Supplemental Material

Ambient Air Pollution, Adipokines, and Glucose Homeostasis: The Framingham Heart Study

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Supplemental Table A. Sample Size of 2003 Annual Average $PM_{2.5}$ Analysis and Distance to Major Roadways Analysis for Each Measured Biomarker.

	Examination cycle 7	Examination cycle 1	Examination cycle 8	Examination cycle 2	Total for 2003 annual average $PM_{2.5}$ analysis		Total for residential proximity analysis	
	(1998-2001)	(2002-2005)	(2005-2008)	(2008-2011)	No. of observations	No. of participants	No. of observations	No. of participants
Fasting Glucose	2,415	3,281	1,925	2,768	10,389	5,958	9,264	5,403
Insulin	-	2,966	1,923	2,768	7,657	5,278	6,784	4,739
HOMA-IR	-	2,966	1,923	2,768	7,657	5,278	6,784	4,739
HbA1c	-	-	1,923	2,767	4,690	4,690	4,164	4,164
Adiponectin	2,016	3,266	-	-	5,282	5,282	4,714	4,714
Resisitn	2,030	-	-	-	2,030	2,030	1,845	1,845
Leptin	-	3,266	-	-	3,266	3,266	2,881	2,881

Abbreviation: $PM_{2.5}$, fine particulate matter; HOMA-IR, homeostasis model assessment of insulin resistance; HbA1c, hemoglobin A1c.

Supplemental Table B. Characteristics and Spearman Correlations Between 1-Day Moving Averages of Pollutants.

Air Pollutants	No. of Observations	Mean (SD)	Interquartile Range	Spearman Correlation Coefficients			
				BC	SO_4^{2-}	NO_x	O_3
$PM_{2.5}$ ($\mu g/m^3$)	6,990	9.7 (5.9)	5.7	0.72	0.82	0.43	0.01
BC ($\mu g/m^3$)	6,983	0.8 (0.4)	0.5		0.54	0.58	-0.26
SO_4^{2-} ($\mu g/m^3$)	6,145	2.9 (2.4)	2.1			0.31	0.13
NO_x (ppb)	6,719	36.5 (20.2)	19.3				-0.54
O_3 (ppb)	6,997	23.7 (10.9)	14.4				

Abbreviation: SD, standard deviation; $PM_{2.5}$, fine particulate matter; BC, black carbon; SO_4^{2-}, sulfates; NO_x, nitrogen oxides; O_3, ozone.

Supplemental Table C. Associations of 2003 Annual Average Fine Particulate Matter ($PM_{2.5}$) With Adipokines And Biomarkers of Glucose Homeostasis, **by Median Age, Sex, Educational Attainment, Obesity and Prediabetes Status** [a].

	Fasting plasma glucose	HBA1c	Adiponectin	Resistin
	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
Median Age [b]				
≤ Median age	-0.11 (-0.35, 0.14)	-0.13 (-0.35, 0.10)	-1.00 (-3.19, 1.25)	-1.18 (-3.98, 1.69)
> Median age	-0.05 (-0.31, 0.22)	0.04 (-0.19, 0.27)	0.55 (-1.86, 3.01)	-3.13 (-5.89, -0.29)
Sex [c]				
Women	-0.16 (-0.41, 0.10)	-0.04 (-0.26, 0.17)	-1.33 (-3.48, 0.87)	-3.08 (-5.69, -0.41)
Men	0.02 (-0.27, 0.31)	-0.06 (-0.31, 0.18)	1.01 (-1.44, 3.52)	-0.93 (-3.93, 2.16)
Educational Attainment [d]				
≤ High school	0.30 (-0.19, 0.78)	0.15 (-0.28, 0.59)	0.62 (-3.30, 4.69)	-3.05 (-7.16, 1.25)
≥ College	-0.15 (-0.36, 0.07)	-0.09 (-0.27, 0.09)	-0.41 (-2.25, 1.46)	-2.06 (-4.40, 0.34)
Obesity Status [e]				
BMI >30 kg/m^2	-0.12 (-0.34, 0.11)	-0.03 (-0.22, 0.16)	-0.33 (-2.23, 1.59)	-1.61 (-3.98, 0.81)
BMI ≤30 kg/m^2	0.04 (-0.32, 0.39)	-0.11 (-0.41, 0.19)	-0.18 (-3.46, 3.22)	-3.55 (-7.16, 0.20)
Prediabetes Status [f]				
No Prediabetes	-0.04 (-0.20, 0.11)	0.00 (-0.19, 0.19)	-0.96 (-2.86, 0.97)	-2.18 (-4.75, 0.46)
Prediabetes	0.04 (-0.20, 0.27)	-0.10 (-0.38, 0.18)	1.10 (-2.07, 4.38)	-1.90 (-4.96, 1.26)

	Insulin	HOMA-IR	Leptin
	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
Median Age [b]			
≤ Median age	-0.14 (-1.64, 1.39)	-0.18 (-1.79, 1.45)	-0.45 (-3.33, 2.52)
> Median age	-1.37 (-2.90, 0.19)	-1.47 (-3.10, 0.19)	0.80 (-2.14, 3.83)
Sex [c]			
Women	-0.59 (-2.10, 0.94)	-0.73 (-2.34, 0.91)	-0.58 (-3.32, 2.23)
Men	-0.92 (-2.61, 0.80)	-0.91 (-2.72, 0.93)	1.18 (-1.91, 4.37)
Educational Attainment [d]			
≤ High school	0.77 (-2.15, 3.78)	1.07 (-2.06, 4.30)	0.44 (-4.92, 6.11)
≥ College	-1.06 (-2.30, 0.20)	-1.21 (-2.53, 0.14)	0.01 (-2.28, 2.35)
Obesity Status [e]			
BMI >30 kg/m^2	-0.76 (-2.07, 0.58)	-0.81 (-2.22, 0.61)	0.08 (-2.29, 2.51)
BMI ≤30 kg/m^2	-0.60 (-2.67, 1.53)	-0.72 (-2.94, 1.54)	0.55 (-3.82, 5.12)
Prediabetes Status [f]			
No Prediabetes	-0.39 (-1.69, 0.92)	-0.44 (-1.78, 0.92)	0.14 (-2.19, 2.53)
Prediabetes	-1.25 (-3.20, 0.74)	-1.21 (-3.22, 0.86)	0.54 (-4.16, 5.46)

