
## Research Report 236

# Traffic-Related Air Pollution and Birth Weight: The Roles of Noise, Placental Function, Green Space, Physical Activity, and Socioeconomic Status (FRONTIER)

Payam Dadvand and Jordi Sunyer et al.

## Appendices 1–60

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Appendices 1–60 were reviewed by the HEI Review Committee and have been lightly edited for spelling, grammar, punctuation, and cross-references to the main report.

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# Contents

## Appendix 1. Quality Assurance / Quality Control Procedures

### Written standard operating procedures (SOPs)

We developed standard operating procedures for all aspects of the project, including enrolment, data collection, data management and curation, and analyses. Instructions and a template were generated to make the SOPs uniform. Maria Foraster, an ISGlobal faculty member, was assigned as the SOP coordinator who 1) developed the aforementioned instructions and template, 2) monitored and assured the adherence of SOPs to these instructions including the details and timing of the preparation, 3) acted as the reference point for the new SOPs as well as the communication of proposals for changes in SOPs, and 4) communicated the changes in SOP with the BiSC Steering Committee for their approval and kept the record of these changes in the case of its approval.

### Recordkeeping procedures

We maintained digital records to document all aspects of the project. For the SOPs, an instruction and a template were generated to make them uniform. The SOP coordinator assured adherence to the record-keeping. Moreover, all the datasets, scripts (R statistical package) to conduct the analyses, and outputs were securely saved.

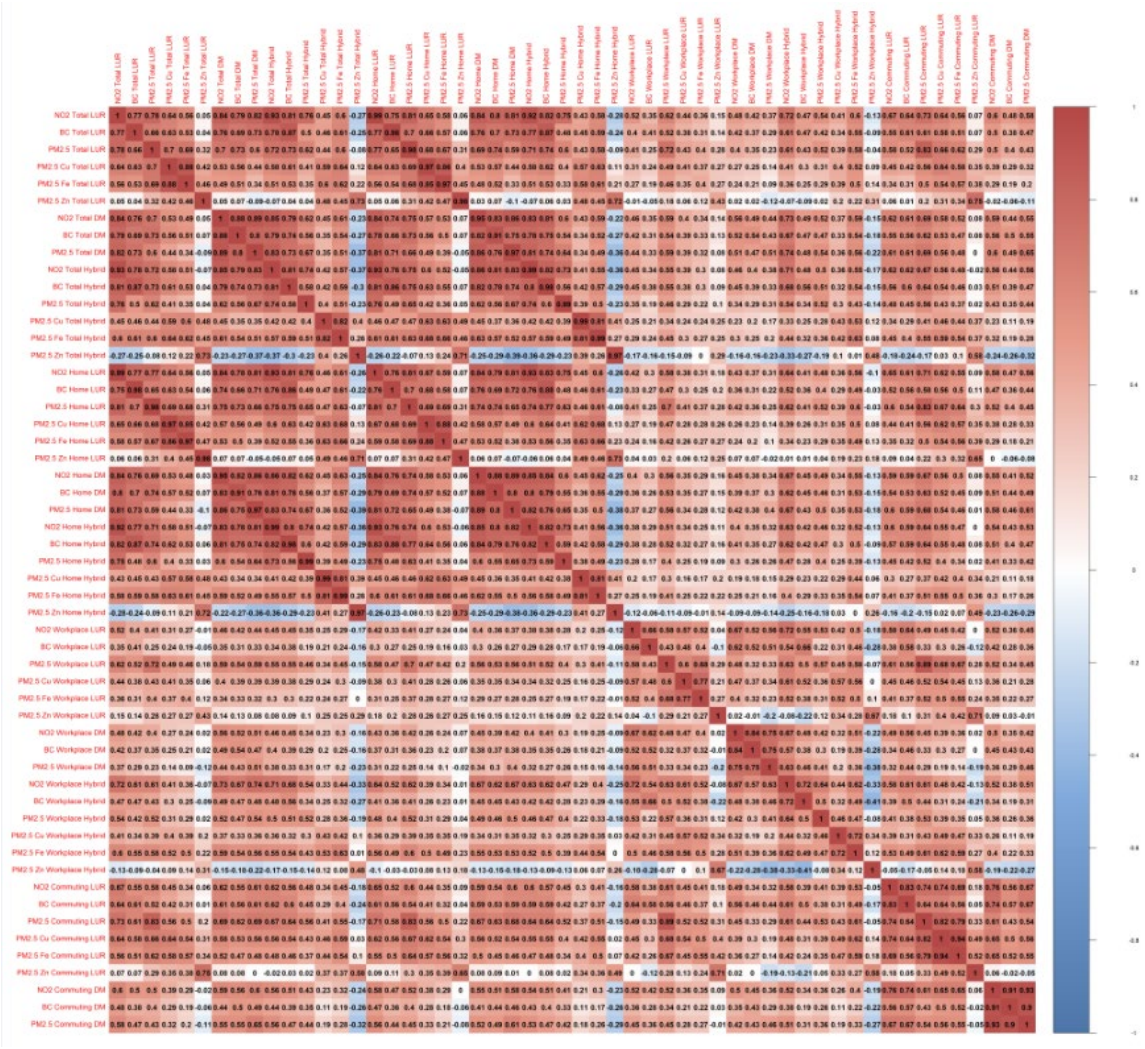
### Data processing procedures

We have developed an SOP for the data processing procedures, including data transfer, storage, cleaning, and maintenance. We also developed and approved a detailed FRONTIER Statistical Analysis Protocol and conducted the FRONTIER analyses accordingly.

### Quality control procedures

Each of the project SOPs contained a section on quality control procedures detailing the measures that needed to be taken to ensure the accuracy and rigor of that specific activity.

**Appendix 2.** Spearman's correlation coefficients among air pollutant levels for the entire pregnancy estimated by land use regression models (LUR), dispersion models (DM), and hybrid LUR-DM models (Hybrid).



**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Total: all microenvironments combined.

**Appendix 3.** Spearman's correlation coefficients among air pollutant levels in all microenvironments combined for the entire pregnancy estimated by land use regression models (LUR), modeled and measured noise levels, and noise annoyance.

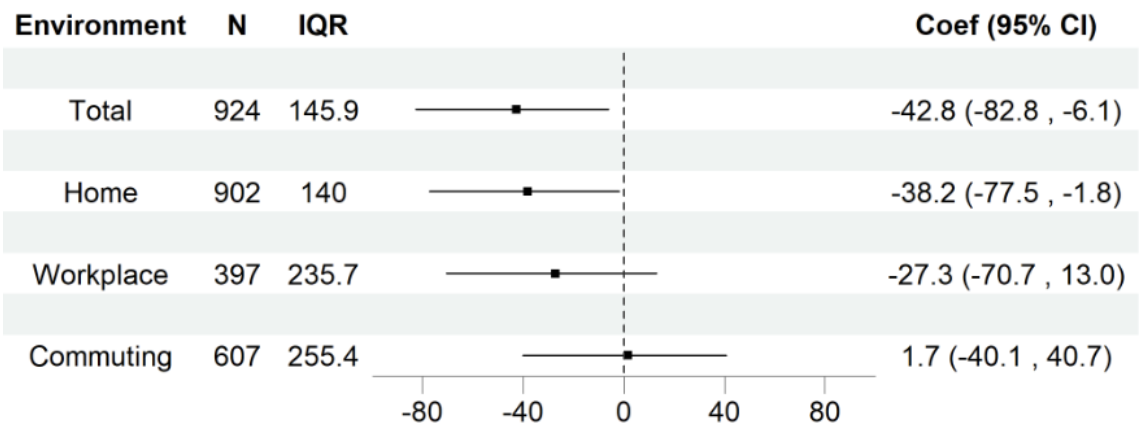

**Abbreviations:** LUR: Land use regression model; Total: all microenvironments combined (i.e., home, workplace, and commuting for air pollutants and home and workplace for noise metrics).

**Appendix 4.** Median (interquartile range (IQR) of the greenness (average normalized difference vegetation index (NDVI)) and canopy volume ($m^3/m^2$) surrounding a home and the major roads within 200m from a home.

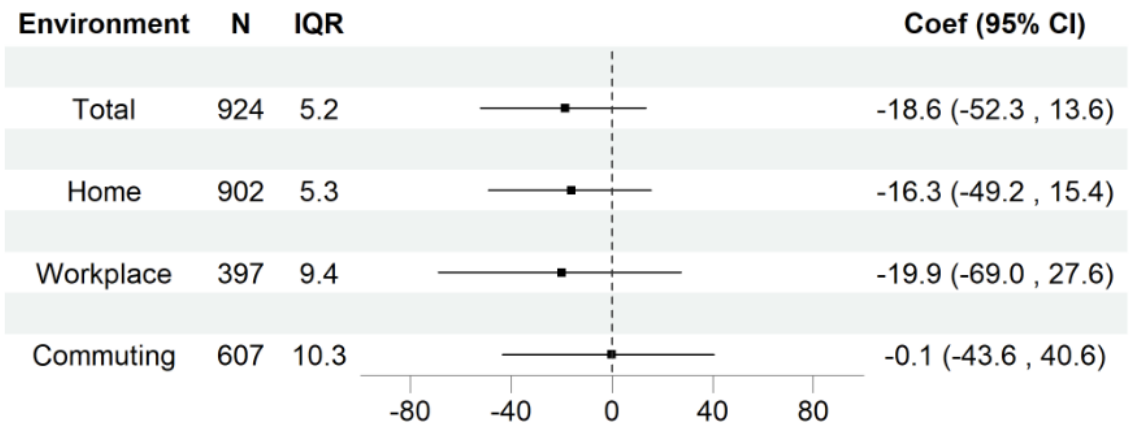
| Variable | Description |
|---|---|
| **Home greenness (50m buffer)** | 0.2 (0.1) |
| Missing | 1 (0.1%) |
| **Home greenness (300m buffer)** | 0.2 (0) |
| Missing | 1.0 (0.1%) |
| **Home canopy volume (50m buffer)** | 2.0 (2.2) |
| Missing | 320 (31.2%) |
| **Home canopy volume (300m buffer)** | 2.3 (1.3) |
| Missing | 320 (31.2%) |
| **Road greenness (50m buffer)** | 0.2 (0.1) |
| Missing | 114 (11.1%) |
| **Road canopy volume (50m buffer)** | 1.9 (2.8) |
| Missing | 118 (11.5%) |

**Appendix 5.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase inhaled dose of (A) $NO_2$ (μg/$m^3$), (B) black carbon (μg/$m^3$), (C) $PM_{2.5}$ (μg/$m^3$), (D) $PM_{2.5}$ Cu content (ng/$m^3$), (E) $PM_{2.5}$ Fe content (μg/$m^3$), and (F) $PM_{2.5}$ Zn content (ng/$m^3$).

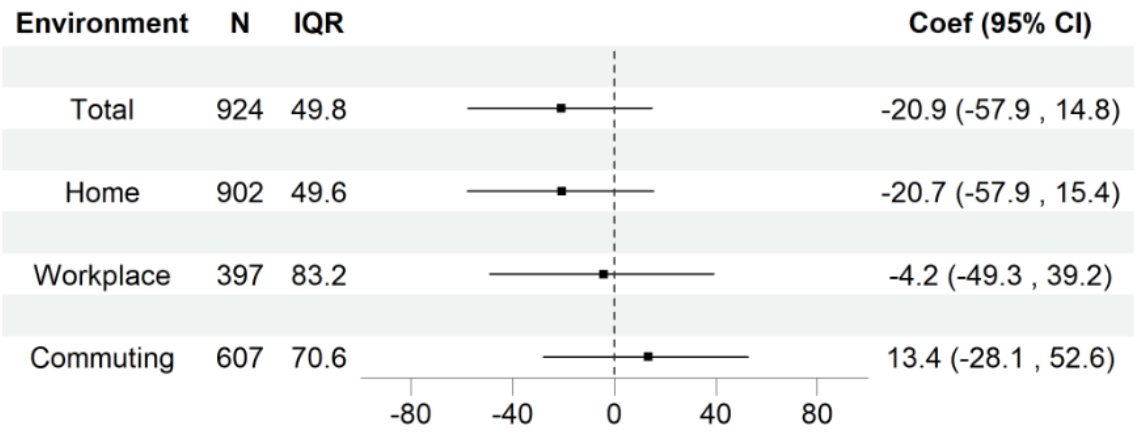
**(A) $NO_2$**



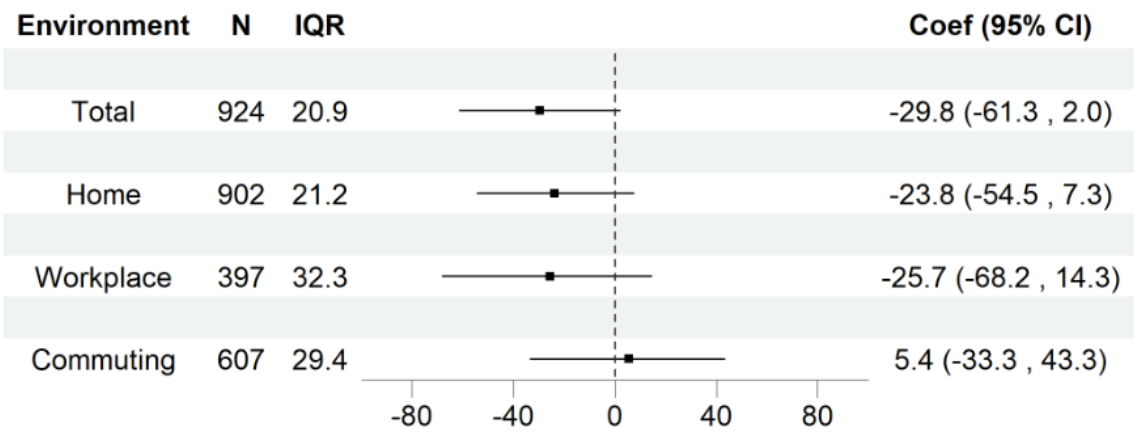

**(B) Black Carbon**



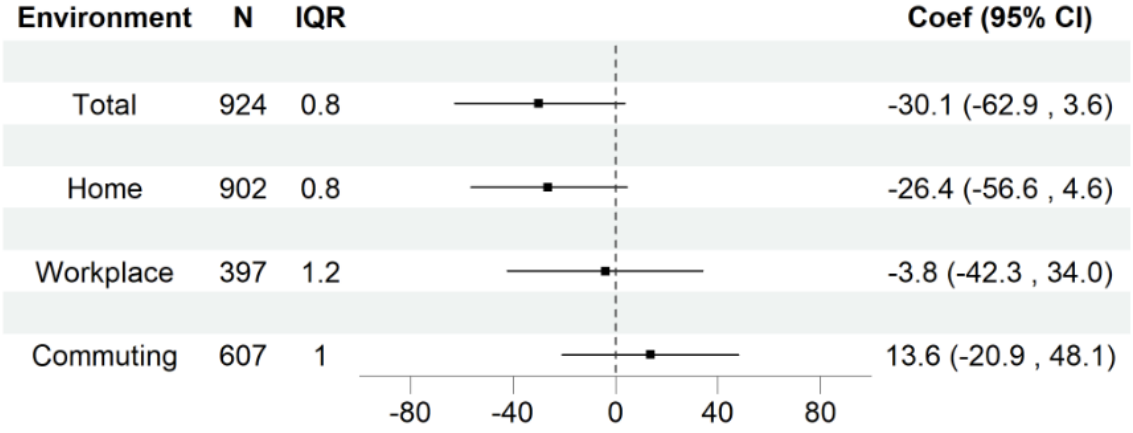

**(C) $PM_{2.5}$**



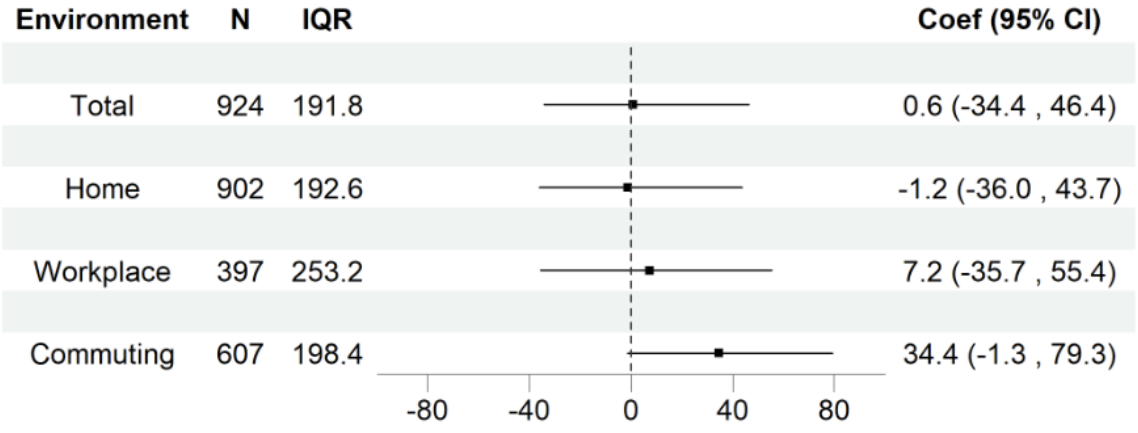
**(D) $PM_{2.5}$ Cu content**




**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

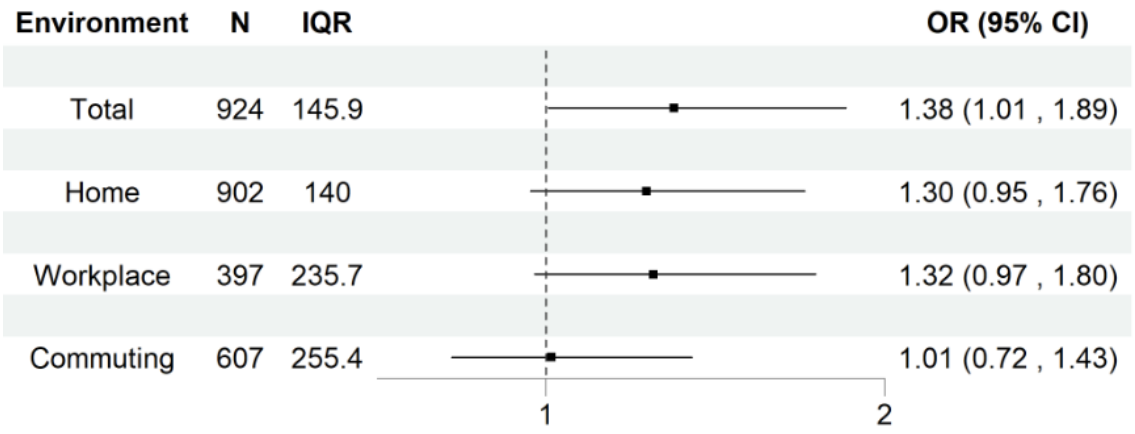



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at

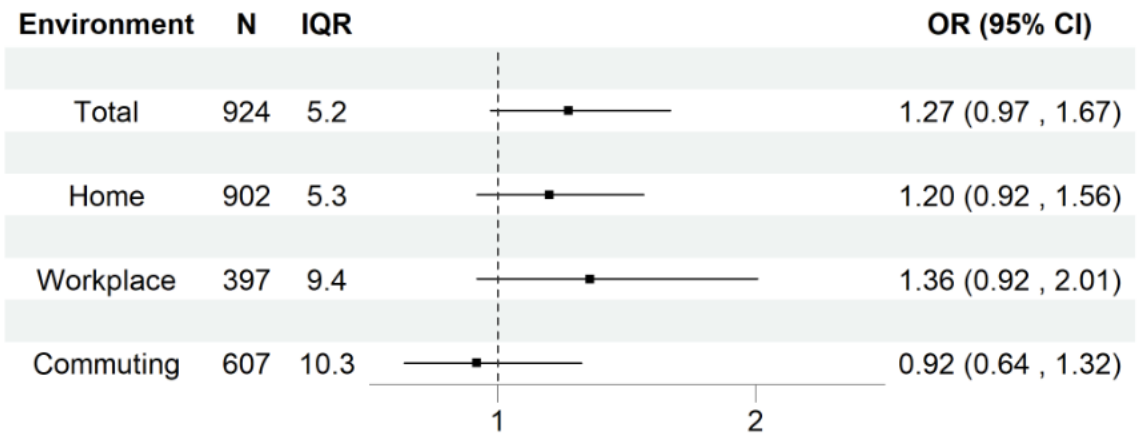
delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Appendix 6.** Adjusted[a] odds ratio (OR) of small for gestational age (SGA) associated with one interquartile (IQR) increase inhaled dose of (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$).

