

Supplementary Material

Long-Term Exposure to Traffic-Related Air Pollution and Progression of Carotid Artery Atherosclerosis

Wen Qi Gan, Ryan W. Allen, Michael Brauer,
Hugh W. Davies, G.B. John Mancini, Scott A. Lear

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Table 1. Comparisons of baseline characteristics for participants who were lost to and those who completed the follow-up^a

Characteristic	Lost to follow-up (n = 251)	Finished follow-up (n = 509)	P value
Age (year)	45.6 ± 8.5	46.8 ± 9.0	0.083
Sex, male (%)	48	49	0.735
Race (%)			< 0.001
Aboriginal	37	14	
Chinese	25	30	
European	15	29	
South Asian	23	27	
Education (%)			< 0.001
≤ High school	44	27	
> High school	56	73	
Annual household income (%)			< 0.001
< \$30,000	39	24	
\$30,000 to \$60,000	35	37	
≥ \$60,000	26	39	
Smoke status (%)			< 0.001
Current	17	7	
Former	25	27	
Never	58	66	
Alcohol intake (yes, %)	23	32	0.015
Physical activity ^b (hours per week)	4.0 (1.7 – 8.1)	3.5 (1.7 – 6.5)	0.119
Body mass index (kg/m ²)	27.9 ± 5.0	27.2 ± 4.7	0.047
SBP (mmHg)	117.9 ± 16.5	118.1 ± 14.8	0.862
DBP (mmHg)	77.6 ± 11.3	77.2 ± 9.4	0.584
Total cholesterol (mmol/L)	5.2 ± 1.0	5.2 ± 1.0	0.810
LDL-C (mmol/L)	3.2 ± 0.9	3.2 ± 0.9	0.460
HDL-C (mmol/L)	1.3 ± 0.3	1.3 ± 0.4	0.746

Abbreviations: DBP, diastolic blood pressure; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; MET, metabolic equivalent of task; SBP, systolic blood pressure.

^aData are presented as percentage for categorical variables or mean ± SD for continuous variables; unless otherwise specified.

^bMedian (interquartile range).

Table 2. Comparisons of baseline carotid artery atherosclerosis for participants who were lost to and those who completed the follow-up^a

Atherosclerosis	Lost to follow-up (n = 251)	Finished follow-up (n = 509)	<i>P</i> value
CIMT (μm)	677 \pm 137	673 \pm 122	0.656
Plaque area (mm^2)	6.26 \pm 11.94	6.61 \pm 13.46	0.728
Plaque number	0.87 \pm 1.23	0.88 \pm 1.14	0.915
Total area (mm^2)	19.8 \pm 13.2	20.0 \pm 14.6	0.798

^aData are presented as mean \pm SD.

Table 3. Number of participants (row percentage) with different annual changes in carotid atherosclerosis

Atherosclerosis	Decrease (< 0)	No change (= 0)	Increase (> 0)
CIMT ($\mu\text{m}/\text{year}$)	86 (17%)	27 (5%)	396 (78%)
Plaque area (mm^2/year)	61 (12%)	145 (28%)	303 (60%)
Plaque number (per year)	29 (6%)	231 (45%)	249 (49%)
Total area (mm^2/year)	86 (17%)	6 (1%)	417 (82%)

Abbreviations: CIMT, carotid intima-media thickness.

Table 4. Mean differences (95% CIs) in annual changes of carotid artery atherosclerosis between the group close to and the group away from major road (the reference category) for participants with increased carotid atherosclerosis (annual change > 0)

Atherosclerosis	Close to major roads ^a	Away from major roads ^a	Difference ^{bc} (model 1)	Difference ^{bc} (model 2)	Difference ^{bc} (model 3)	Difference ^{bc} (model 4)
CIMT ($\mu\text{m}/\text{year}$) ($n_1 = 90, n_2 = 306$) ^d	12.4 \pm 9.1	13.6 \pm 9.6	-1.20 (-3.52 to 1.13)	-1.68 (-4.02 to 0.66)	-1.65 (-4.03 to 0.72)	-1.08 (-3.51 to 1.35)
Plaque area (mm^2/year) ($n_1 = 76, n_2 = 227$) ^d	2.19 \pm 3.04	2.30 \pm 2.42	-0.11 (-0.82 to 0.59)	-0.08 (-0.76 to 0.59)	-0.06 (-0.74 to 0.63)	0.00 (-0.70 to 0.71)
Plaque number (per year) ($n_1 = 64, n_2 = 185$) ^d	0.23 \pm 0.20	0.23 \pm 0.19	0.00 (-0.06 to 0.05)	-0.01 (-0.06 to 0.05)	-0.01 (-0.06 to 0.05)	-0.01 (-0.07 to 0.04)
Total area (mm^2/year) ($n_1 = 100, n_2 = 317$) ^d	1.84 \pm 2.86	1.85 \pm 2.34	-0.02 (-0.59 to 0.56)	-0.11 (-0.67 to 0.44)	-0.11 (-0.67 to 0.44)	-0.02 (-0.58 to 0.53)

Abbreviations: CIMT, carotid intima-media thickness.