Abbreviation: $PM_{2.5}$, fine particulate matter; HBA1c, hemoglobin A1c; HOMA-IR, homeostasis model assessment of insulin resistance; CI, confidence intervals.

a) Results were scaled to equivalent to 1.5 $\mu g/m^3$ higher in $PM_{2.5}$ concentrations.

b) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin. Median age for fasting glucose analyses was 50 years old, for insulin and HOMA-IR analyses was 47 years old, for HBA1c analysis was 53 years old, for adiponectin analysis was 46 years old, for leptin 40 years old, and for resistin was 59 years old.

c) Models were adjusted for centered age, (centered age)^2, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

d) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

e) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

f) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

Supplemental Table D. Associations of Residential Proximity to Major Roadways With Adipokines And Biomarkers of Glucose Homeostasis, **by Median Age, Sex, Educational Attainment, Obesity and Prediabetes Status** [a].

	Fasting plasma glucose	HBA1c	Adiponectin	Resistin
	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
Median Age [b]				
≤ Median age	0.21 (-0.09, 0.51)	0.06 (-0.22, 0.34)	0.66 (-2.07, 3.47)	0.80 (-2.39, 4.09)
> Median age	0.35 (0.03, 0.67)	0.00 (-0.28, 0.27)	-2.15 (-4.86, 0.64)	3.57 (0.37, 6.87)
Sex [c]				
Women	0.40 (0.09, 0.71)	0.06 (-0.21, 0.33)	0.82 (-1.84, 3.55)	2.20 (-0.82, 5.31)
Men	0.14 (-0.19, 0.48)	-0.01 (-0.30, 0.28)	-2.53 (-5.32, 0.34)	2.20 (-1.21, 5.72)
Educational Attainment [d]				
≤ High school	0.16 (-0.30, 0.62)	0.31 (-0.11, 0.72)	1.22 (-2.67, 5.27)	2.43 (-1.32, 6.33)
≥ College	0.32 (0.06, 0.58)	-0.05 (-0.28, 0.17)	-1.11 (-3.36, 1.19)	1.95 (-0.97, 4.95)
Obesity Status [e]				
BMI ≤30 kg/m^2	0.17 (-0.09, 0.44)	-0.11 (-0.35, 0.12)	-0.23 (-2.50, 2.10)	3.28 (0.55, 6.09)
BMI >30 kg/m^2	0.55 (0.14, 0.96)	0.37 (0.01, 0.73)	-2.18 (-5.86, 1.65)	-0.10 (-4.12, 4.09)
Prediabetes Status [f]				
No Prediabetes	0.15 (-0.04, 0.33)	-0.02 (-0.26, 0.22)	0.20 (-2.09, 2.53)	1.91 (-0.99, 4.88)
Prediabetes	0.15 (-0.12, 0.42)	0.01 (-0.31, 0.33)	-3.06 (-6.62, 0.64)	2.65 (-0.97, 6.41)

	Insulin	HOMA-IR	Leptin
	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
Median Age [b]			
≤ Median age	0.93 (-0.89, 2.78)	1.12 (-0.83, 3.10)	2.82 (-0.66, 6.43)
> Median age	0.25 (-1.63, 2.16)	0.54 (-1.47, 2.59)	-0.27 (-4.01, 3.61)
Sex [c]			
Women	0.81 (-1.04, 2.70)	1.18 (-0.81, 3.21)	0.87 (-2.61, 4.46)
Men	0.37 (-1.61, 2.39)	0.46 (-1.65, 2.63)	2.15 (-1.60, 6.03)
Educational Attainment [d]			
≤ High school	0.25 (-2.63, 3.21)	0.50 (-2.58, 3.68)	-0.76 (-6.51, 5.33)
≥ College	0.79 (-0.74, 2.35)	1.04 (-0.61, 2.71)	2.02 (-0.85, 4.98)
Obesity Status [e]			
BMI ≤30 kg/m^2	0.40 (-1.18, 2.00)	0.56 (-1.13, 2.28)	2.96 (-0.03, 6.04)
BMI >30 kg/m^2	1.13 (-1.37, 3.69)	1.58 (-1.11, 4.33)	-3.10 (-8.01, 2.06)
Prediabetes Status [f]			
No Prediabetes	-0.23 (-1.79, 1.35)	-0.15 (-1.76, 1.49)	2.61 (-0.30, 5.60)
Prediabetes	1.61 (-0.67, 3.93)	1.71 (-0.65, 4.12)	-3.05 (-8.36, 2.57)

Abbreviation: $PM_{2.5}$, fine particulate matter; HBA1c, hemoglobin A1c; HOMA-IR, homeostasis model assessment of insulin resistance; CI, confidence intervals.

a) Analysis was restricted to participants who lived within 1,000 m from major roadways. Results were scaled to comparing participants who lived 64 m from major roadways to those who lived 413 m away.

b) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin. Median age for fasting glucose analyses was 50 years old, for insulin and HOMA-IR analyses was 47 years old, for HBA1c analysis was 53 years old, for adiponectin analysis was 46 years old, for leptin 40 years old, and for resistin was 59 years old.

c) Models were adjusted for centered age, (centered age)^2, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

d) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

e) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

f) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

Supplemental Table E. Sensitivity Analyses for Associations of 2003 Annual Average Fine Particulate Matter ($PM_{2.5}$) and Residential Proximity to Major Roadways With Adipokines And Biomarkers of Glucose Homeostasis.