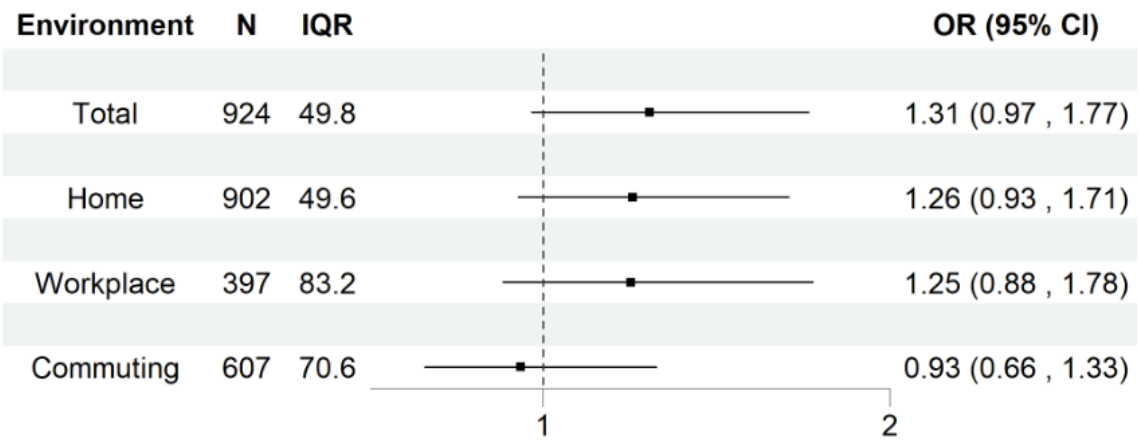
**(A) $NO_2$**



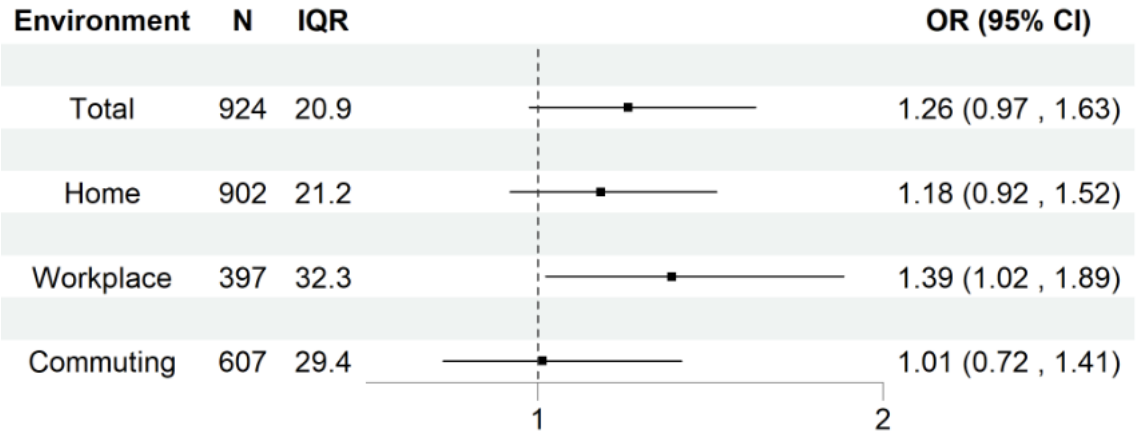

**(B) Black Carbon**



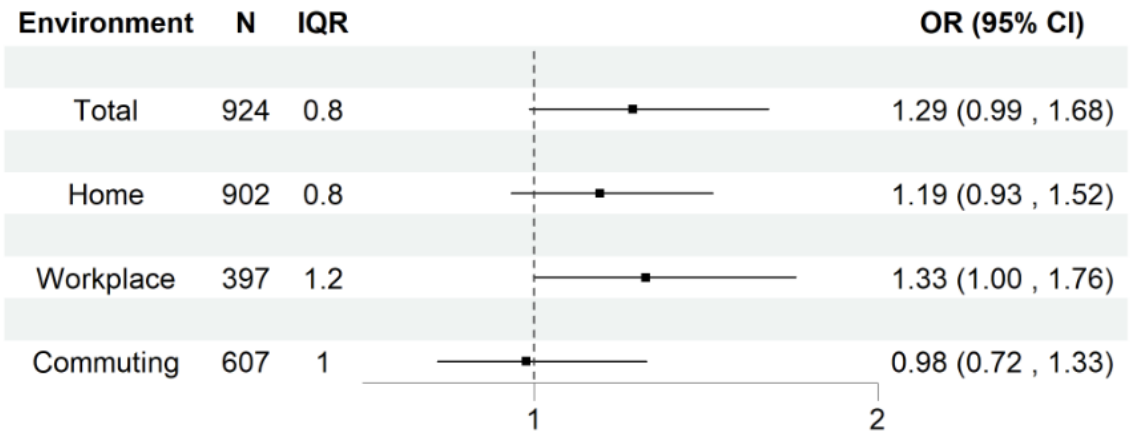
**(C) $PM_{2.5}$**



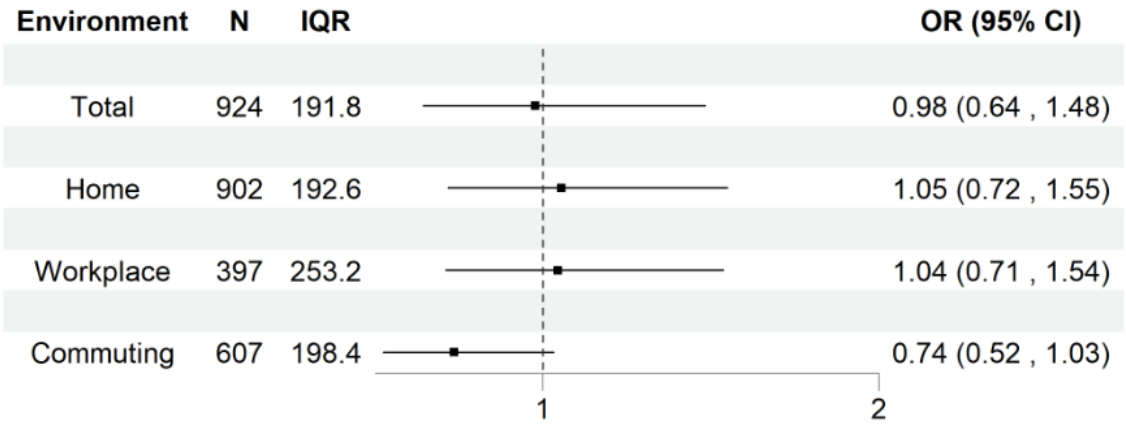

**(D) $PM_{2.5}$ Cu content**




**(E) $PM_{2.5}$ Fe content**



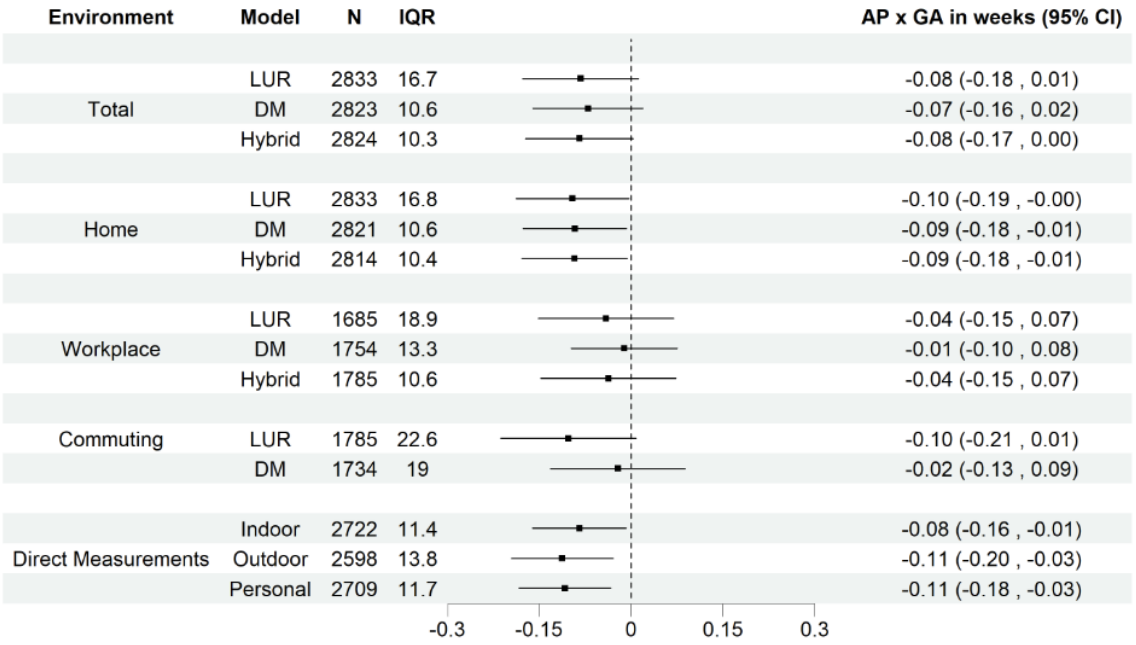
**(F) $PM_{2.5}$ Zn content**



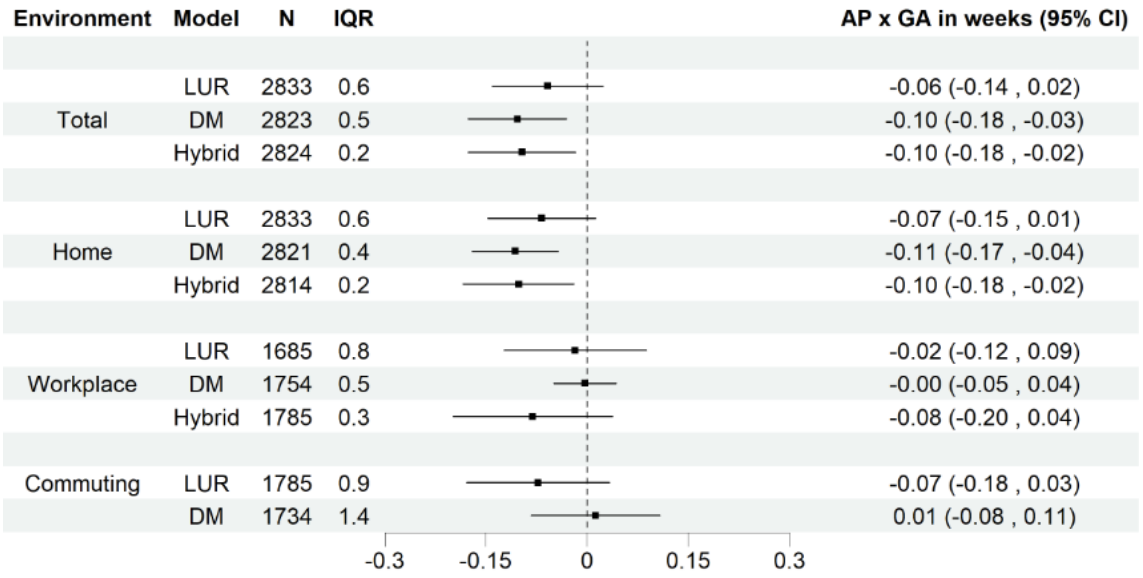

[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Appendix 7.** Adjusted[a] change in the trajectory of head circumference (mm) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$).

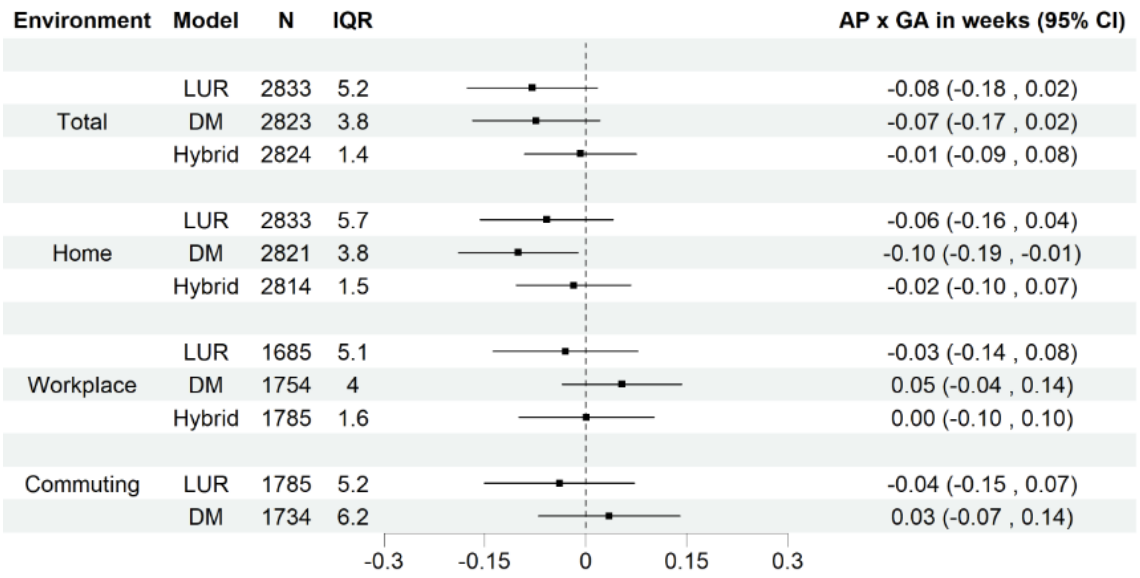
**(A) $NO_2$**



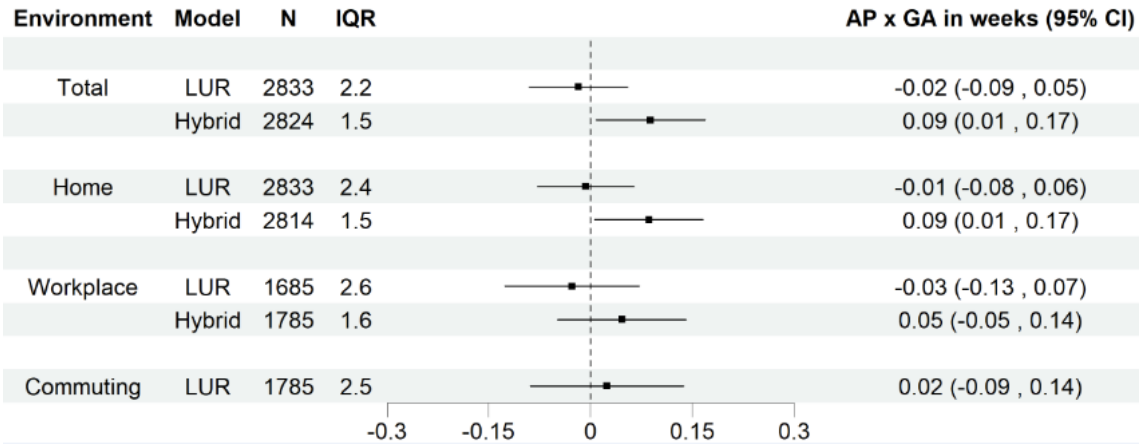

**(B) Black Carbon**



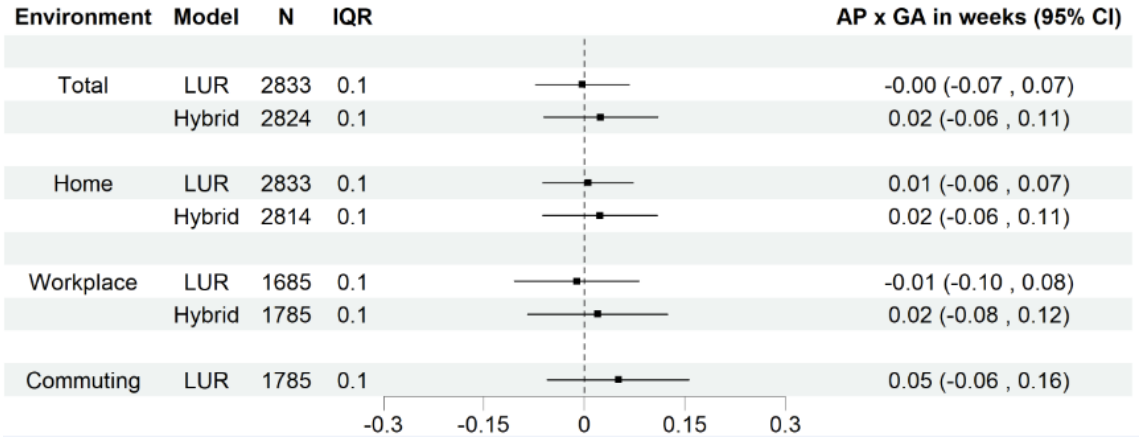
**(C) $PM_{2.5}$**



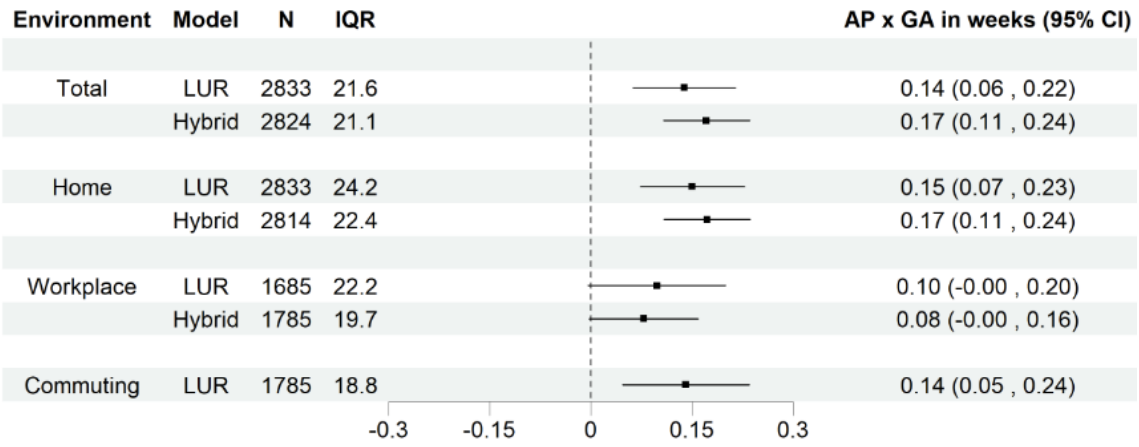

**(D) $PM_{2.5}$ Cu content**




**(E) $PM_{2.5}$ Fe content**



**(F) $PM_{2.5}$ Zn content**




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at the time of ultrasound examination (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

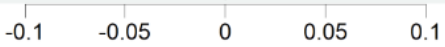
**Appendix 8.** Adjusted[a] change in the trajectory of the biparietal diameter (mm) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$).

