm; NO_2: nitrogen dioxide; L_{den}: 24-hour weighted average road traffic noise level

Models adjusting for age (underlying time), a strata term of year of cohort entry (1993/1999), and individual- and area-level covariates.

Low and high categories were determined based on the various cutoff levels for 25% ($PM_{2.5}$: 18.5 μg/m^3; NO_2: 8.2 μg/m^3; L_{den}: 48.6 dB); 50% ($PM_{2.5}$: 20.8 μg/m^3; NO_2: 11.1 μg/m^3; L_{den}: 53.0 dB); and 75% ($PM_{2.5}$: 23.6 μg/m^3; NO_2: 16.8 μg/m^3; L_{den}: 57.8 dB)

[*]: P-value < 0.05; [#]: P-value < 0.1

Table S9. Effect modification on the association between three-year exposure to $PM_{2.5}$ and incident heart failure (HF) in the Danish Nurse Cohort study (N = 22,189)

Effect modifiers		Hazard ratio (95% confidence intervals) per 5.1 μg/m^3 in $PM_{2.5}$	P-value[§]
Age at baseline	< 65 years	1.21 (0.93, 1.57)	0.89
	≥ 65 years	1.43 (1.05, 1.93) [*]	
Obesity (<30 kg/m^2)	No	1.16 (0.95, 1.42)	0.07
	Yes	1.29 (0.77, 2.15)	
Smoking	Never	1.04 (0.73, 1.49)	0.04
	Former	1.72 (1.25, 2.36) [*]	
	Current	0.96 (0.72, 1.29)	
Alcohol consumption	Never (0 drinks per week)	0.97 (0.67, 1.41)	0.72
	Moderate (1 - 14 drinks per week)	1.21 (0.95, 1.56)	
	Heavy (> 15 drinks per week)	1.34 (0.90, 2.00)	
Physical activity	Low	1.08 (0.67, 1.72)	0.70
	Medium	1.23 (0.99, 1.54) [#]	
	High	1.12 (0.68, 1.84)	
Shift work	Day	1.12 (0.75, 1.67)	0.34
	Evening	1.25 (0.59, 2.64)	
	Night	2.20 (0.97, 4.97) [#]	
	Rotating	0.81 (0.32, 2.08)	
Hypertension	No	1.01 (0.81, 1.28)	0.02
	Yes	1.41 (1.02, 1.93)[*]	
Diabetes	No	1.14 (0.94, 1.38)	0.29
	Yes	1.52 (0.74, 3.12)	
Urbanicity	Urban	1.27 (0.97, 1.67) [#]	0.07
	Suburban	0.86 (0.51, 1.44)	
	Rural	1.12 (0.83, 1.50)	

$PM_{2.5}$: particulate matter with a diameter < 2.5 μm; NO_2

Models adjusting for age (underlying time), a strata term of year of cohort entry (1993/1999), individual- and area-level covariates, and a 3-year running mean of L_{den}

[§]Difference of estimates between subgroups; [*]: P-value < 0.05; [#]: P-value < 0.05

Table S10. Previous studies on the association between long-term exposure to $PM_{2.5}$, NO_2, and road traffic noise and heart failure