Condition	Exposure	Fasting plasma glucose	HBA1c	Adiponectin	Resistin
		% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
1. Minimally adjusted [a]	$PM_{2.5}$ [c]	-0.17 (-0.37, 0.02)	-0.08 (-0.24, 0.08)	-0.18 (-1.82, 1.49)	-1.24 (-3.21, 0.77)
	Distance [d]	0.39 (0.16, 0.63)	0.09 (-0.11, 0.29)	-1.61 (-3.60, 0.43)	2.22 (-0.09, 4.58)
2. $PM_{2.5}$ 2003-2005 average [b]	$PM_{2.5}$ [c]	-0.06 (-0.24, 0.12)	-0.03 (-0.18, 0.12)	0.69 (-0.85, 2.26)	-1.78 (-3.61, 0.09)
3. Exclude observations with 2003 annual $PM_{2.5}$ > 12 μg/m^3 [b]	$PM_{2.5}$ [c]	-0.02 (-0.28, 0.23)	-0.09 (-0.30, 0.12)	0.38 (-1.81, 2.61)	-2.09 (-4.55, 0.42)
4. Include those who lived >1,000 m from the nearest major roadway [b]	Distance [d]	0.18 (-0.02, 0.39)	-0.05 (-0.22, 0.13)	-0.56 (-2.31, 1.21)	1.78 (-0.32, 3.92)
5. Restrict to participant with both $PM_{2.5}$ and proximity data [b]	$PM_{2.5}$ [c]	-0.03 (-0.26, 0.20)	0.00 (-0.19, 0.19)	-0.61 (-2.57, 1.39)	-1.70 (-4.05, 0.71)
	Distance [d]	0.28 (0.05, 0.51)	0.03 (-0.17, 0.22)	-0.73 (-2.68, 1.26)	2.20 (-0.09, 4.54)

Condition	Exposure	Insulin	HOMA-IR	Leptin
		% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
1. Minimally adjusted [a]	$PM_{2.5}$ [c]	-1.36 (-2.68, -0.03)	-1.55 (-2.97, -0.12)	-0.83 (-3.87, 2.30)
	Distance [d]	1.45 (-0.18, 3.11)	1.81 (0.05, 3.59)	5.25 (1.17, 9.51)
2. $PM_{2.5}$ 2003-2005 average [b]	$PM_{2.5}$ [c]	-0.52 (-1.58, 0.55)	-0.60 (-1.73, 0.54)	-0.01 (-1.95, 1.98)
3. Exclude observations with 2003 annual $PM_{2.5}$ > 12 μg/m^3 [b]	$PM_{2.5}$ [c]	-0.53 (-2.03, 1.00)	-0.57 (-2.18, 1.06)	1.12 (-1.75, 4.07)
4. Include those who lived >1,000 m from the nearest major roadway [b]	Distance [d]	0.66 (-0.56, 1.89)	0.82 (-0.48, 2.13)	1.45 (-0.85, 3.79)
5. Restrict to participant with both $PM_{2.5}$ and proximity data [b]	$PM_{2.5}$ [c]	-1.11 (-2.46, 0.26)	-1.15 (-2.60, 0.31)	0.50 (-2.00, 3.06)
	Distance [d]	0.60 (-0.76, 1.99)	0.85 (-0.62, 2.33)	1.46 (-1.12, 4.12)

Abbreviation: $PM_{2.5}$, fine particulate matter; HBA1c, hemoglobin A1c; HOMA-IR, homeostasis model assessment of insulin resistance; CI, confidence intervals.

a) Models were adjusted for centered age, (centered age)^2, sex, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

b) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.
c) Results were scaled to equivalent to 1.5 μg/m^3 higher in $PM_{2.5}$ concentrations.
d) Analysis was restricted to participants who lived within 1,000 m from major roadways. Results were scaled to comparing participants who lived 64 m (25th percentile) from major roadways to those who lived 413 m (75th percentile) away.

Supplemental Table F. Associations of the 2003 Annual Average Fine Particulate Matter ($PM_{2.5}$) Concentrations and Residential Proximity to Major Roadways With Adipokines and Biomarkers of Glucose Homeostasis Among Participants Who Lived Within 50 km From the Central Site [a].

	Fasting Plasma Glucose		HBA1c		Adiponectin		Resistin	
	% Difference	95% CI	% Difference	95% CI	% Difference	95% CI	% Difference	95% CI
2003 annual $PM_{2.5}$ [b,c]	-0.16	-0.53, 0.21	-0.18	-0.50, 0.13	0.20	-2.86, 3.34	-1.69	-5.32, 2.08
2003 annual $PM_{2.5}$ + $\Delta PM_{2.5}$ [c,d]	-0.14	-0.51, 0.24	-0.21	-0.53, 0.12	0.79	-2.31, 3.99	-1.20	-4.90, 2.65
Living closer to major roadways [e,f]	0.08	-0.21, 0.36	0.02	-0.22, 0.26	-0.45	-2.81, 1.97	2.02	-0.65, 4.77
Distance categories [c]								
<50 m	0.45	-0.21, 1.12	0.03	-0.52, 0.58	-1.31	-6.66, 4.35	2.73	-3.25, 9.09
50-<100 m	0.25	-0.58, 1.09	0.12	-0.59, 0.83	0.91	-5.98, 8.31	-3.72	-11.07, 4.24
100-<200 m	0.04	-0.66, 0.74	0.56	-0.04, 1.15	0.24	-5.47, 6.29	5.23	-1.38, 12.29
200-<400 m	0.26	-0.38, 0.91	0.12	-0.42, 0.65	-0.04	-5.30, 5.52	-2.66	-8.23, 3.25
400-<1,000 m	0 (REF)		0 (REF)		0 (REF)		0 (REF)	