**(A) $NO_2$**

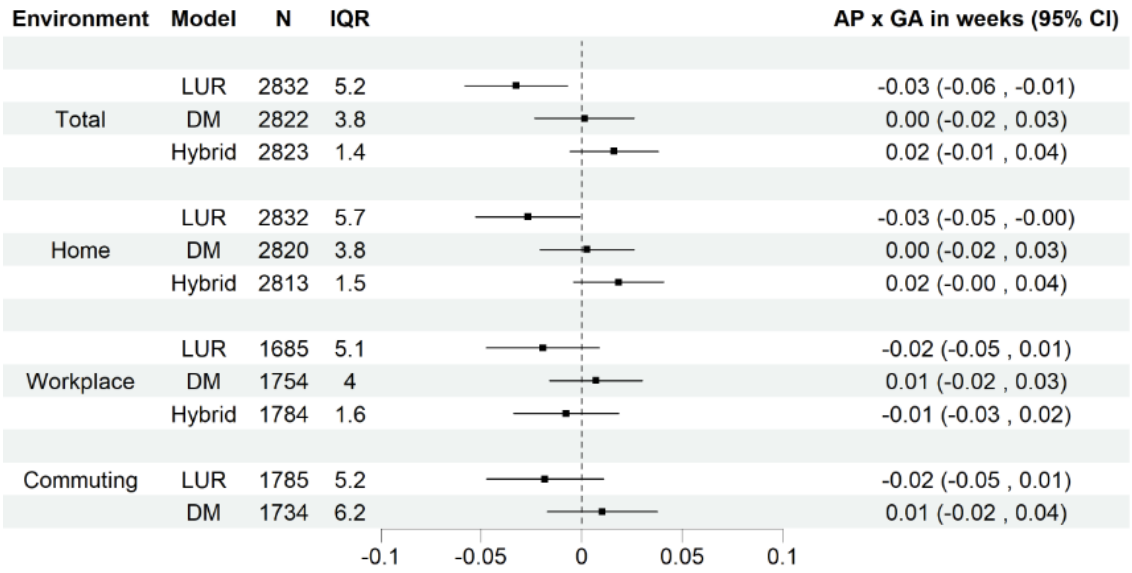
| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2832 | 16.7 | -0.01 (-0.03 , 0.02) |
| | DM | 2822 | 10.6 | -0.00 (-0.03 , 0.02) |
| | Hybrid | 2823 | 10.3 | -0.01 (-0.03 , 0.02) |
| Home | LUR | 2832 | 16.8 | -0.01 (-0.04 , 0.01) |
| | DM | 2820 | 10.6 | -0.00 (-0.02 , 0.02) |
| | Hybrid | 2813 | 10.4 | -0.01 (-0.03 , 0.02) |
| Workplace | LUR | 1685 | 18.9 | -0.00 (-0.03 , 0.03) |
| | DM | 1754 | 13.3 | -0.01 (-0.03 , 0.02) |
| | Hybrid | 1784 | 10.6 | 0.00 (-0.03 , 0.03) |
| Commuting | LUR | 1785 | 22.6 | -0.01 (-0.04 , 0.02) |
| | DM | 1734 | 19 | -0.00 (-0.03 , 0.03) |
| Direct Measurements | Indoor | 2721 | 11.4 | -0.02 (-0.04 , -0.00) |
| | Outdoor | 2597 | 13.8 | -0.02 (-0.04 , 0.00) |
| | Personal | 2708 | 11.7 | -0.03 (-0.05 , -0.01) |


**(B) Black Carbon**

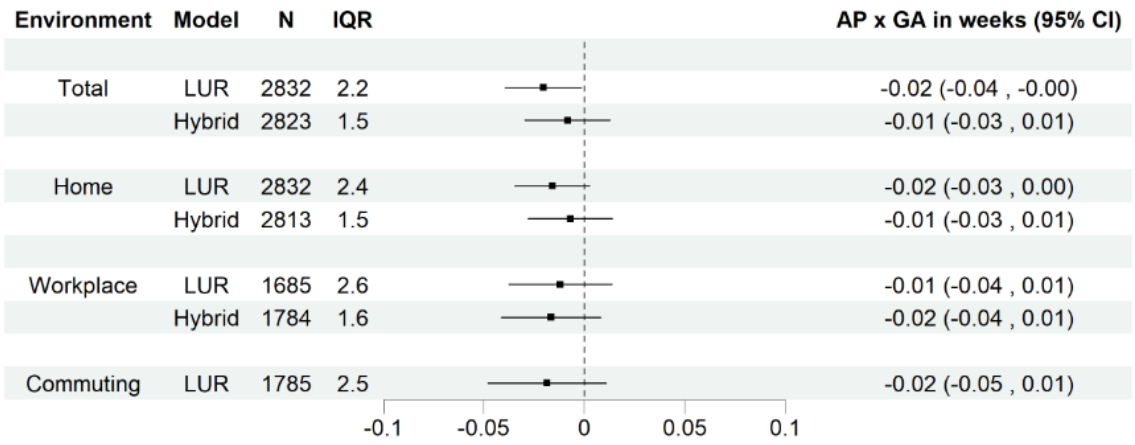
| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2832 | 0.6 | -0.01 (-0.03 , 0.01) |
| | DM | 2822 | 0.5 | -0.01 (-0.03 , 0.01) |
| | Hybrid | 2823 | 0.2 | -0.01 (-0.03 , 0.01) |
| Home | LUR | 2832 | 0.6 | -0.01 (-0.03 , 0.01) |
| | DM | 2820 | 0.4 | -0.00 (-0.02 , 0.01) |
| | Hybrid | 2813 | 0.2 | -0.01 (-0.03 , 0.01) |
| Workplace | LUR | 1685 | 0.8 | 0.01 (-0.02 , 0.03) |
| | DM | 1754 | 0.5 | -0.00 (-0.01 , 0.01) |
| | Hybrid | 1784 | 0.3 | -0.00 (-0.03 , 0.03) |
| Commuting | LUR | 1785 | 0.9 | 0.00 (-0.02 , 0.03) |
| | DM | 1734 | 1.4 | 0.01 (-0.02 , 0.03) |



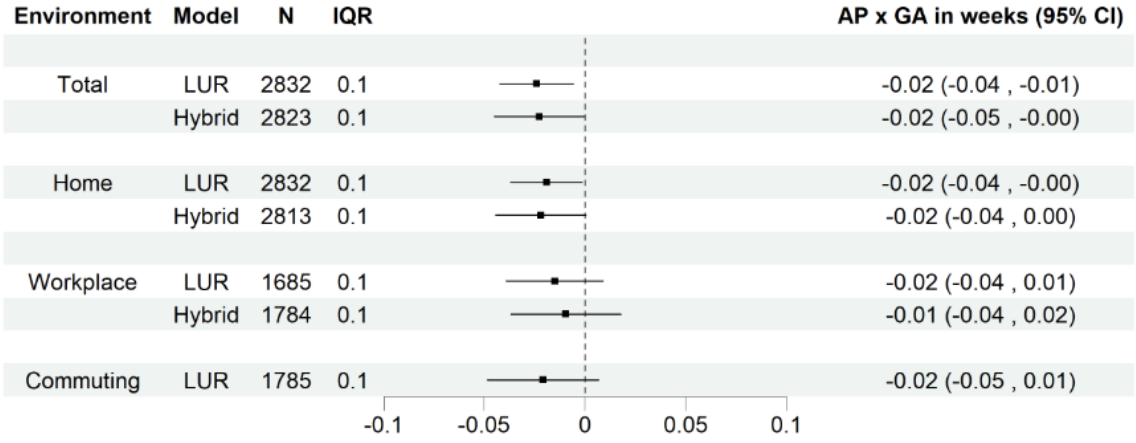
**(C) $PM_{2.5}$**



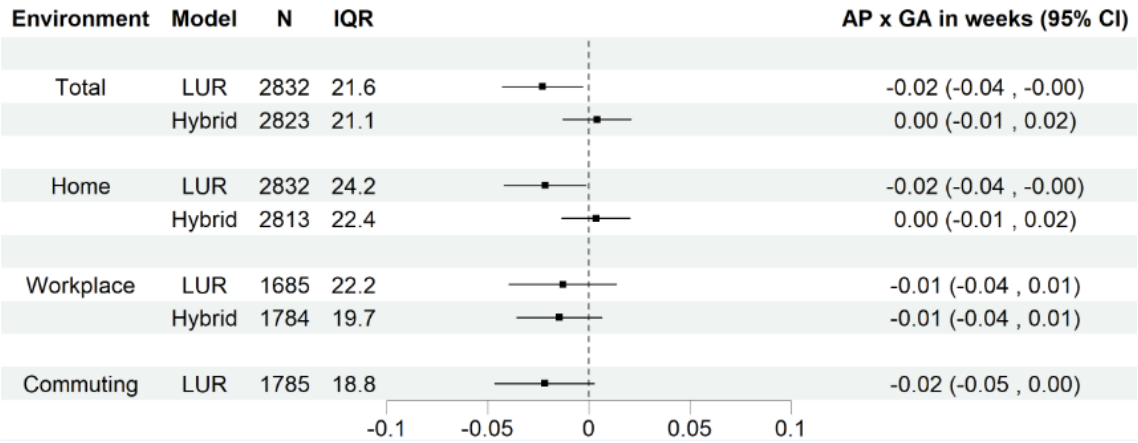

**(D) $PM_{2.5}$ Cu content**




**(E) $PM_{2.5}$ Fe content**



**(F) $PM_{2.5}$ Zn content**

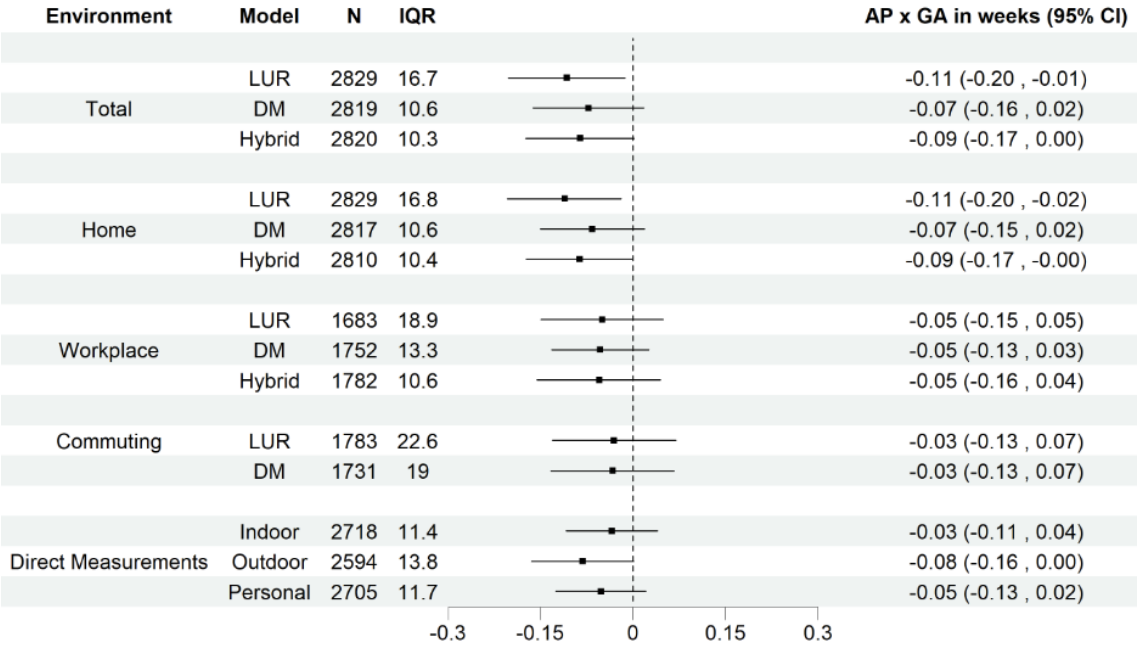



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at the time of ultrasound examination (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

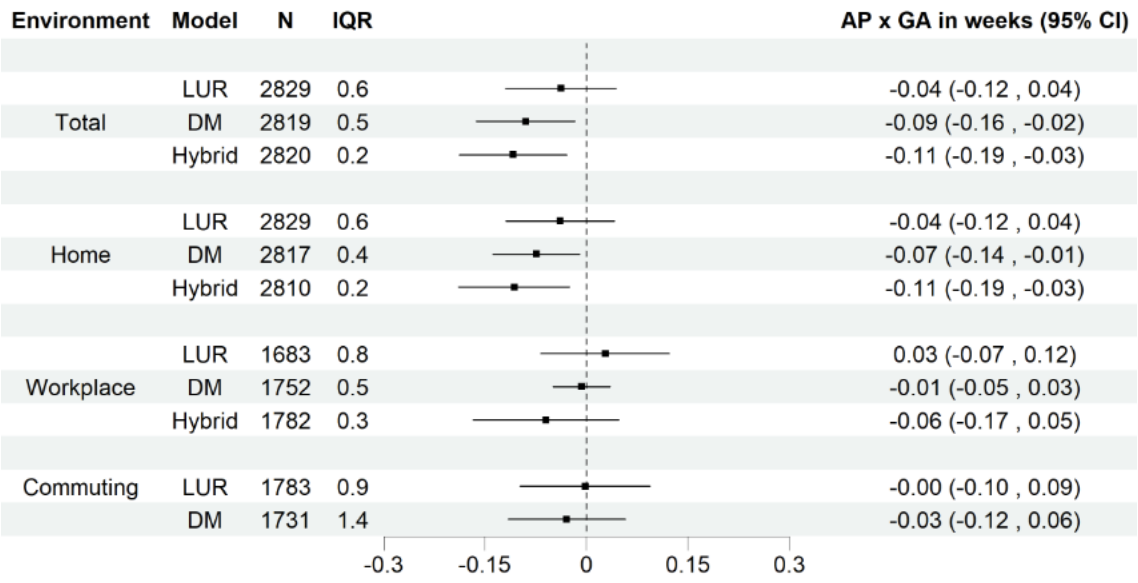
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 9.** Adjusted[a] change in the trajectory of abdominal circumference (mm) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$).

**(A) $NO_2$**

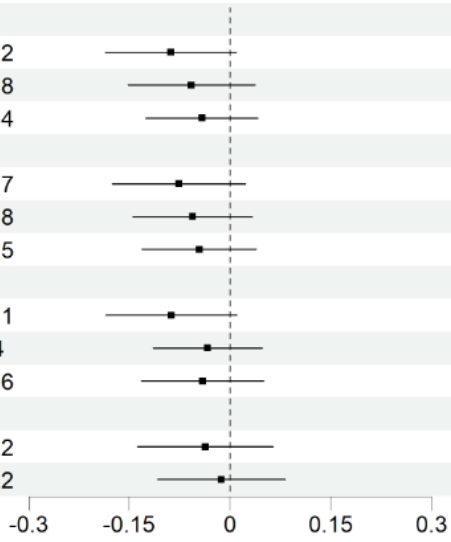



**(B) Black Carbon**



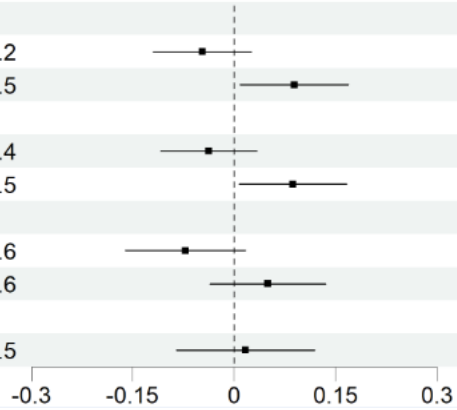
**(C) $PM_{2.5}$**

| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2829 | 5.2 | -0.09 (-0.19 , 0.01) |
| | DM | 2819 | 3.8 | -0.06 (-0.15 , 0.04) |
| | Hybrid | 2820 | 1.4 | -0.04 (-0.13 , 0.04) |
| Home | LUR | 2829 | 5.7 | -0.08 (-0.18 , 0.02) |
| | DM | 2817 | 3.8 | -0.06 (-0.15 , 0.03) |
| | Hybrid | 2810 | 1.5 | -0.05 (-0.13 , 0.04) |
| Workplace | LUR | 1683 | 5.1 | -0.09 (-0.19 , 0.01) |
| | DM | 1752 | 4 | -0.03 (-0.11 , 0.05) |
| | Hybrid | 1782 | 1.6 | -0.04 (-0.13 , 0.05) |
| Commuting | LUR | 1783 | 5.2 | -0.04 (-0.14 , 0.06) |
| | DM | 1731 | 6.2 | -0.01 (-0.11 , 0.08) |



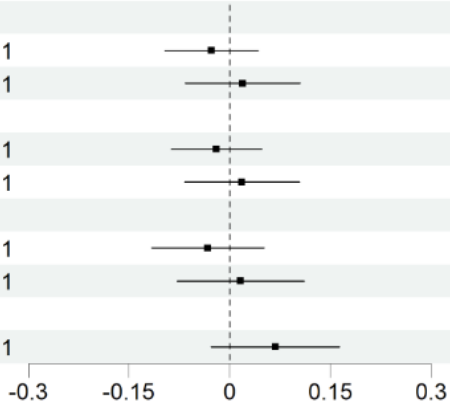

**(D) $PM_{2.5}$ Cu content**

| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2829 | 2.2 | -0.05 (-0.12 , 0.03) |
| | Hybrid | 2820 | 1.5 | 0.09 (0.01 , 0.17) |
| Home | LUR | 2829 | 2.4 | -0.04 (-0.11 , 0.03) |
| | Hybrid | 2810 | 1.5 | 0.09 (0.01 , 0.17) |
| Workplace | LUR | 1683 | 2.6 | -0.07 (-0.16 , 0.02) |
| | Hybrid | 1782 | 1.6 | 0.05 (-0.04 , 0.14) |
| Commuting | LUR | 1783 | 2.5 | 0.02 (-0.09 , 0.12) |

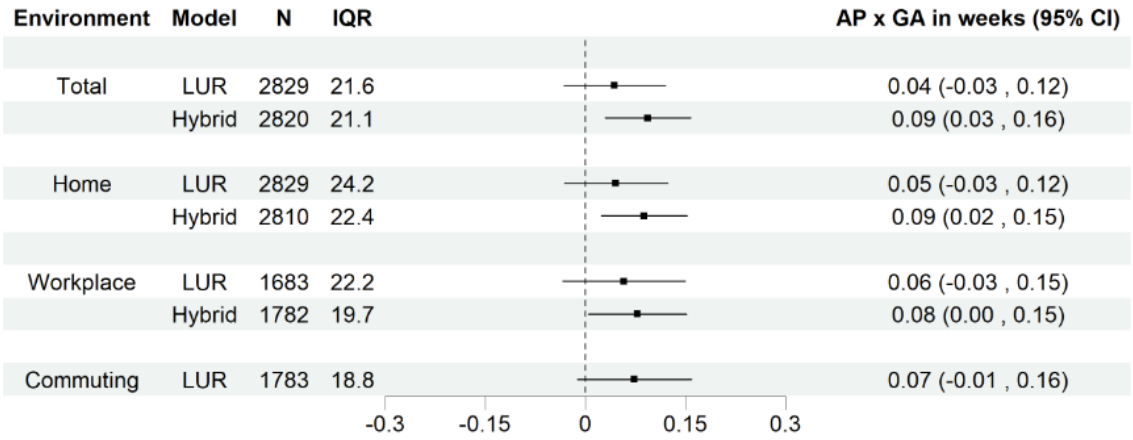



**(E) $PM_{2.5}$ Fe content**

| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2829 | 0.1 | -0.03 (-0.10 , 0.04) |
| | Hybrid | 2820 | 0.1 | 0.02 (-0.07 , 0.10) |
| Home | LUR | 2829 | 0.1 | -0.02 (-0.09 , 0.05) |
| | Hybrid | 2810 | 0.1 | 0.02 (-0.07 , 0.10) |
| Workplace | LUR | 1683 | 0.1 | -0.03 (-0.12 , 0.05) |
| | Hybrid | 1782 | 0.1 | 0.02 (-0.08 , 0.11) |
| Commuting | LUR | 1783 | 0.1 | 0.07 (-0.03 , 0.16) |



**(F) $PM_{2.5}$ Zn content**



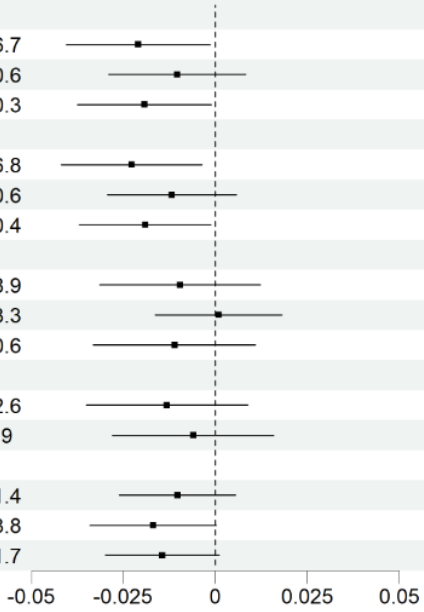

[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at the time of ultrasound examination (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 10.** Adjusted[a] change in the trajectory of femur length (mm) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$).