^aData are presented as mean \pm standard deviation.

^bDifference of least squares means between the group close to and the group away from major roads (the group away from major roads was the reference category).

^cModel 1 was a crude unadjusted model; model 2 was adjusted for age, sex, and ethnicity; model 3 was further adjusted for BMI, smoking status, physical activity, education, and annual household income; model 4 was additionally adjusted for systolic blood pressure, LDL-C, HDL-C, neighborhood income levels, and neighborhood education levels.

^d n_1 is for participants living close to major roads, n_2 is for participants living away from major roads.

Table 5. Relative risks (95% CIs) of having greater progression (\geq the 85th percentile) in annual changes of carotid artery atherosclerosis for participants living close to major roads compared with those living away from major roads (the reference category)^a

Annual change \geq 85th percentile	RR (95% CI) ^b (model 1)	RR (95% CI) ^b (model 2)	RR (95% CI) ^b (model 3)	RR (95% CI) ^b (model 4)
CIMT \geq 19.19 $\mu\text{m}/\text{year}^c$	0.99 (0.55 -1.78)	0.78 (0.42-1.42)	0.77 (0.42-1.42)	0.81 (0.42-1.57)
Plaque area \geq 2.95 $\text{mm}^2/\text{year}^c$	0.81 (0.44-1.51)	0.50 (0.26-0.95)	0.54 (0.28-1.05)	0.55 (0.27-1.12)
Plaque number \geq 0.36 per year ^c	1.07 (0.60-1.89)	0.80 (0.45-1.45)	0.81 (0.44-1.47)	0.78 (0.42-1.46)
Total area \geq 3.17 $\text{mm}^2/\text{year}^c$	0.84 (0.45-1.57)	0.50 (0.26-0.96)	0.56 (0.29-1.10)	0.58 (0.29-1.20)

Abbreviations: CI, confidence interval; CIMT, carotid intima-media thickness; RR, relative risk.

^aThe Cox proportional hazard model was used for the data analyses.

^bModel 1 was a crude unadjusted model; model 2 was adjusted for age, sex, and ethnicity; model 3 was further adjusted for BMI, smoking status, physical activity, education, and annual household income; model 4 was additionally adjusted for systolic blood pressure, LDL-C, HDL-C, neighborhood income levels, and neighborhood education levels.

^cThe 85th percentile for the atherosclerosis marker.

Etable 6. Comparisons of three cohort studies on air pollution and CIMT^a

Characteristic	Current Study (n = 509)	Adar <i>et al.</i> 2013 ¹ (n = 4955)	Kunzli <i>et al.</i> 2010 ² (n = 1483)
Region	Vancouver, Canada	Los Angeles and other 5 U.S. cities	Los Angeles
Baseline PM _{2.5} (µg/m ³)	4.1 ± 1.5	16.6 ± 3.7	27.8 ± 2.4
Mean follow-up time (years)	5.5 ± 0.4	2.5 ± 0.8	1.8 – 3.3 ^b
Age (year)	47 ± 9	62 ± 10	59 ± 10
Male sex (%)	49	38	37
BMI (kg/m ²)	27.2 ± 4.8	28.2 ± 5.3	29.2 ± 5.5
Current smokers (%)	7	12	3
LDL-C (mmol/L)	3.2 ± 0.9	3.0 ± 0.8	3.5 ± 0.9
SBP (mmHg)	118 ± 15	126 ± 21	131 ± 18
Baseline CIMT (µm)	673 ± 122	678 ± 189	780 ± 150
Annual change in CIMT (µm/yr)	9.2 ± 12.1	14.0 ± 53.0	2.0 ± 12.9

Abbreviations: CIMT, carotid intima-media thickness; LDL-C, low-density lipoprotein cholesterol; SBP, systolic blood pressure.

^aData are presented as percentage for categorical variables and mean ± SD for continuous variables.

^bRange of average follow-up time for the five clinical trials.

REFERENCES

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