	Insulin		HOMA-IR		Leptin	
	% Difference	95% CI	% Difference	95% CI	% Difference	95% CI
2003 annual $PM_{2.5}$ [b,c]	-0.34	-2.51, 1.88	-0.49	-2.81, 1.88	0.60	-3.31, 4.68
2003 annual $PM_{2.5}$ + $\Delta PM_{2.5}$ [c,d]	-0.53	-2.71, 1.70	-0.68	-3.01, 1.70	0.25	-3.69, 4.34
Living closer to major roadways [e,f]	0.42	-1.28, 2.16	0.45	-1.37, 2.31	3.92	0.61, 7.35
Distance categories [c]						
<50 m	1.59	-2.37, 5.72	1.76	-2.49, 6.19	6.14	-1.67, 14.58
50-<100 m	-3.20	-7.94, 1.77	-3.25	-8.30, 2.08	2.18	-7.00, 12.27
100-<200 m	-0.26	-4.40, 4.05	-0.29	-4.70, 4.33	-4.91	-12.11, 2.88
200-<400 m	0.45	-3.39, 4.43	0.41	-3.69, 4.68	-6.30	-12.97, 0.88
400-<1,000 m	0 (REF)		0 (REF)		0 (REF)	

Abbreviation: CI, confidence interval; $PM_{2.5}$, fine particulate matter; HBA1c, hemoglobin A1c; HOMA-IR, homeostasis model assessment of insulin resistance.

a) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract

population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.

b) Sample size was: 7,007 for fasting plasma glucose; 3,069 for HbA1c; 3,599 for adiponectin; 1,479 for resistin; 4,996 for fasting insulin and HOMA-IR; and 2,129 for leptin.

c) Results were scaled to equivalent to 1.5 $\mu g/m^3$ higher in $PM_{2.5}$ concentrations.

d) $\Delta PM_{2.5}$ = (1-day moving average of $PM_{2.5}$ measured at central site) – (model-based 2003 annual average $PM_{2.5}$).

e) Analysis was further restricted to participants who lived within 1,000 m from major roadways.

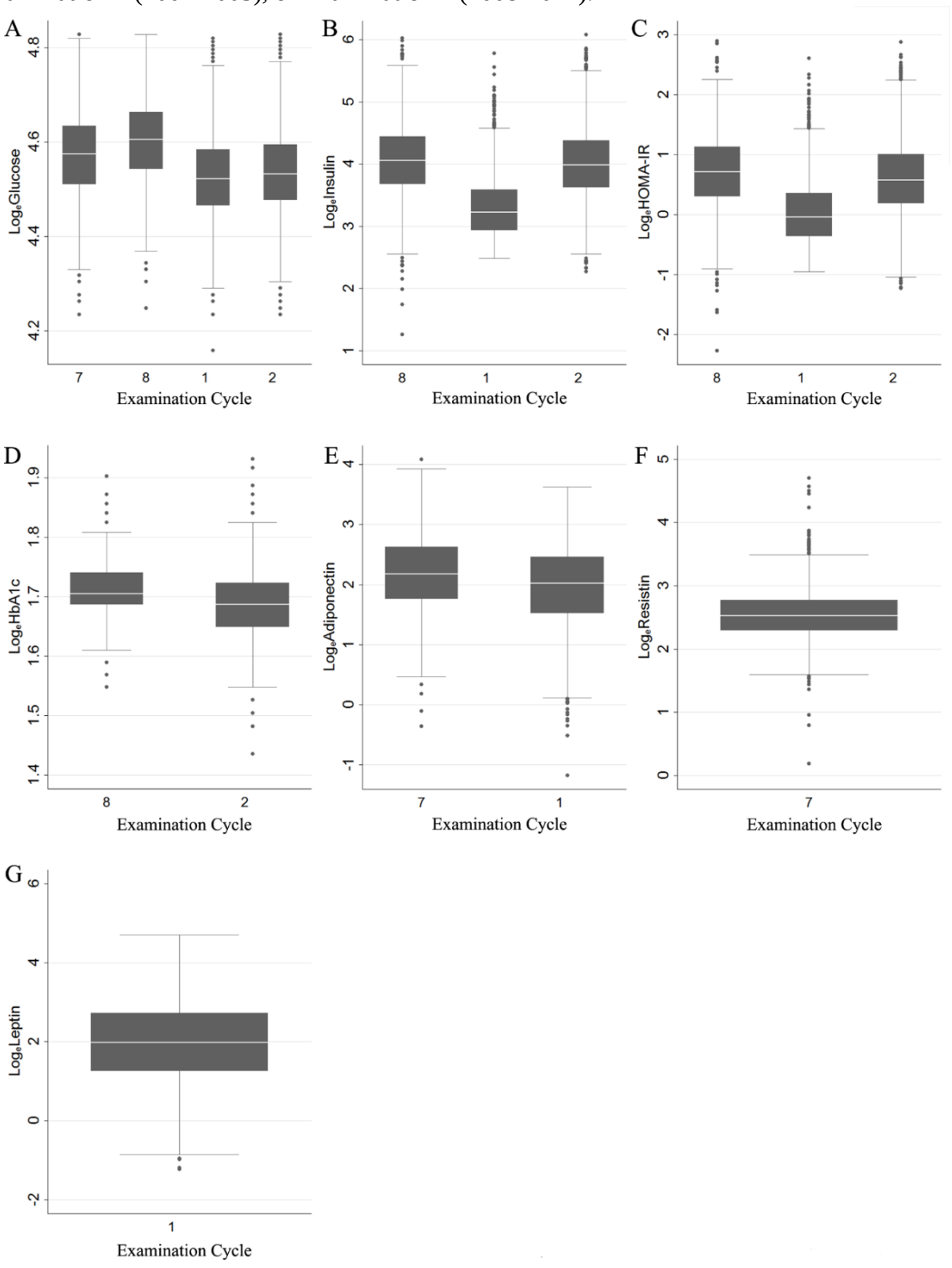
f) Results were scaled to comparing participants who lived 64 m (25^{th} percentile) from major roadways to those who lived 413 m (75^{th} percentile) away.