Author (year)	Cohort/study, area, study period, and N	Disease definition	Exposure					Hazard ratios (95% Confidence intervals)	
			Period	Window	Variable [§]	Mean (5-95th percentile)	Adj[†]	Published	Per unit [¶]
Mortality									
Beelen et al. (2009)	Netherlands Cohort Study on Diet and Cancer, the Netherlands, 1987-1996, N=120,852	ICD-9: 428; ICD-10: I50	1987-1996	10-year mean (1987-1996)	$PM_{2.5}$	-	-	2.69 (1.37-5.27) per 10 µg/m^3	1.66 (1.18-2.33)
Incidence									
Atkinson et al. (2013)	UK eneral practices cohort, UK, 2003-2007, N=810,188	ICD-10: I50	2002-2006	Previous year's annual mean	$PM_{2.5}$	12.9 (SD: 1.4; min: 7.2; max: 20.2) in 2002	-	1.06 (1.01-1.11) per 1.9 µg/m^3	1.17 (1.03-1.32)
					NO_2	22.5 (SD: 7.4; min: 1.7; max: 60.8)	-	1.06 (1.01-1.11) per 10.7 µg/m^3	1.05 (1.01-1.09)
To et al. (2015)	Canadian National Breast Screening Study, Canada, 1992-2013, N=29,549	ICD-9: 428; ICD-10: I500, I501, I509	1998-2006	9-year mean (1998-2006)	$PM_{2.5}$	12.47 (SD: 2.40)	-	1.30 (1.11-1.52) per 10 µg/m^3	1.14 (1.06-1.24)
Carey et al. (2016)	Greater London general practices cohort, UK, 2005-2011, N=209,215	ICD-10: I50	2004	1-year road traffic PM2.5 (2004)	$PM_{2.5}$	1.45 (SD: 0.52)	-	1.15 (1.02-1.30) per 1 µg/m^3	2.04 (1.09-3.81)
Seidler et al. (2016)	Administrative cohort in Rhine-Main area of Germany, 2005-2010, N=654,172 control and 70,012 cases	ICD-10: I50	2005	Annual mean	Noise	(min: 40; max: 70)	-	1.01 (1.00-1.02) per 10 dB	1.01 (1.00-1.02)
Stockfelt et al. (2017)	The Primary Prevention Study, Sweden, 1990-2011, N=5,850	ICD-9: 428: ICD-10: I50, I11.0	1990–2011	5-year moving average	$PM_{2.5}$	Median 9.3 (min: 6.3; max12)	-	1.49 (1.07-2.10) per 5 µg/m3	1.50 (1.06-2.13)
	The GOT-MONICA cohort, Sweden, 1990-2011, N=4,500	ICD-9: 428: ICD-10: I50, I11.0	1990–2011	5-year moving average	$PM_{2.5}$	Median: 8.5 (min: 5.6; max: 12)	-	0.50 (0.21-1.17) per 5 µg/m3	0.49 (0.21-1.17)
Kim et al. (2017)	National Health Insurance Service – National Sample Cohort, 2007-2013, N=136,094	ICD-10: I11.0, I13.0, I13.2, I25.5, I42, I50, O90.3	2007-2013	7-year moving average	$PM_{2.5}$	25.0 (SD: 14.3; min: 2.8; max: 121.2)	-	1.44 (1.29–1.61) per 1 µg/m^3	6.42 (3.63-11.35)
					NO_2	34.5 (SD: 12.9; min: 6.4; max: 92.4)	-	2.40 (2.02-2.85) per 18.4 ppb	1.62 (1.47-1.78)
Sørensen et al. (2017)	Danish Diet, Cancer, and Health cohort, 1993-2011, N=50,954	ICD-8: 427.0, 427.1; ICD-10: I50, I11.0, I42.0, I42.9	1993-2011		NO_2	15.7 (12.2–33.5)	Noise	1.07(1.01,1.14) per 7.5 ug/m3	1.09 (1.01-1.17)