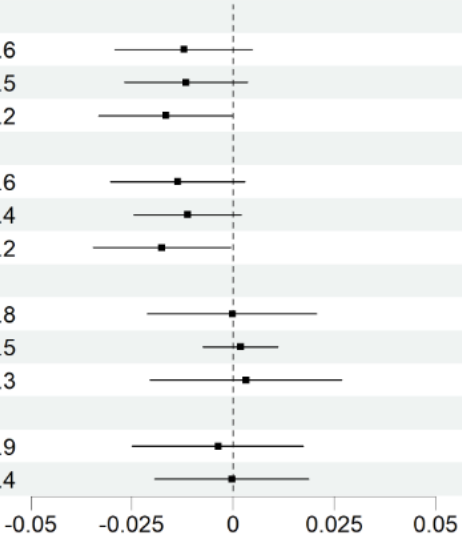
**(A) $NO_2$**

| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2831 | 16.7 | -0.021 (-0.040 , -0.001) |
| | DM | 2821 | 10.6 | -0.010 (-0.029 , 0.008) |
| | Hybrid | 2822 | 10.3 | -0.019 (-0.037 , -0.001) |
| Home | LUR | 2831 | 16.8 | -0.023 (-0.042 , -0.004) |
| | DM | 2819 | 10.6 | -0.012 (-0.029 , 0.006) |
| | Hybrid | 2812 | 10.4 | -0.019 (-0.037 , -0.001) |
| Workplace | LUR | 1683 | 18.9 | -0.010 (-0.031 , 0.012) |
| | DM | 1752 | 13.3 | 0.001 (-0.016 , 0.018) |
| | Hybrid | 1783 | 10.6 | -0.011 (-0.033 , 0.011) |
| Commuting | LUR | 1783 | 22.6 | -0.013 (-0.035 , 0.009) |
| | DM | 1732 | 19 | -0.006 (-0.028 , 0.016) |
| Direct Measurements | Indoor | 2720 | 11.4 | -0.010 (-0.026 , 0.006) |
| | Outdoor | 2596 | 13.8 | -0.017 (-0.034 , 0.000) |
| | Personal | 2707 | 11.7 | -0.014 (-0.030 , 0.001) |

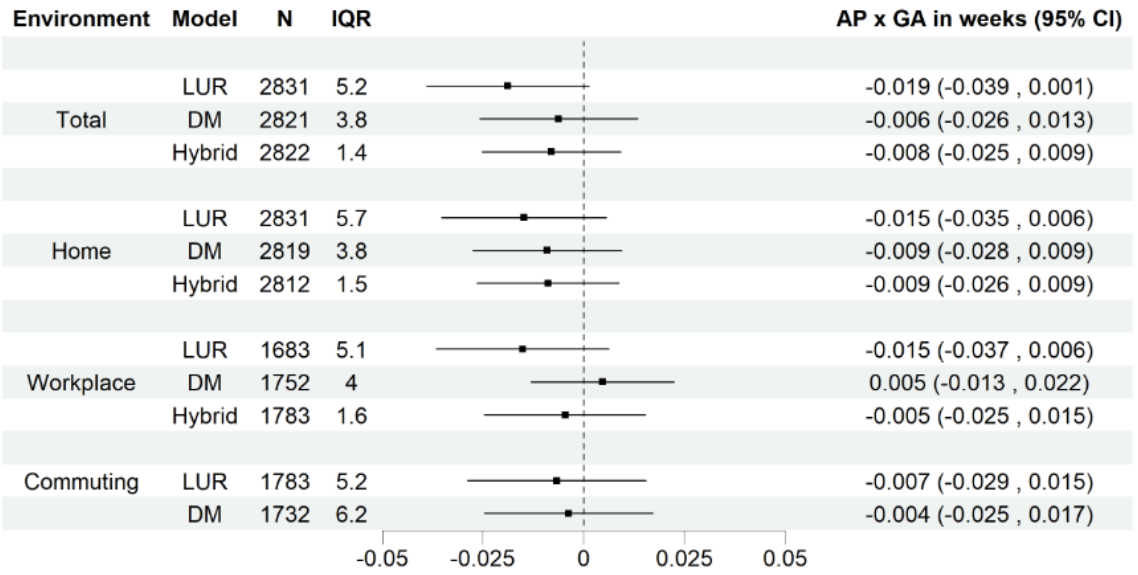



**(B) Black Carbon**

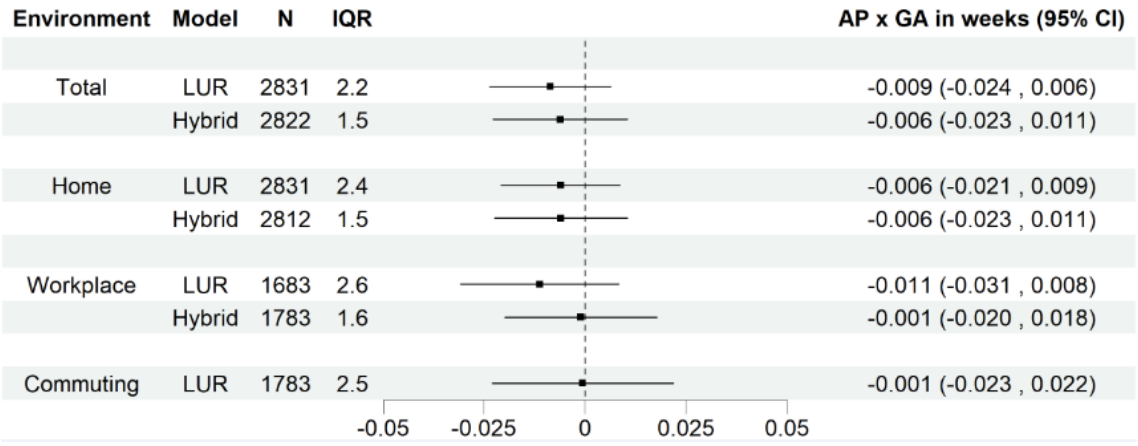
| Environment | Model | N | IQR | AP x GA in weeks (95% CI) |
|---|---|---|---|---|
| Total | LUR | 2831 | 0.6 | -0.012 (-0.029 , 0.005) |
| | DM | 2821 | 0.5 | -0.012 (-0.027 , 0.004) |
| | Hybrid | 2822 | 0.2 | -0.017 (-0.033 , -0.000) |
| Home | LUR | 2831 | 0.6 | -0.014 (-0.030 , 0.003) |
| | DM | 2819 | 0.4 | -0.011 (-0.025 , 0.002) |
| | Hybrid | 2812 | 0.2 | -0.018 (-0.035 , -0.001) |
| Workplace | LUR | 1683 | 0.8 | -0.000 (-0.021 , 0.021) |
| | DM | 1752 | 0.5 | 0.002 (-0.007 , 0.011) |
| | Hybrid | 1783 | 0.3 | 0.003 (-0.021 , 0.027) |
| Commuting | LUR | 1783 | 0.9 | -0.004 (-0.025 , 0.017) |
| | DM | 1732 | 1.4 | -0.000 (-0.019 , 0.019) |



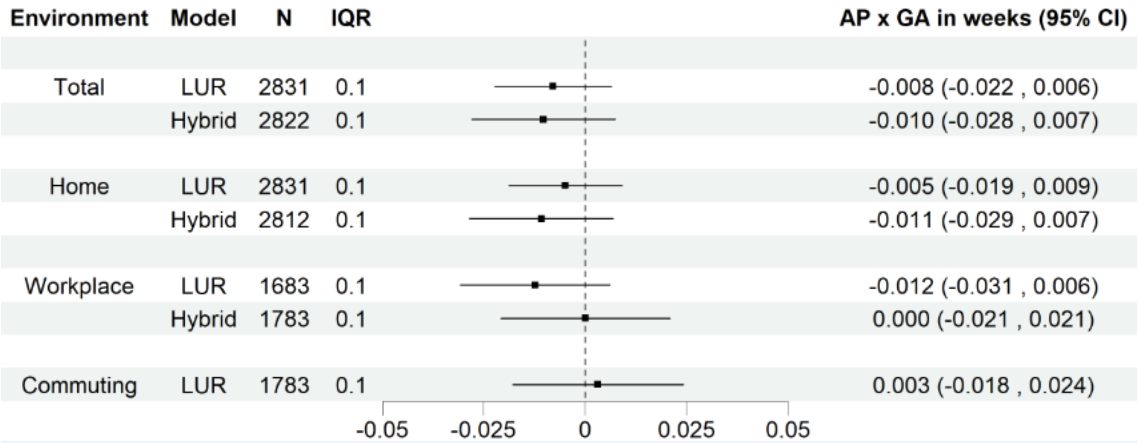
**(C) $PM_{2.5}$**



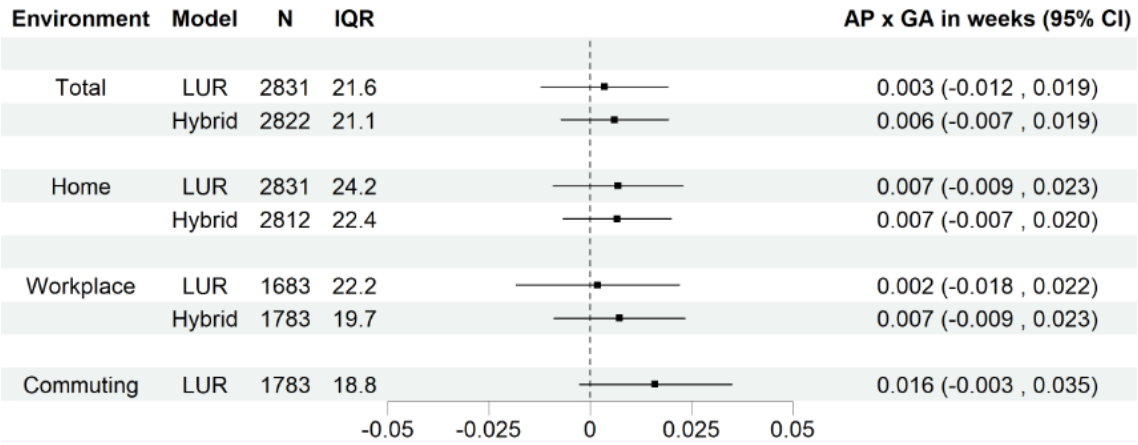

**(D) $PM_{2.5}$ Cu content**




**(E) $PM_{2.5}$ Fe content**



**(F) $PM_{2.5}$ Zn content**

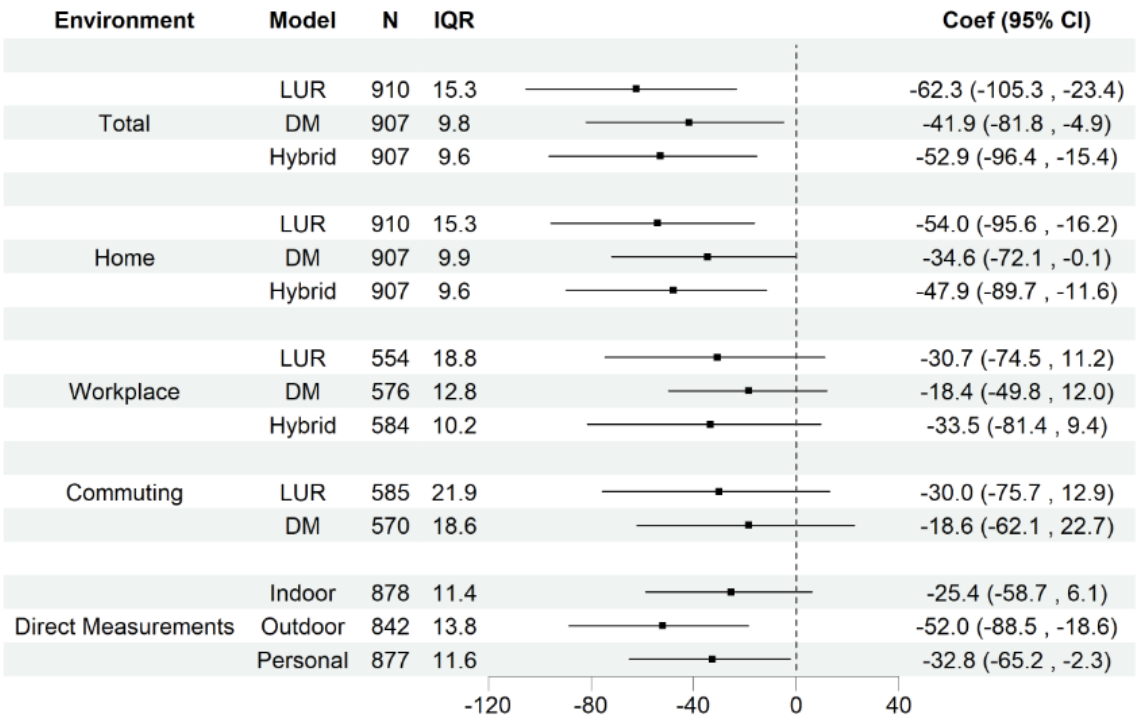



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at the time of ultrasound examination (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

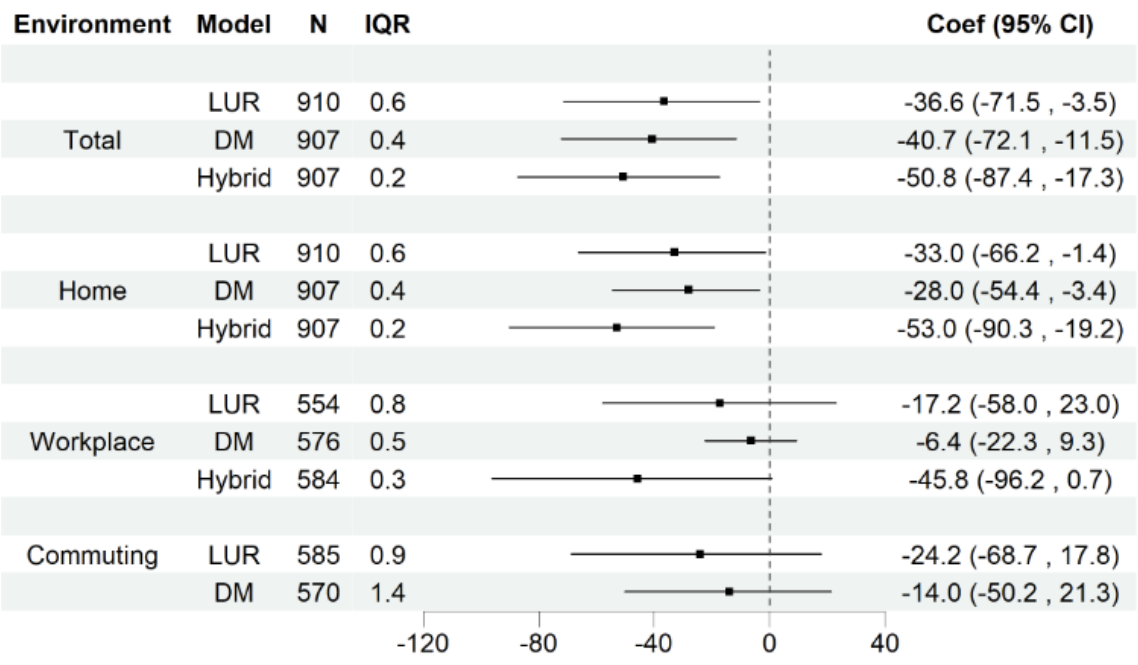
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 11.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) based on complete case analysis.