Supplemental Table G. Associations of the 2003 Annual Average Fine Particulate Matter ($PM_{2.5}$) Concentrations and Residential Proximity to Major Roadways With Adipokines and Biomarkers of Glucose Homeostasis [a], Restricting to Participants With Two Measurements.

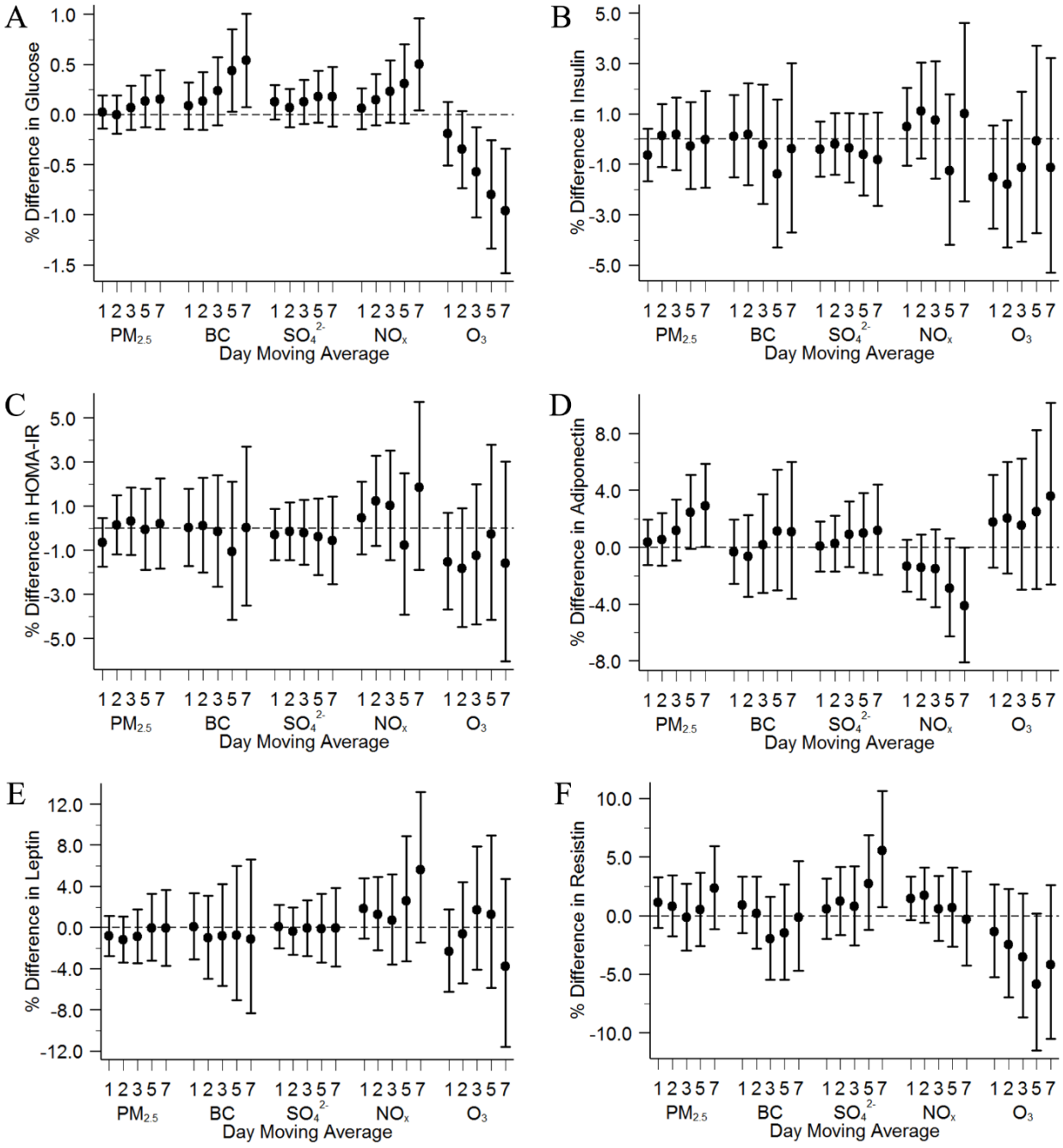
	Fasting Glucose	Insulin	HOMA-IR
	% Difference (95% CI)	% Difference (95% CI)	% Difference (95% CI)
2003 annual $PM_{2.5}$ [b,c], $\mu g/m^3$	-0.17 (-0.38, 0.05)	-0.99 (-2.39, 0.42)	-1.14 (-2.63, 0.37)
Living closer to major roadways [d,e]	0.22 (-0.03, 0.47)	-0.10 (-1.80, 1.63)	0.07 (-1.75, 1.92)
Distance Category [d], m			
<50	0.65 (0.07, 1.23)	-1.02 (-4.86, 2.98)	-0.59 (-4.71, 3.72)
50-<100	0.11 (-0.61, 0.83)	-2.96 (-7.53, 1.83)	-2.95 (-7.83, 2.19)
100-<200	0.06 (-0.54, 0.67)	-2.33 (-6.29, 1.79)	-2.58 (-6.79, 1.83)
200-<400	0.47 (-0.09, 1.02)	-1.99 (-5.66, 1.83)	-1.89 (-5.82, 2.20)
400-<1,000	0 (REF)	0 (REF)	0 (REF)