					Noise	57.0 (49.0–70.6)	NO_2	1.08(1.00,1.16) per 9.9 dB	1.07 (1.00-1.14)
Downward et al. (2018)	The Dutch arm of this study (EPIC-NL), the Netherlands, 1993-2010, N=33,831	ICD-10: I50	2009	1-year (2009)	$PM_{2.5}$	17 (SD: 0:56; min: 15.4; max: 20.95)	-	0.44 (0.16-1.20) per 5 µg/m^3	0.43 (0.16-1.20)
					NO_2	25 (SD: 6; min: 13; max: 62)	-	1.22 (1.01-1.48) per 10 µg/m3	1.19 (1.00-1.40)
Bai et al. (2018)	Ontario Population Health and Environment Cohort, Canada, 1996–2012, N=1,112,060	ICD-9: 428; ICD-10: I50	1996–2012	3-year moving average	NO_2	21.4 (SD: 3.5; min: 9.9; max: 21.1)	$PM_{2.5}$	1.05 (1.04-1.06) per 4.0 ppb	1.13 (1.10-1.16)
					Noise	NA	NO_2	0.999 0.999-1.000	0.99 (0.98-1.00)
Bai et al. (2019)	Ontario Population Health and Environment Cohort, Canada, 2001-2015, N=5,062,146	ICD-9: 428; ICD-10: I50	1998-2012	3-year moving average	$PM_{2.5}$	9.6 (SD: 2.8; min: 1.1; max: 20.0)	-	1.05 (1.04-1.05) per 3.5 µg/m^3	1.07 (1.07-1.07)
					NO_2	18.3 (SD: 8.5; min: 2.7; max: 71.4)	-	1.02 (1.01-1.04) per 13.9 ppb	1.01 (1.00-1.03)
Yazdi et al. (2019)	Medicare beneficiary cohort, USA, 2000-2012, N=11,084,660	ICD-9: 428	2000-2012	Annual mean	$PM_{2.5}$	~12 (min: 7.5; max: 15)	-	1.053 (1.052–1.054) per 1 µg/m^3	1.30 (1.30-1.31)
Bai et al. (2020)	Ontario Population Health and Environment Cohort, Canada, 2001-2015, N=986,295	ICD-9: 428; ICD-10: I50	2001-2015	3-year moving average	Noise	56.3 (SD: 7.1; min: 15; max: 85.3)	UFP/ NO_2	1.07 (1.06-1.08) per 10.7 dB	1.06 (1.05-1.07)

§ $PM_{2.5}$: particulate matter with a diameter < 2.5 µm (µg/m^3); NO_2: nitrogen dioxide (µg/m^3); Noise: 24-hour weighted average road traffic noise level (dB)

† Mutual adjustment

¶ $PM_{2.5}$: 5.1 µg/m^3; NO_2: 8.6 µg/m^3; Noise: 9.3 dB

ICD-8, 9, or 10: International classification of disease, 8^{th}, 9^{th}, or 10^{th} version

UFP: Ultrafine particle

Figure S1. Number of participants in the study.