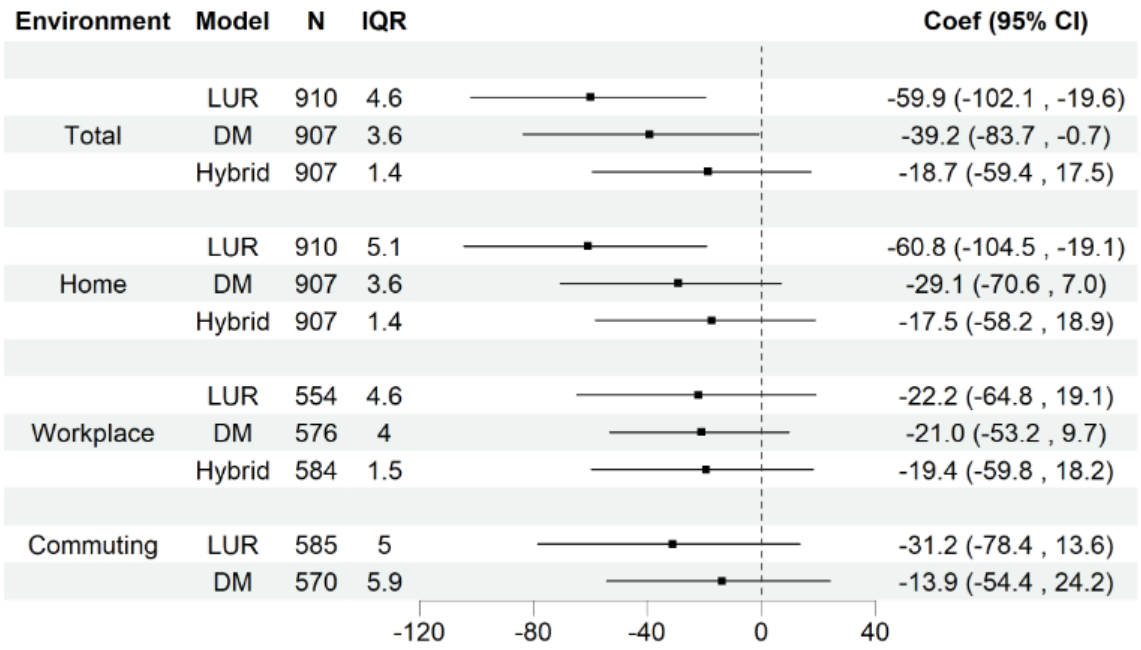
**(A) $NO_2$**



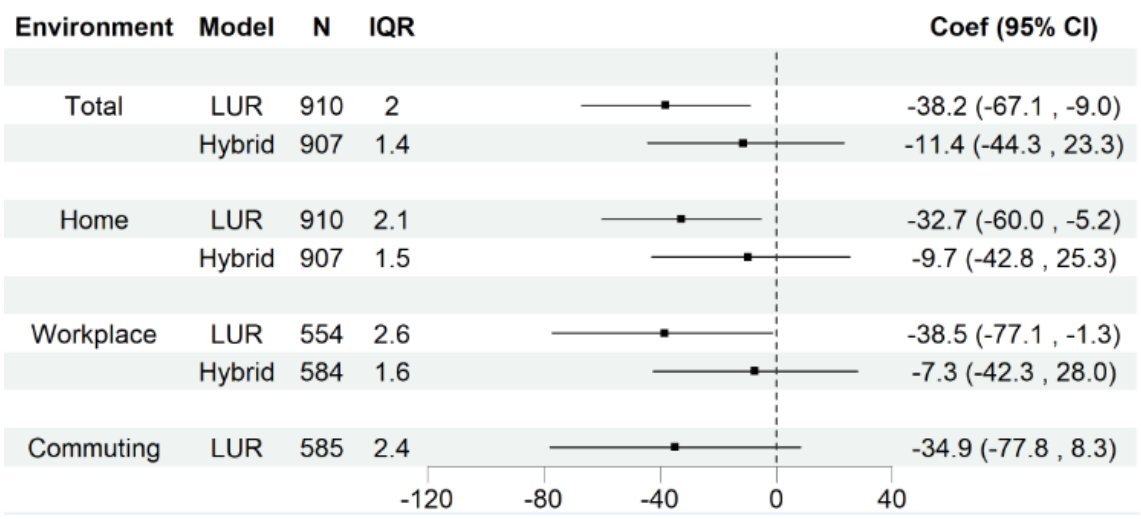

**(B) Black Carbon**



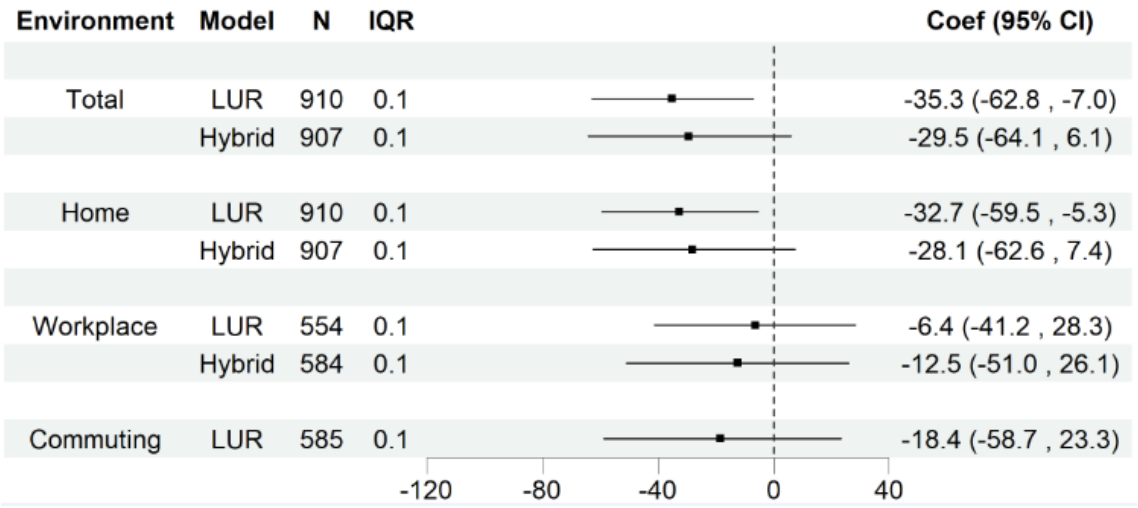
**(C) $PM_{2.5}$**



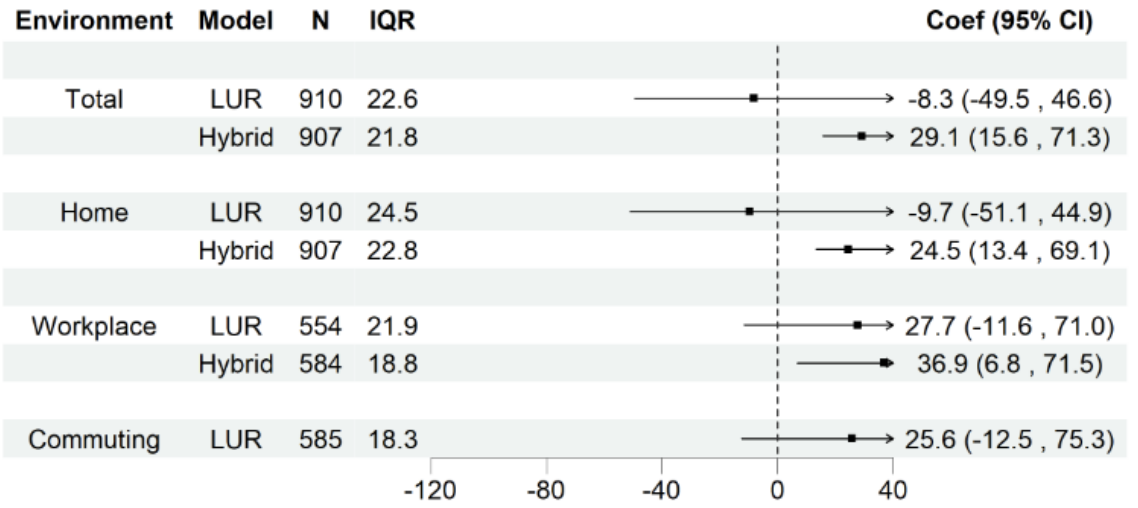

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

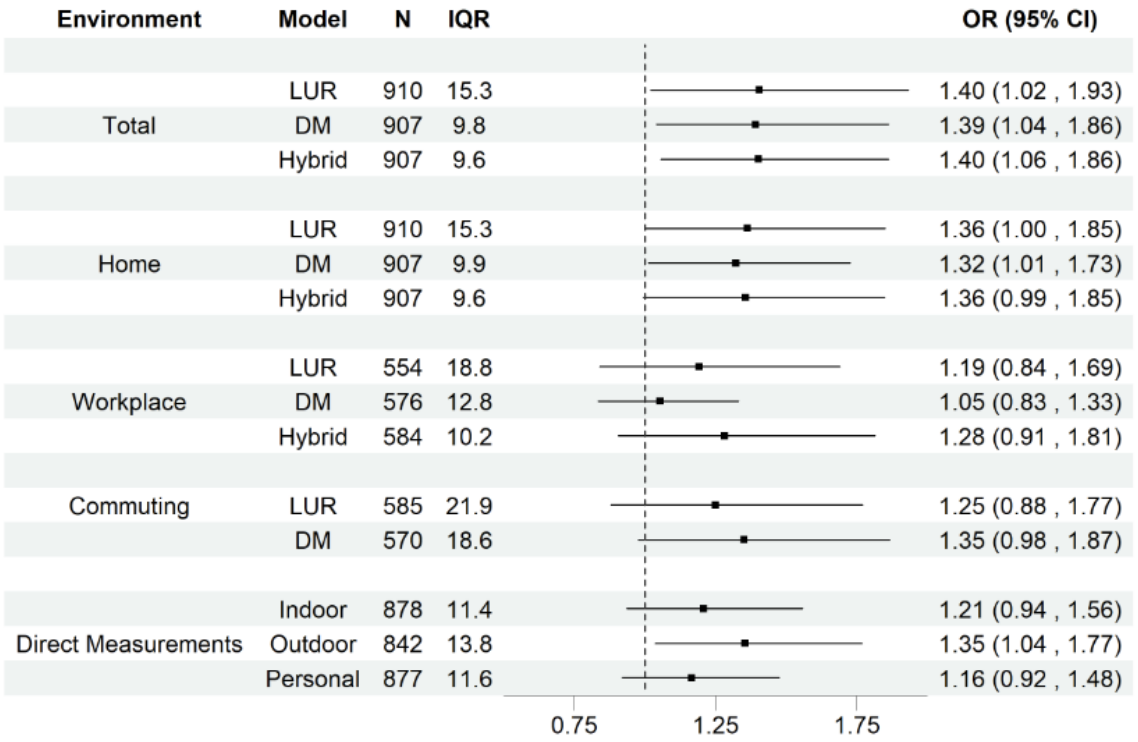



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

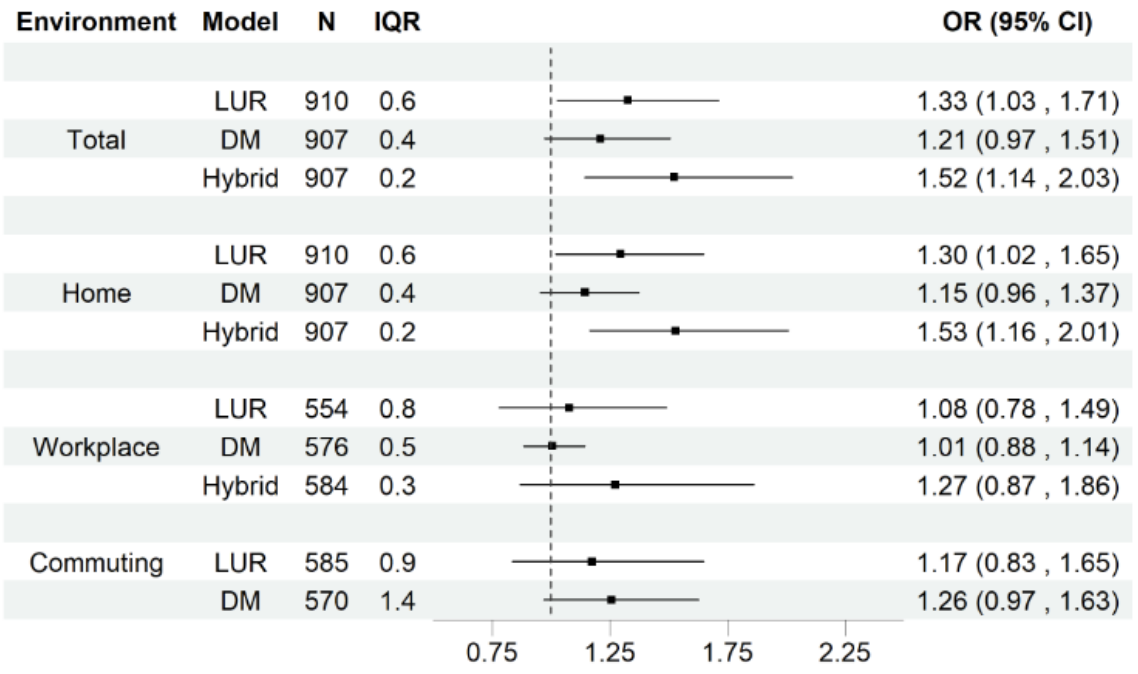
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 12.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) based on complete case analysis.