Abbreviation: CI, confidence interval; $PM_{2.5}$, fine particulate matter; HOMA-IR, homeostasis model assessment of insulin resistance.
a) Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, and sine and cosine season. An exam identifier was added for fasting glucose, insulin, HOMA-IR, HBA1c, and adiponectin.
b) Analyses were restricted to participants with two measurements: 4,431 for fasting plasma glucose; and 2,379 for fasting insulin and HOMA-IR.
c) Results were scaled to equivalent to 1.5 $\mu g/m^3$ higher in $PM_{2.5}$ concentrations.
d) Analysis was further restricted to participants who lived within 1,000 m from major roadways.
e) Results were scaled to comparing participants who lived 64 m (25th percentile) from major roadways to those who lived 413 m (75th percentile) away.

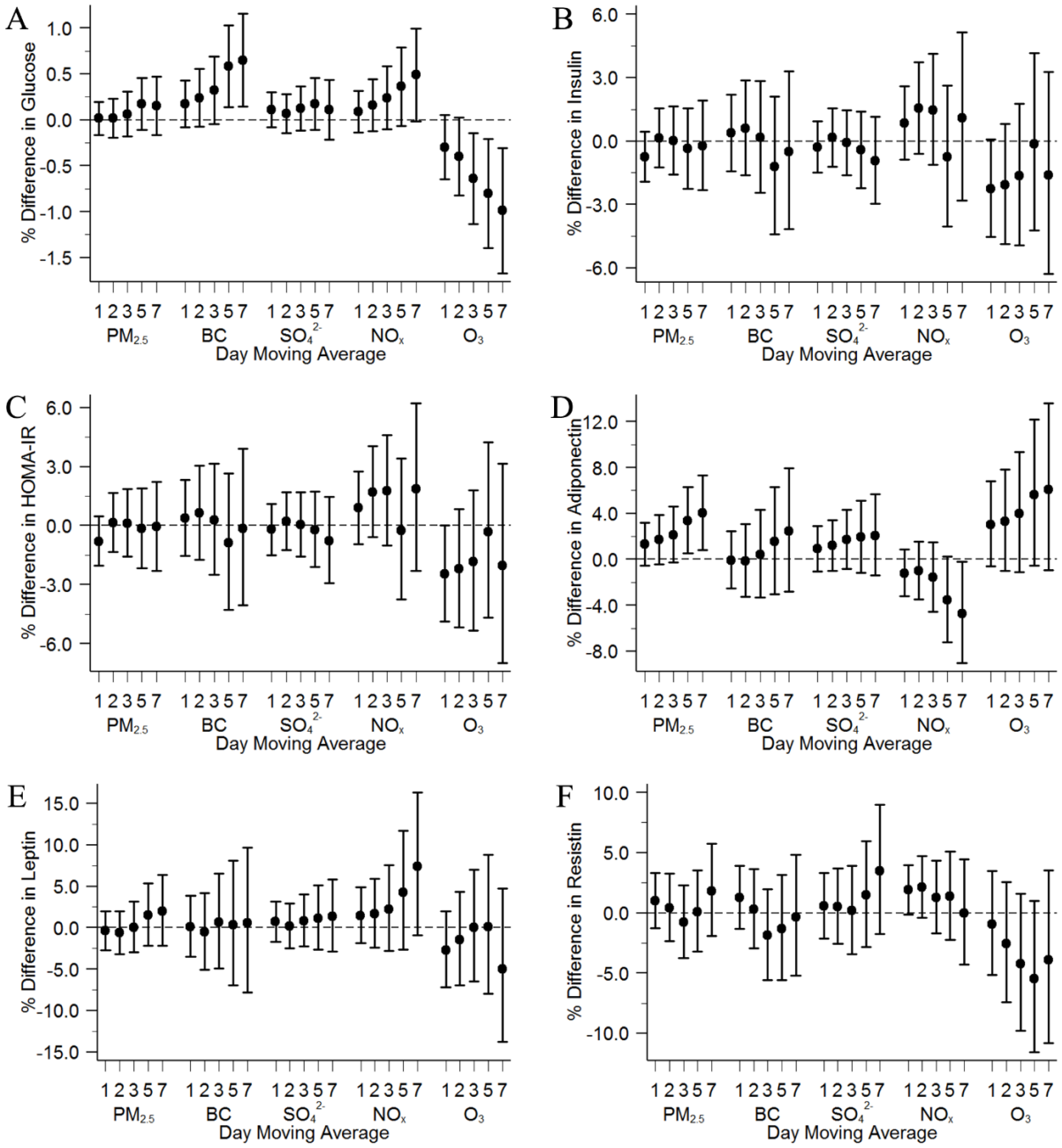
Supplemental Figure A. Boxplots of A) Fasting Glucose, B) Insulin, C) HOMA-IR, D) HbA1c, E) Adiponectin, F) Resistin, and G) Leptin Among Participants From the Framingham Offspring Cohort Examination 7 (1998-2001), Examination 8 (2005-2008), Third Generation Cohort Examination 1 (2002-2005), or Examination 2 (2008-2011).