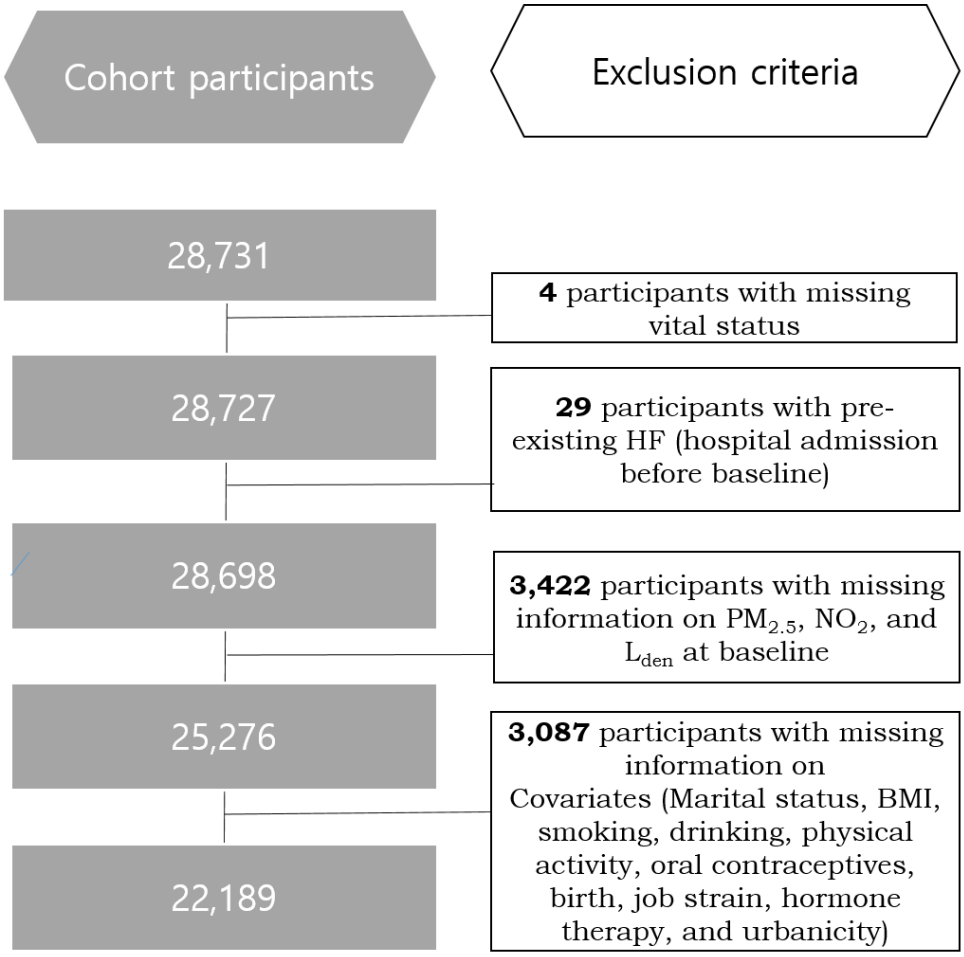
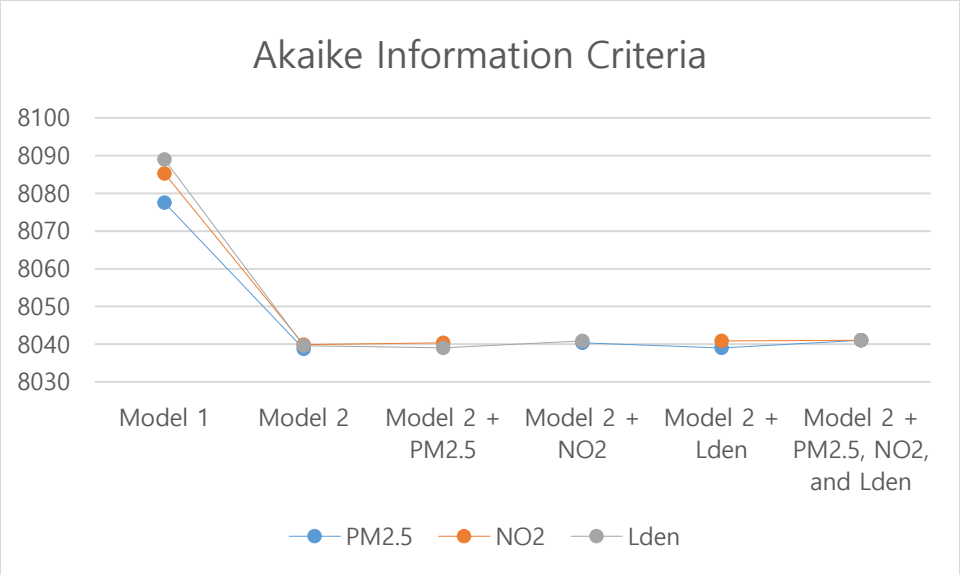


Figure S2. Akaike Information Criteria to compare models.



$PM_{2.5}$: particulate matter with a diameter < 2.5 μm; NO_2: nitrogen dioxide; L_{den}: 24-hour weighted average road traffic noise level

Model 1 adjusting for age (underlying time) and a strata term of year of cohort entry (1993/1999)

Model 2 adjusting for individual- and area-level covariates in addition to the covariates in Model 1