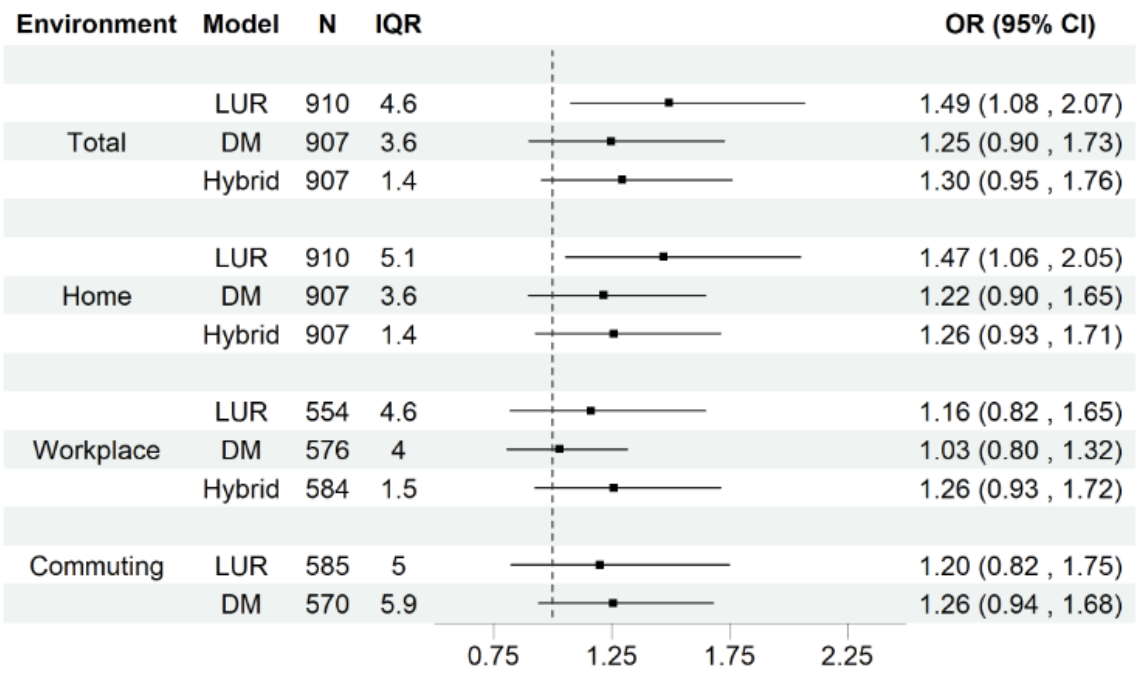
**(A) $NO_2$**



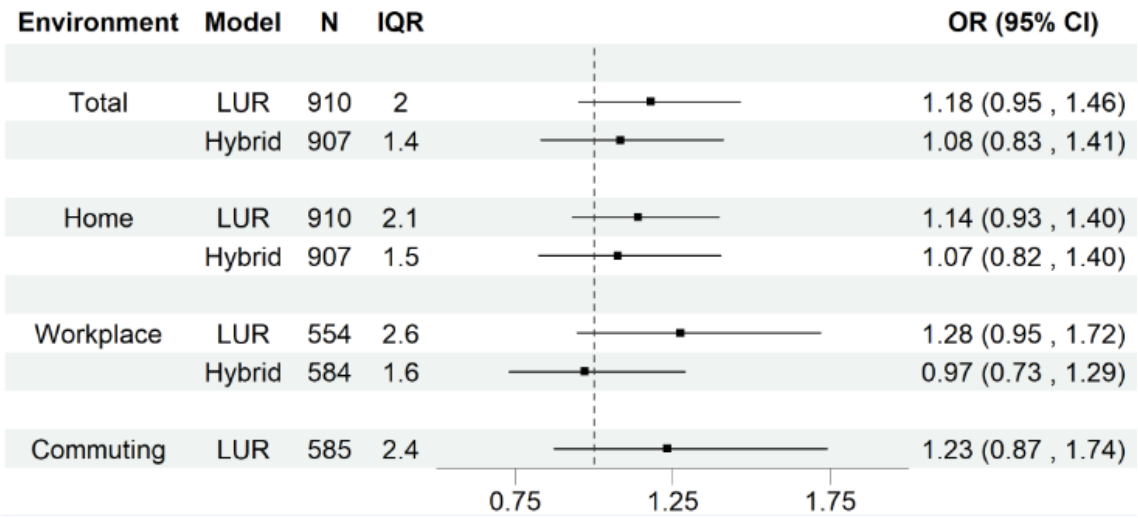

**(B) Black Carbon**



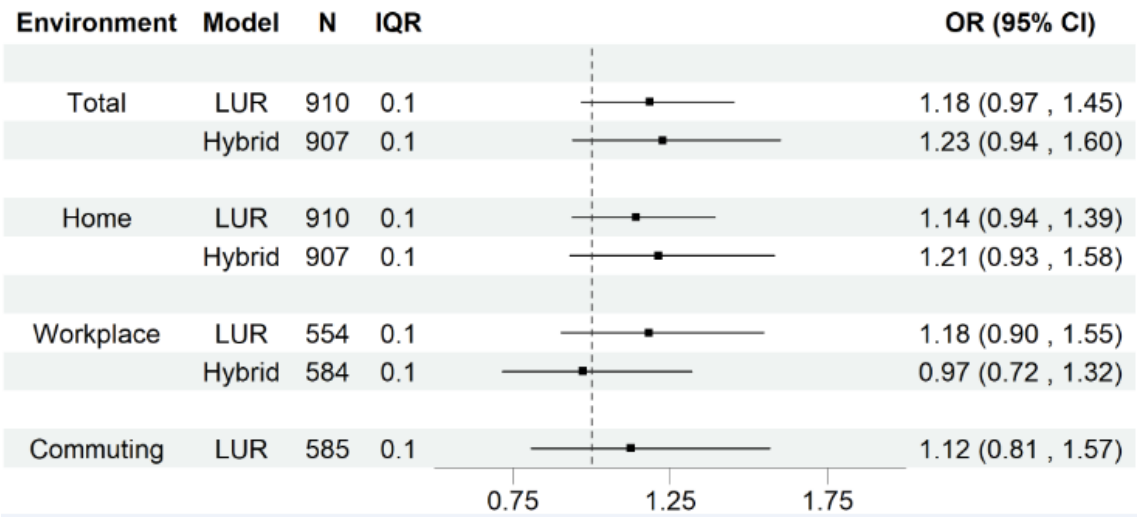
**(C) $PM_{2.5}$**



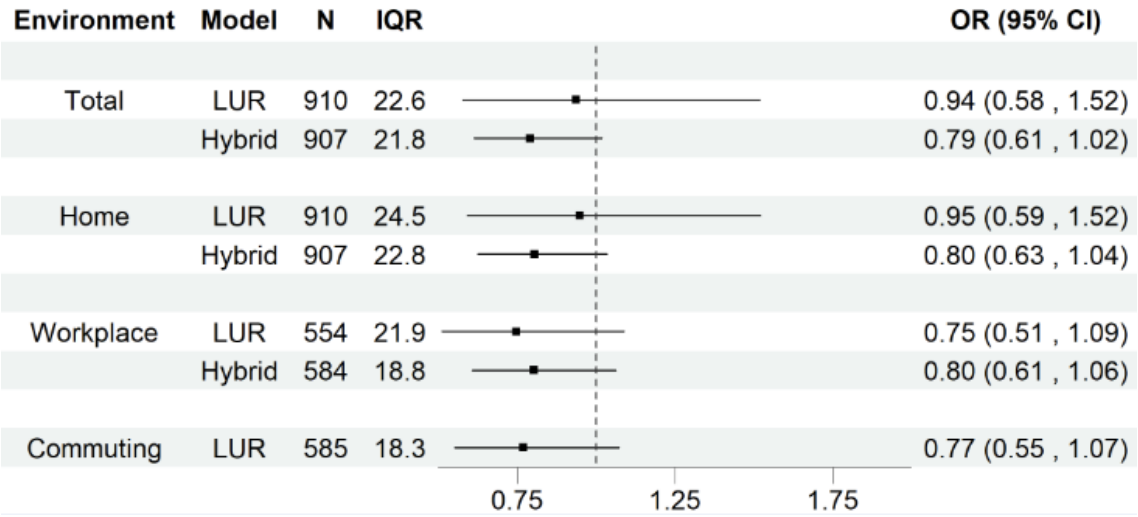

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

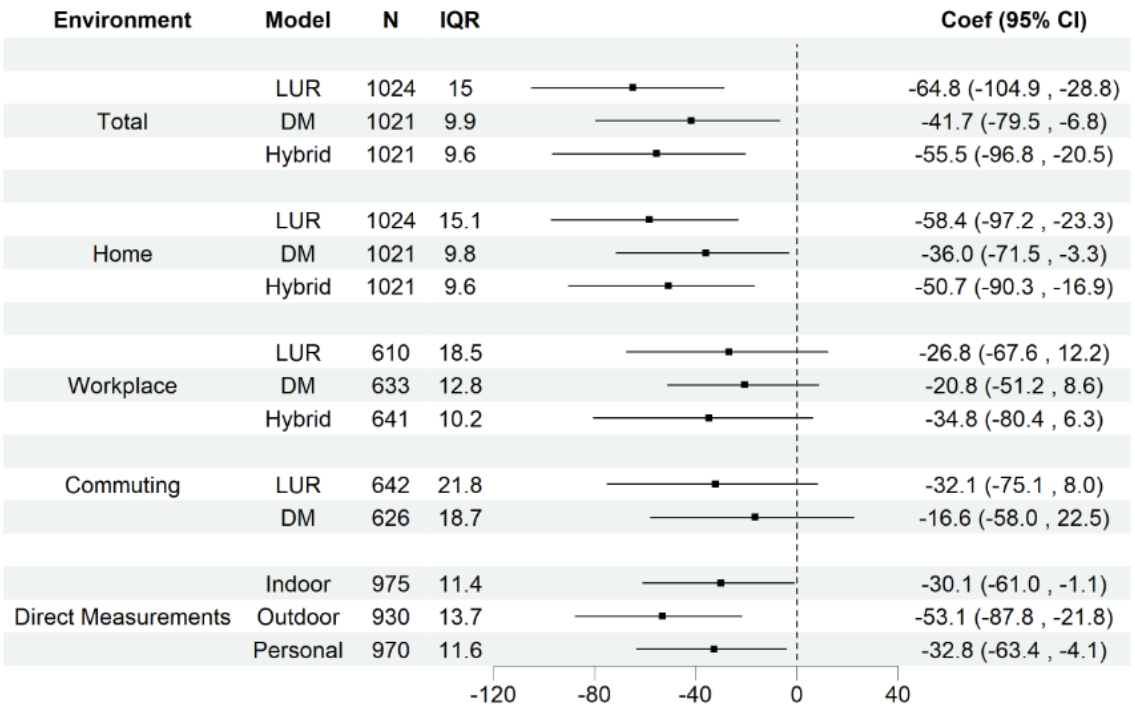



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

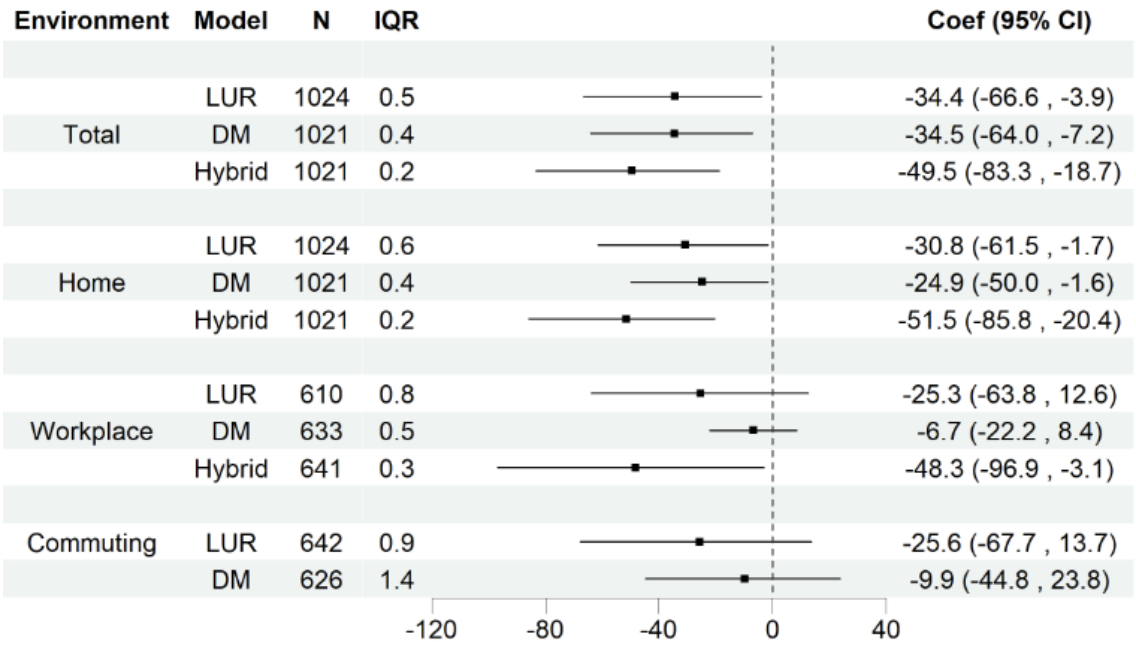
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 13.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for neonate's ethnicity.

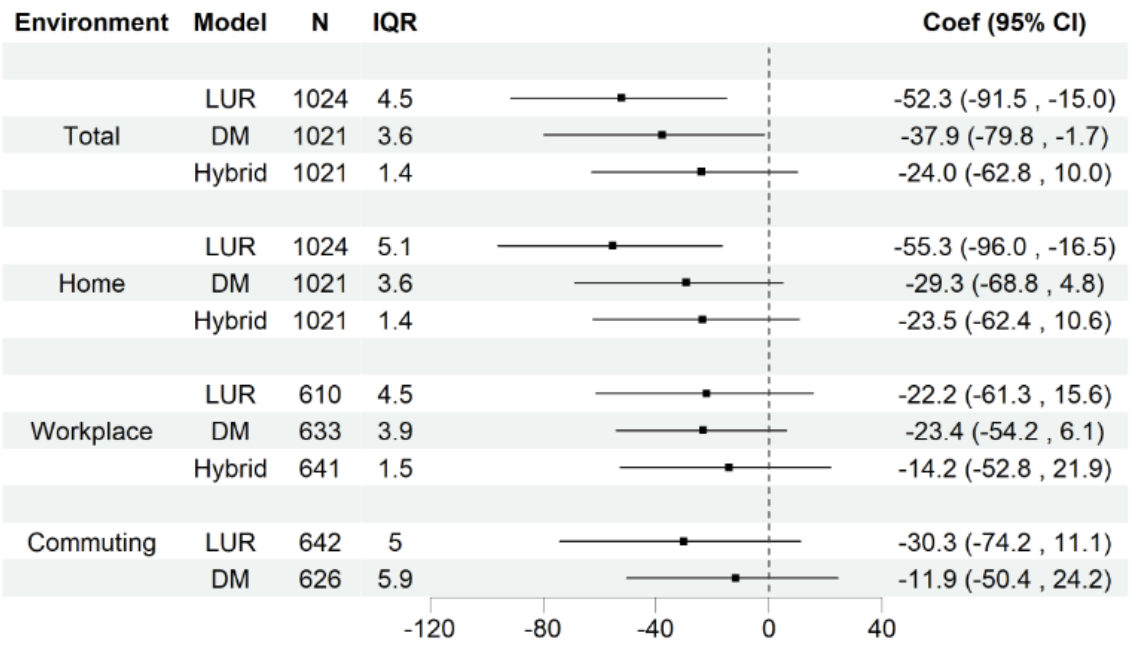
**(A) $NO_2$**



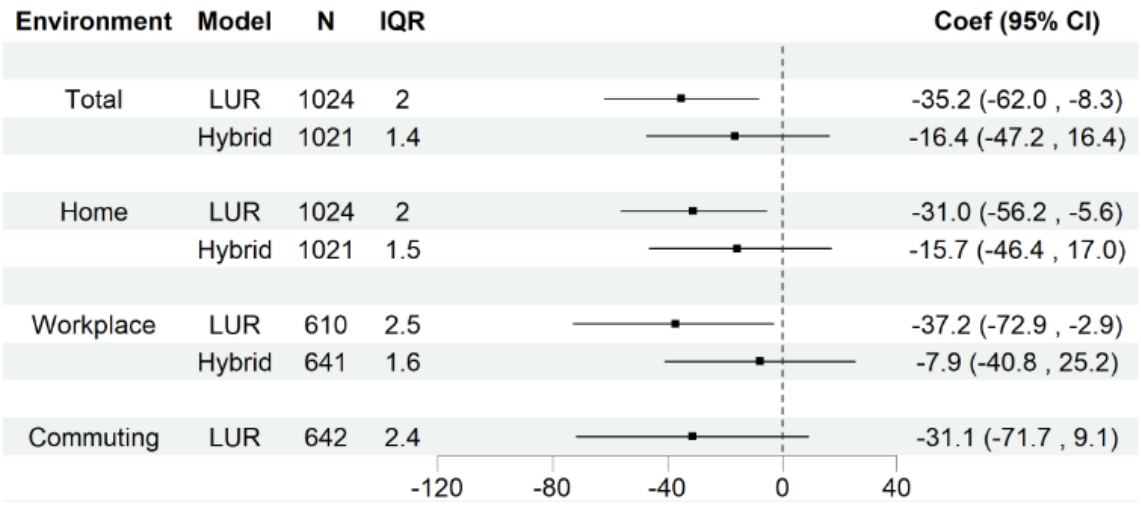

**(B) Black Carbon**



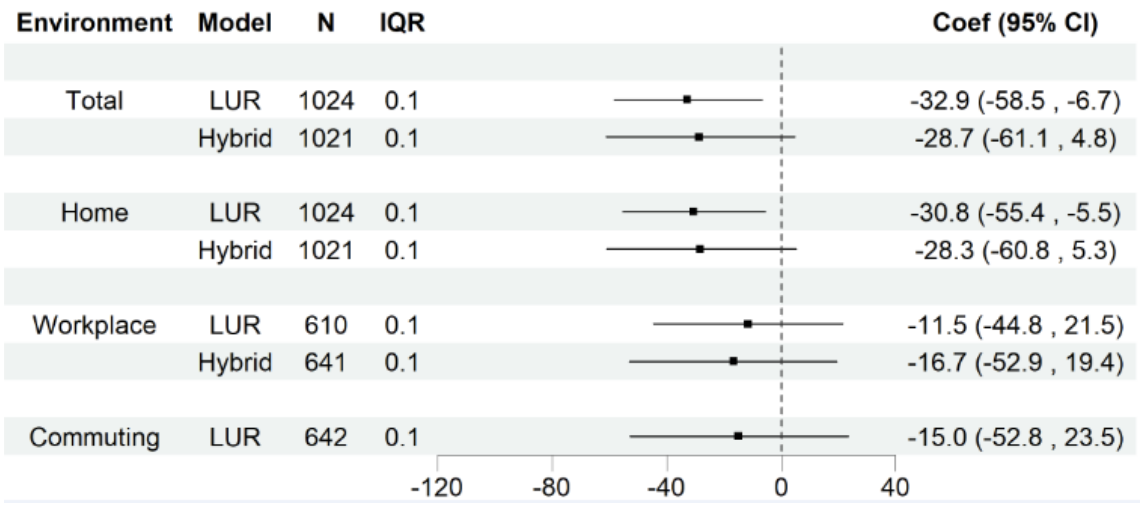
**(C) $PM_{2.5}$**



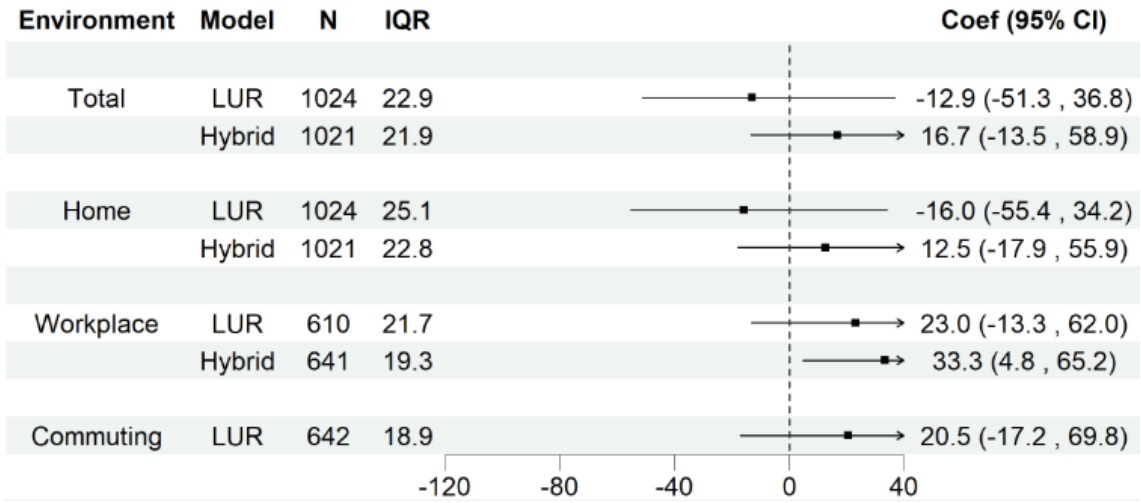

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

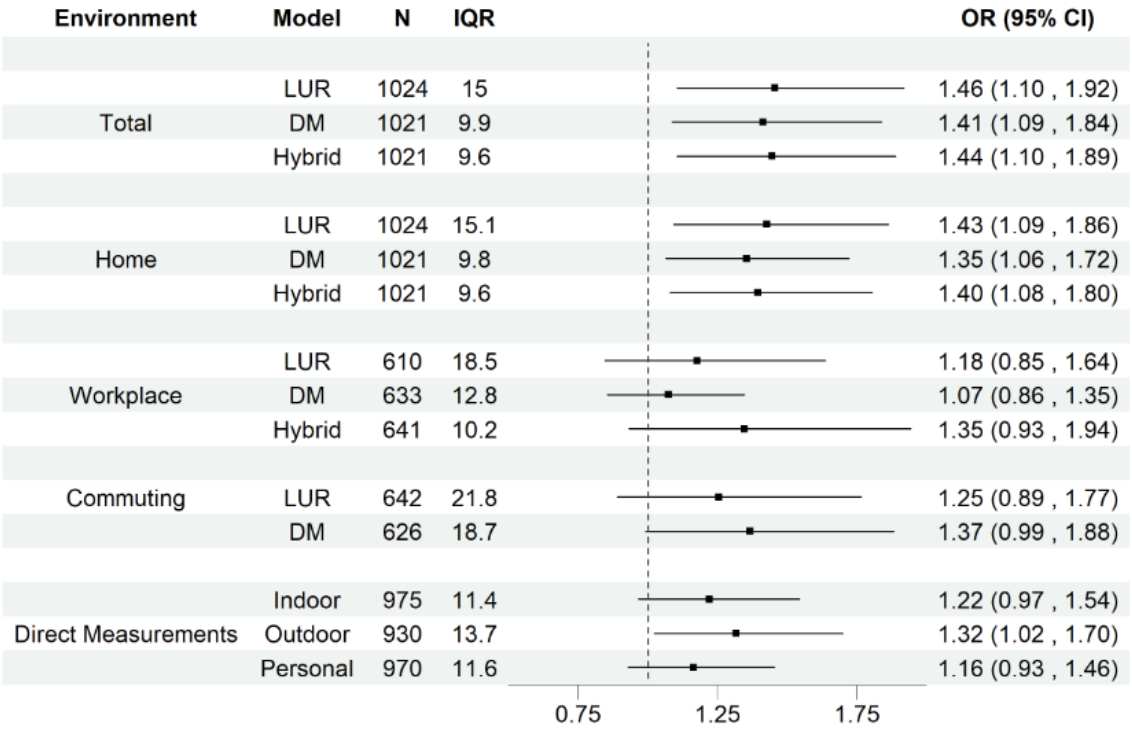



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), sex of the neonate (girl vs. boy), and neonate's ethnicity (categorical, European vs. other).

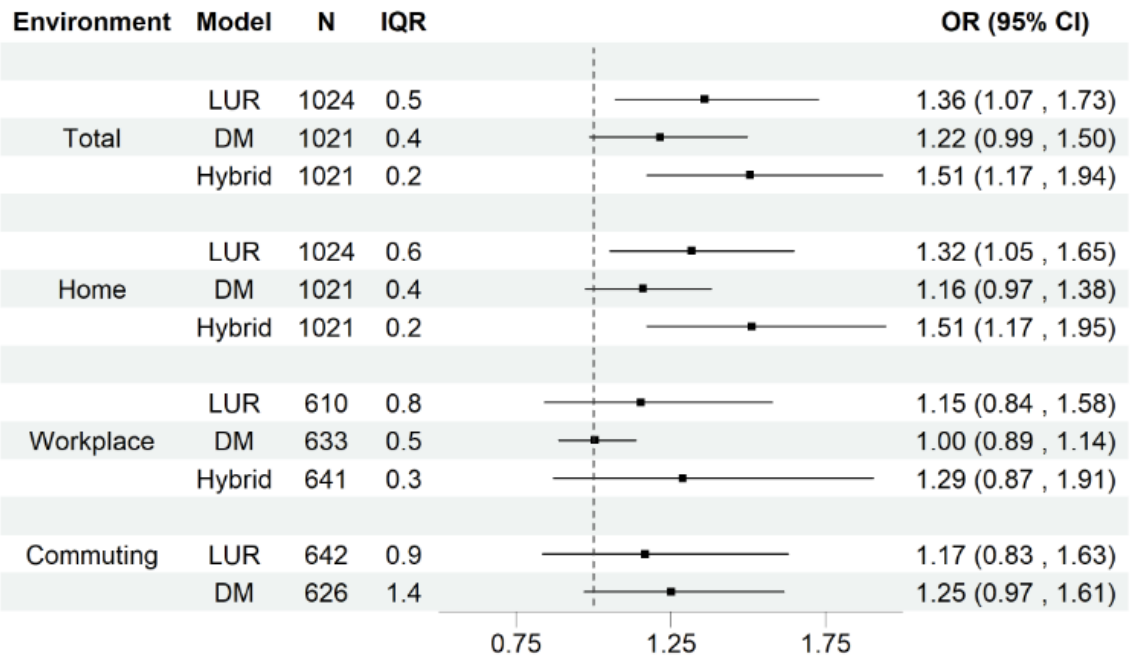
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 14.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for neonate's ethnicity.