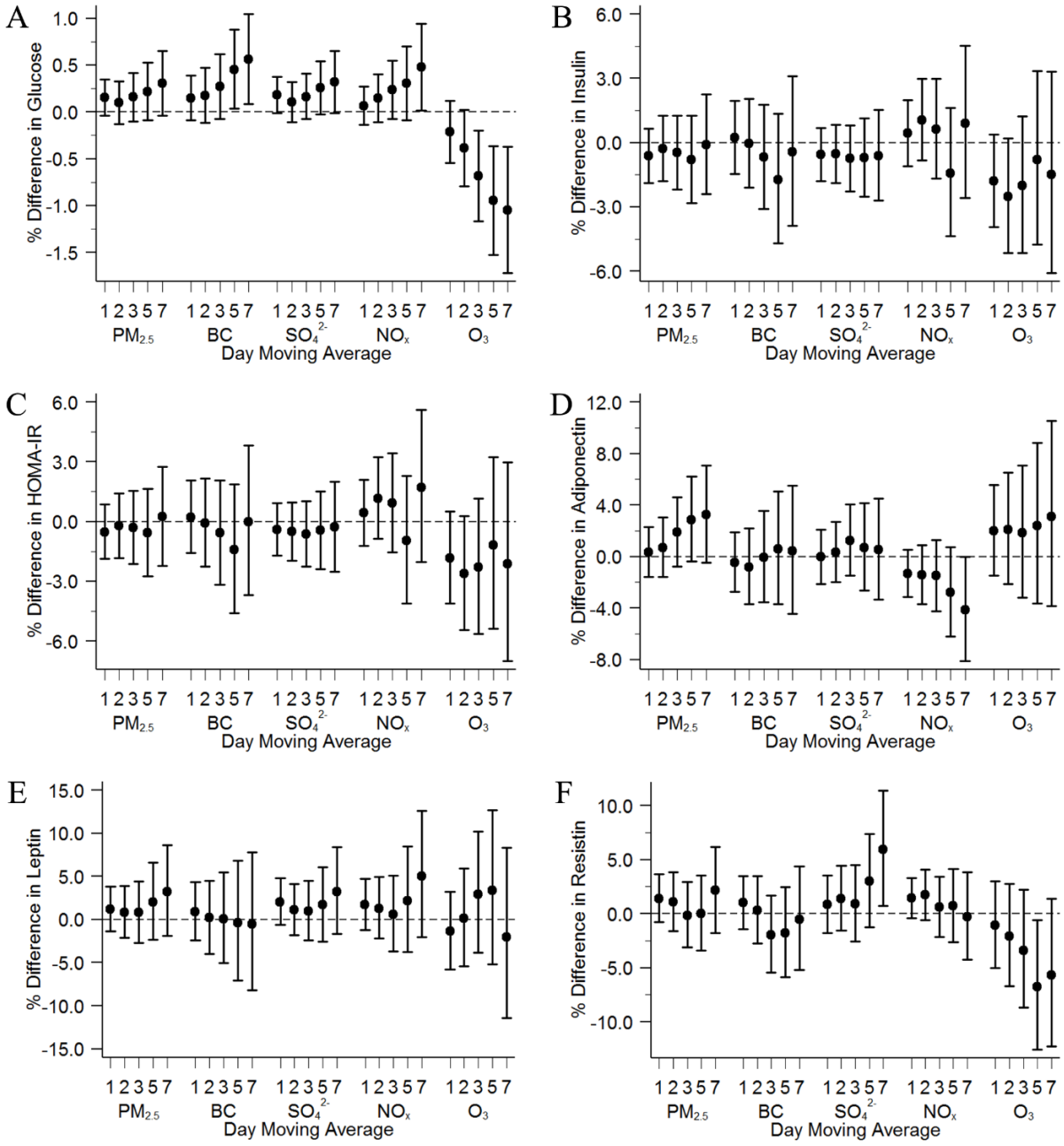
Supplemental Figure B. Associations of **1-, 2-, 3-, 5-, and 7-Day Moving Averages** of Air Pollutants With A) Fasting Glucose, B) Insulin, C) HOMA-IR, D) Adiponectin, E) Leptin, and F) Resistin. Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season, day of week, temperature, and relative humidity. An exam identifier was added for glucose, insulin, HOMA-IR, and adiponectin. Results were scaled to 5 µg/m^3 for fine particulate matter ($PM_{2.5}$), 0.5 µg/m^3 for black carbon (BC), 2 µg/m^3 for sulfate (SO_4^{2-}), 20 ppb for nitrogen oxides (NO_x), and 15 ppb for ozone (O_3). Error bars indicate the 95% confidence intervals.