**(A) $NO_2$**

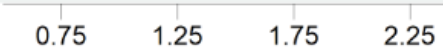



**(B) Black Carbon**



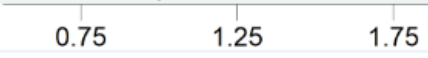
**(C) $PM_{2.5}$**

| Environment | Model | N | IQR | OR (95% CI) |
|---|---|---|---|---|
| Total | LUR | 1024 | 4.5 | 1.53 (1.13 , 2.07) |
| | DM | 1021 | 3.6 | 1.28 (0.97 , 1.68) |
| | Hybrid | 1021 | 1.4 | 1.30 (1.00 , 1.69) |
| Home | LUR | 1024 | 5.1 | 1.52 (1.12 , 2.08) |
| | DM | 1021 | 3.6 | 1.25 (0.97 , 1.61) |
| | Hybrid | 1021 | 1.4 | 1.27 (0.98 , 1.65) |
| Workplace | LUR | 610 | 4.5 | 1.20 (0.86 , 1.67) |
| | DM | 633 | 3.9 | 1.04 (0.81 , 1.32) |
| | Hybrid | 641 | 1.5 | 1.26 (0.93 , 1.71) |
| Commuting | LUR | 642 | 5 | 1.24 (0.86 , 1.78) |
| | DM | 626 | 5.9 | 1.26 (0.94 , 1.68) |

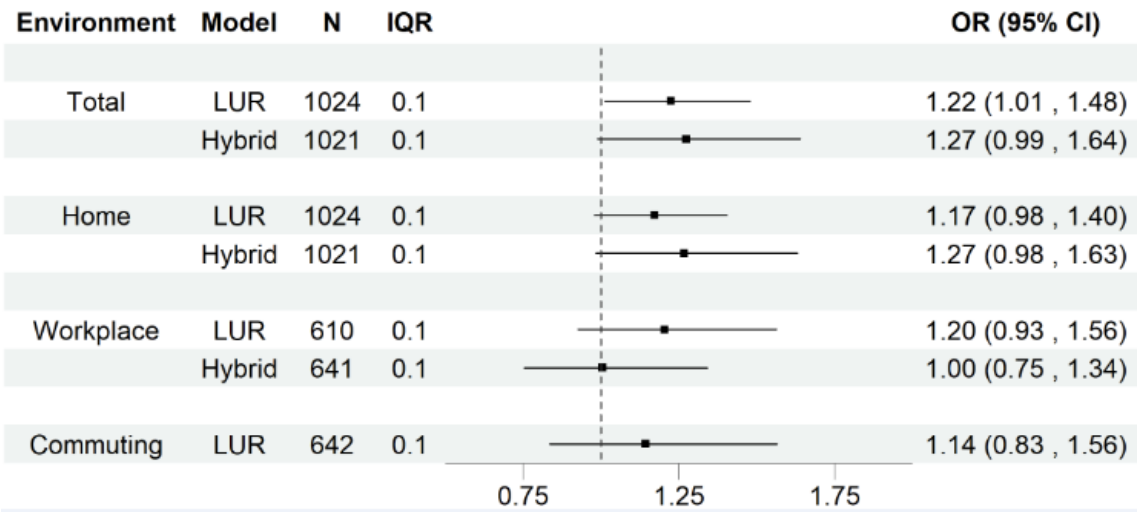



**(D) $PM_{2.5}$ Cu content**

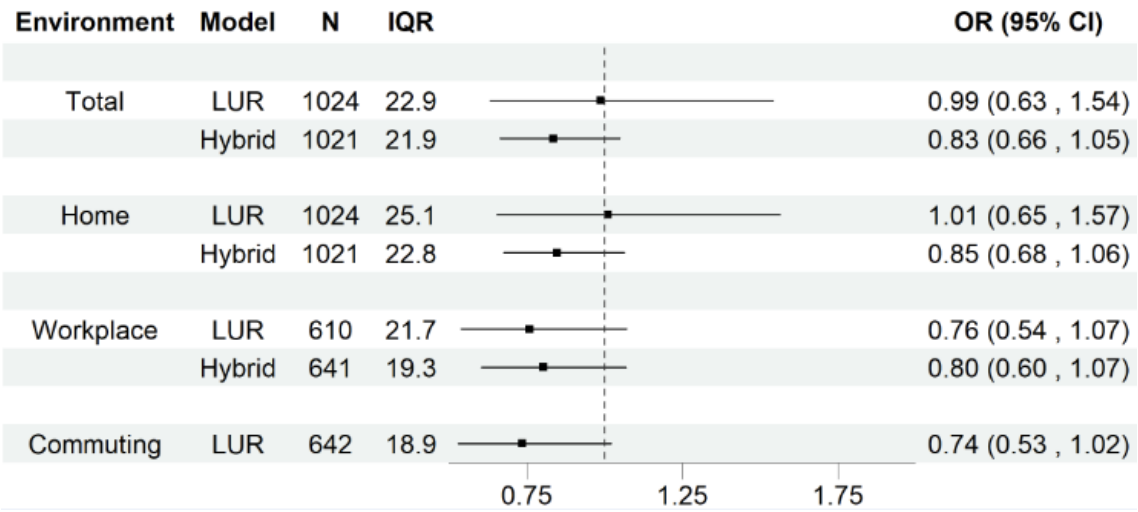
| Environment | Model | N | IQR | OR (95% CI) |
|---|---|---|---|---|
| Total | LUR | 1024 | 2 | 1.22 (1.00 , 1.49) |
| | Hybrid | 1021 | 1.4 | 1.14 (0.89 , 1.47) |
| Home | LUR | 1024 | 2 | 1.17 (0.97 , 1.41) |
| | Hybrid | 1021 | 1.5 | 1.13 (0.88 , 1.45) |
| Workplace | LUR | 610 | 2.5 | 1.27 (0.96 , 1.68) |
| | Hybrid | 641 | 1.6 | 0.98 (0.75 , 1.29) |
| Commuting | LUR | 642 | 2.4 | 1.24 (0.89 , 1.73) |



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

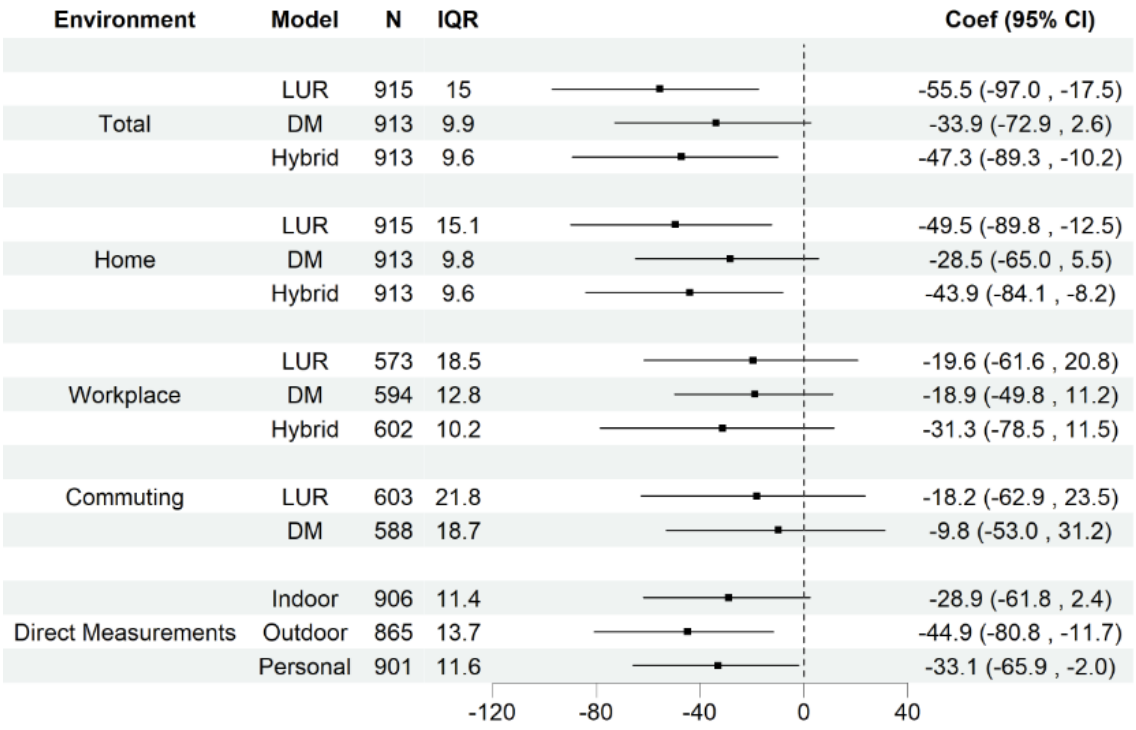



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no), and neonate's ethnicity (categorical, European vs. other).

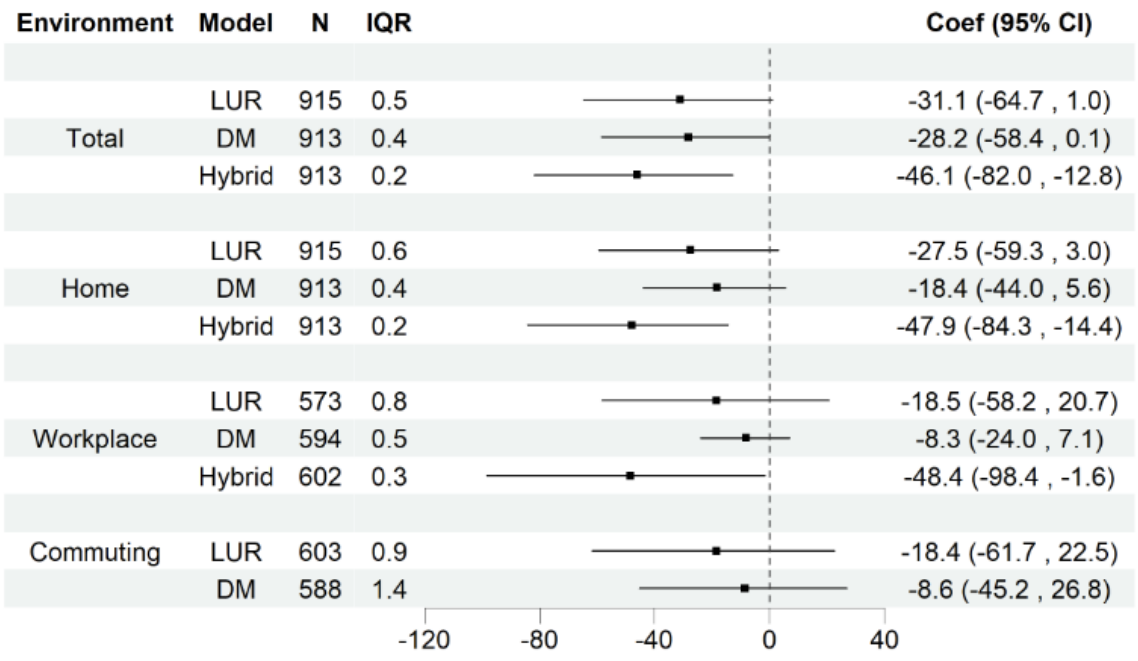
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 15.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for type of cooking stove.