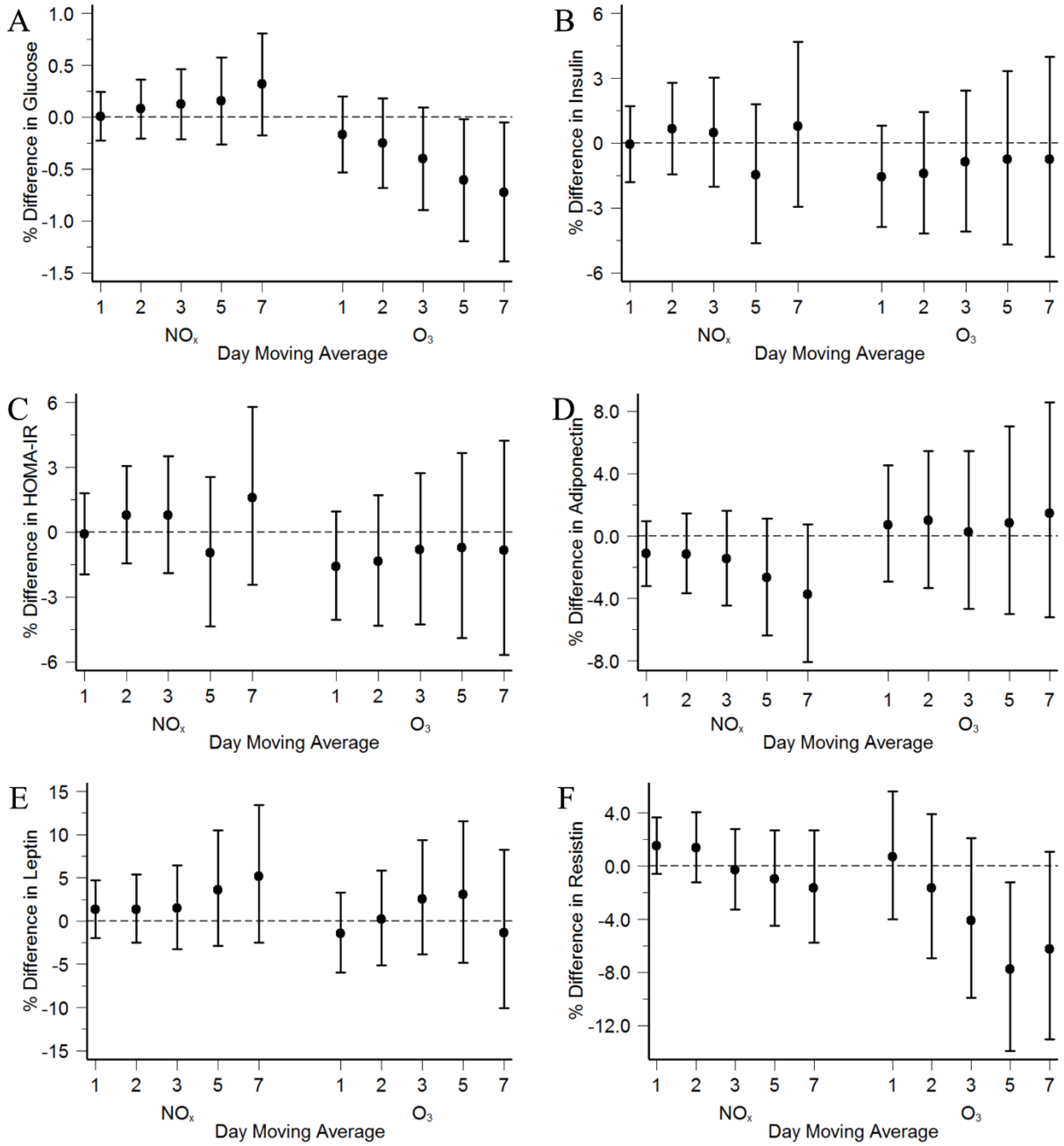
Supplemental Figure C. Associations of 1- to 7-Day Moving Averages of Air Pollutants With A) Fasting Glucose, B) Insulin, C) HOMA-IR, D) Adiponectin, E) Leptin, and F) Resistin Among Participants **Who Lived Within 40 Km From the Central Site.** Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season, day of week, temperature, and relative humidity. An exam identifier was added for glucose, insulin, HOMA-IR, and adiponectin. Results were scaled to 5 µg/m^3 for fine particulate matter ($PM_{2.5}$), 0.5 µg/m^3 for black carbon (BC), 2 µg/m^3 for sulfate (SO_4^{2-}), 20 ppb for NO_x, and 15 ppb for O_3. Error bars indicate the 95% confidence intervals.



Supplemental Figure D. Associations of 1- to 7-Day Moving Averages of Air Pollutants With A) Fasting Glucose, B) Insulin, C) HOMA-IR, D) Adiponectin, E) Leptin, and F) Resistin. **Observations with fine particulate matter ($PM_{2.5}$) > 35 µg/m^3 in any of the 7 days prior to examination visit were excluded.** Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season, day of week, temperature, and relative humidity. An exam identifier was added for glucose, insulin, HOMA-IR, and adiponectin. Results were scaled to 5 µg/m^3 for fine particulate matter ($PM_{2.5}$), 0.5 µg/m^3 for black carbon (BC), 2 µg/m^3 for sulfate (SO_4^{2-}), 20 ppb for NO_x, and 15 ppb for O_3. Error bars indicate the 95% confidence intervals.



Supplemental Figure E. Associations of 1- to 7-Day Moving Averages of Air Pollutants With A) Fasting Glucose, B) Insulin, C) HOMA-IR, D) Adiponectin, E) Leptin, and F) Resistin. Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season, day of week, temperature, and relative humidity. An exam identifier was added for glucose, insulin, HOMA-IR, and adiponectin. Results were scaled to 20 ppb for NO_x and 15 ppb for O_3. Error bars indicate the 95% confidence intervals. **The same day moving averages of both pollutants were included in the same model.**



Supplemental Figure F. Associations of **1-, 3-, and 7-Day Moving Averages** of Air Pollutants With A) Fasting Glucose, B) Insulin, and C) HOMA-IR, **Restricting to Participants With Two Measurements**. Models were adjusted for centered age, (centered age)^2, sex, body mass index, smoking status, pack years, alcohol intake, educational attainment, physical activity, census tract median household income, census tract median value of owner occupied housing units, census tract population density, usual occupation, date of examination visit, sine and cosine season, day of week, temperature, and relative humidity. An exam identifier was added for glucose, insulin, HOMA-IR, and adiponectin. Results were scaled to 5 µg/m^3 for fine particulate matter ($PM_{2.5}$), 0.5 µg/m^3 for black carbon (BC), 2 µg/m^3 for sulfate (SO_4^{2-}), 20 ppb for nitrogen oxides (NO_x), and 15 ppb for ozone (O_3). Error bars indicate the 95% confidence intervals.