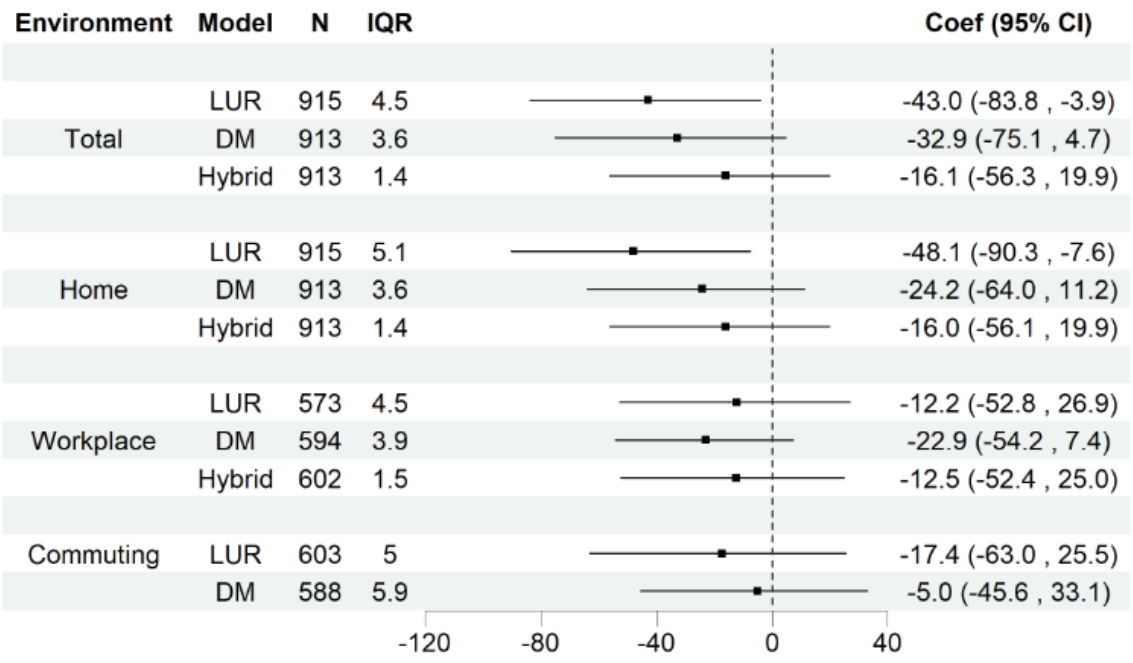
**(A) $NO_2$**



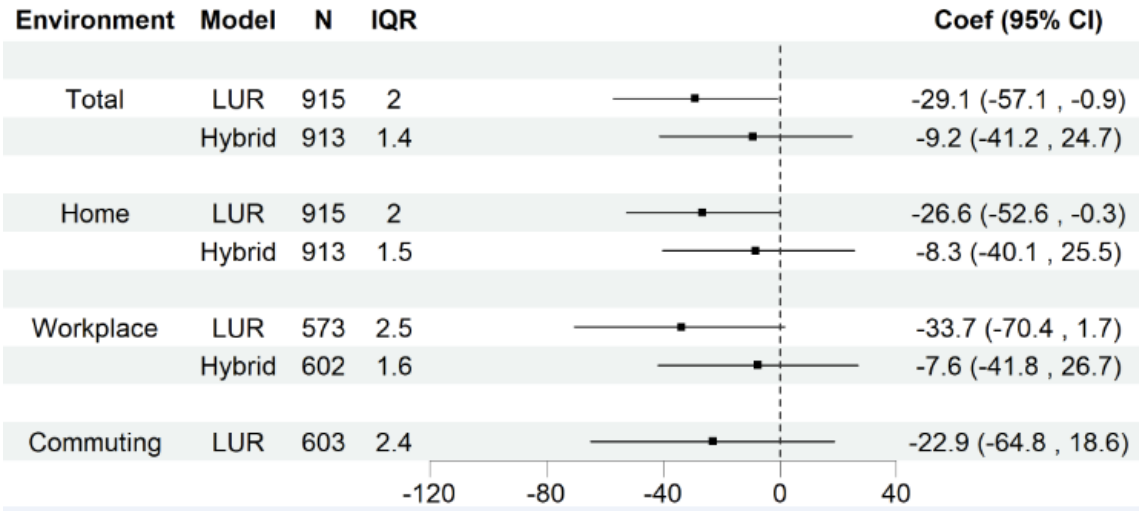

**(B) Black Carbon**



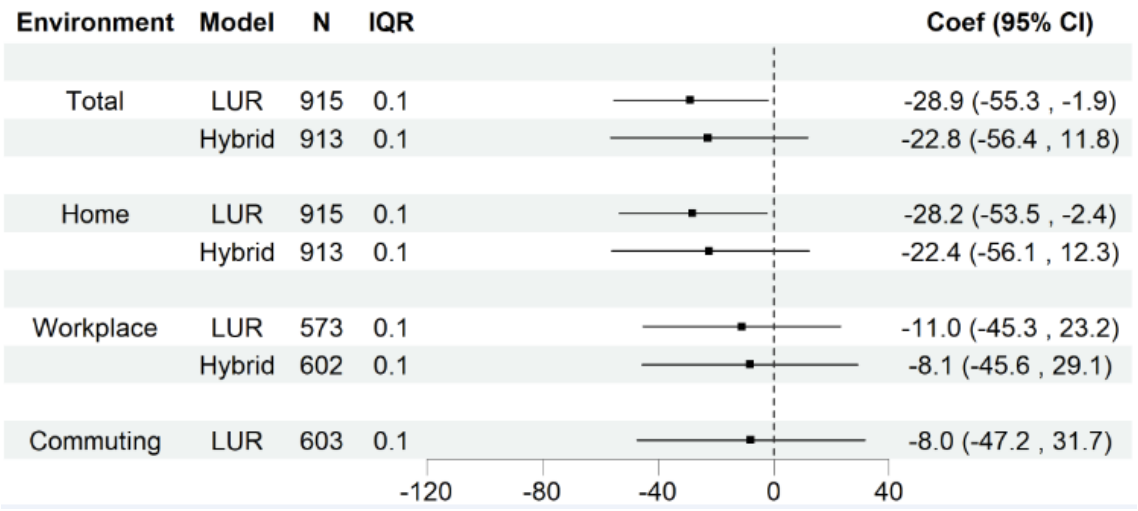
**(C) $PM_{2.5}$**



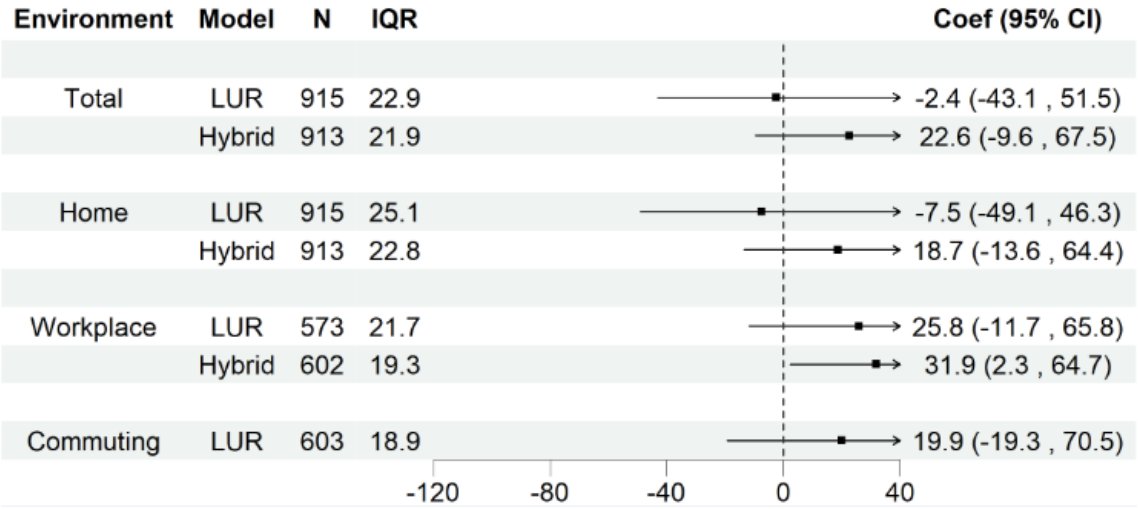

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

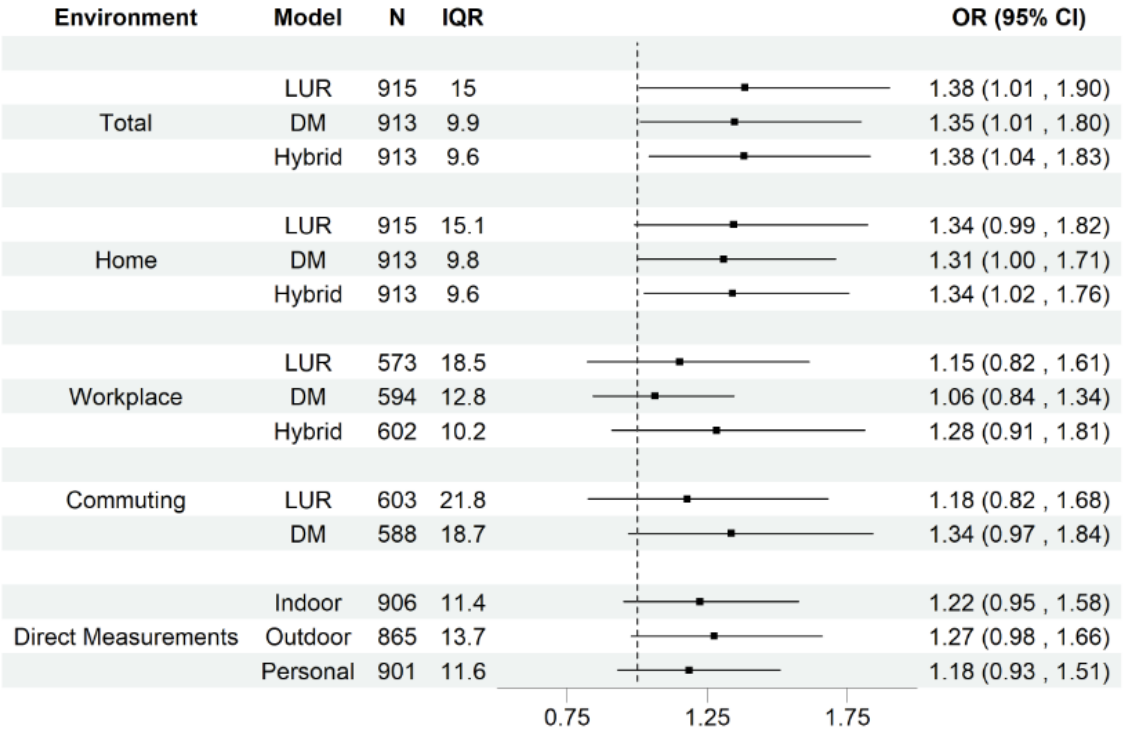



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), sex of the neonate (girl vs. boy), and type of cooking stove (categorical, gas vs. electric).

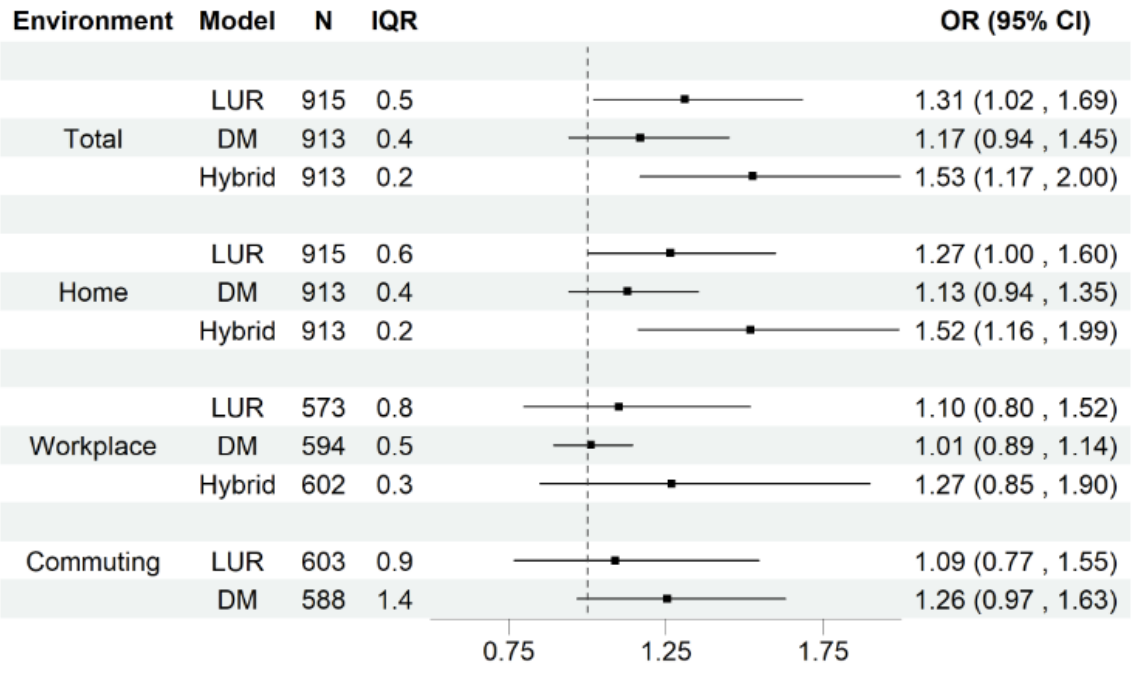
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 16.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for type of cooking stove.

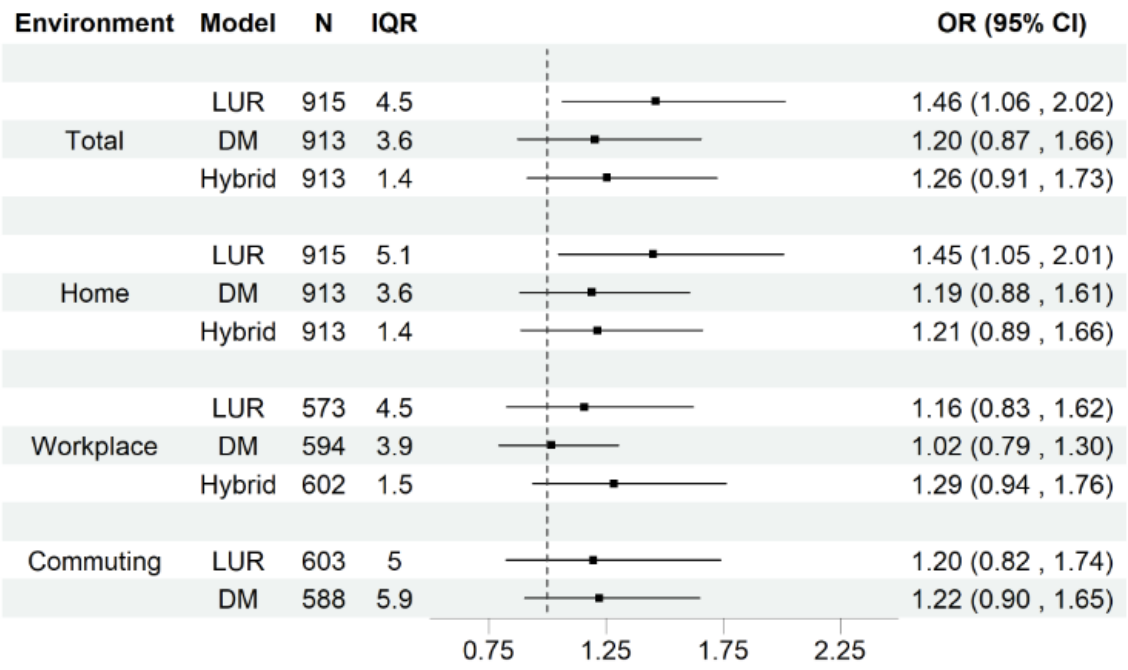
**(A) $NO_2$**



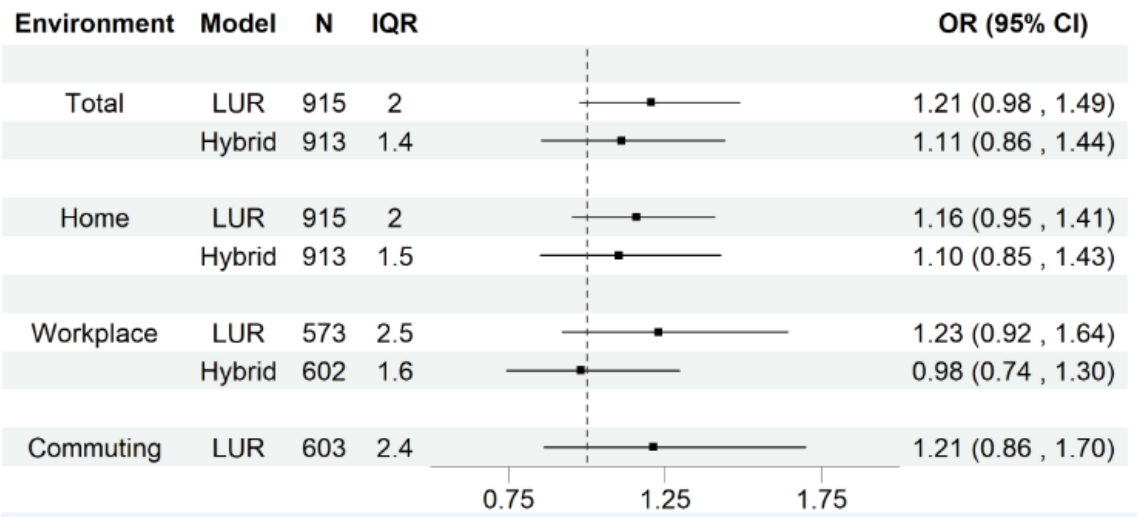

**(B) Black Carbon**



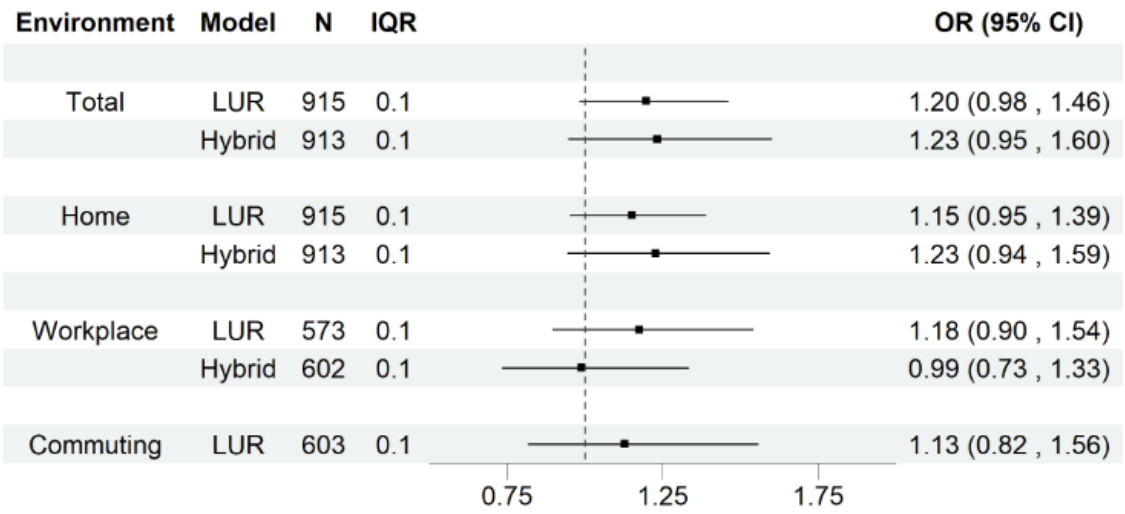
**(C) $PM_{2.5}$**



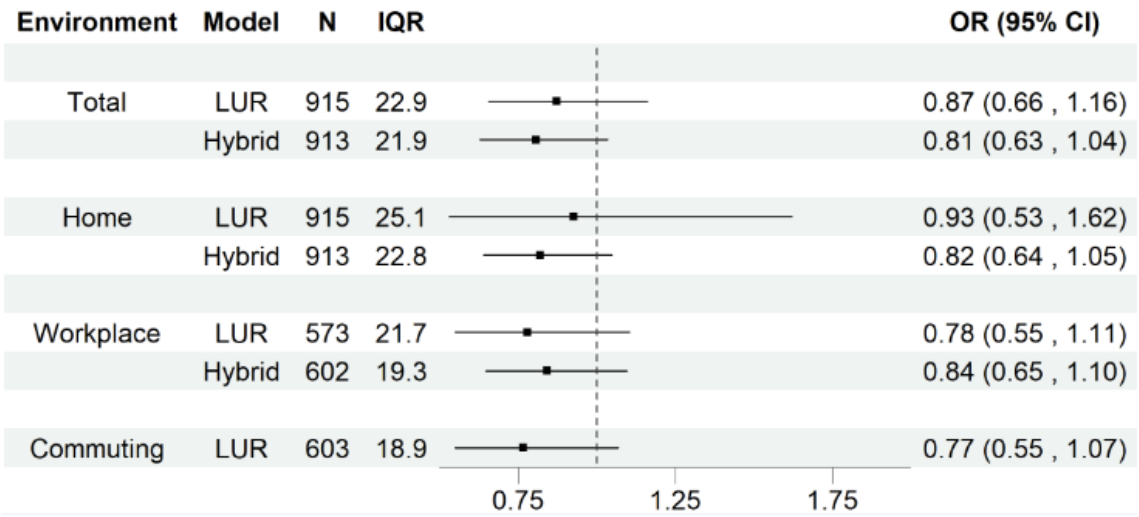

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

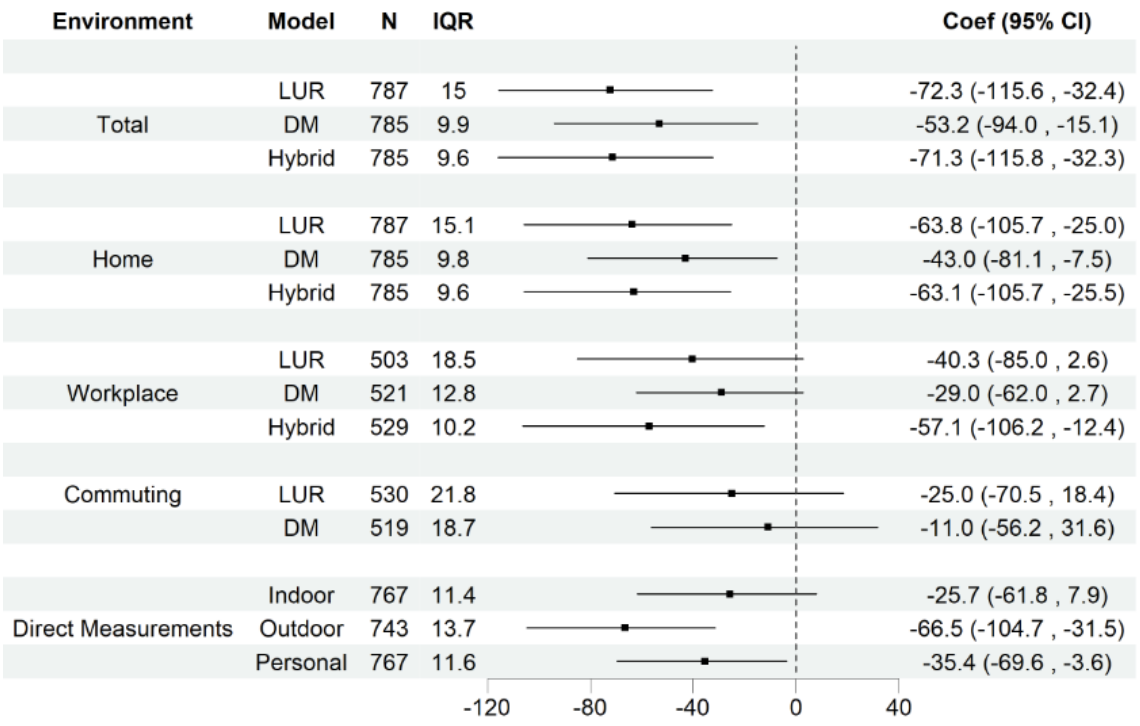



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no), and type of cooking stove (categorical, gas vs. electric).

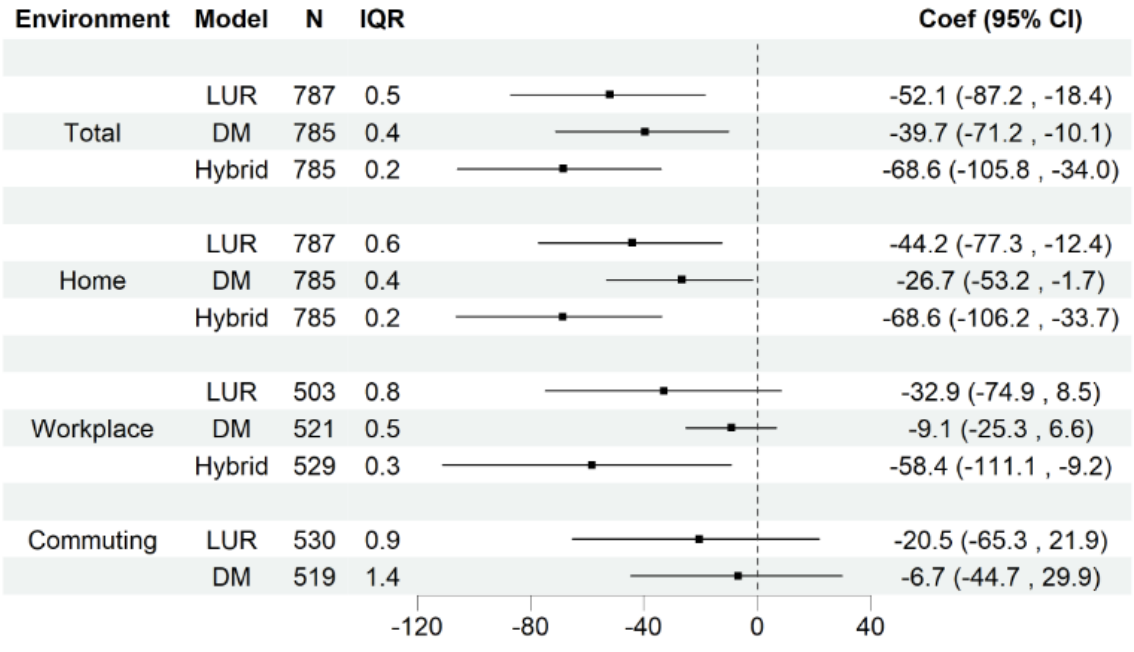
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 17.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ (μg/m$^3$), (B) black carbon (μg/m$^3$), (C) $PM_{2.5}$ (μg/m$^3$), (D) $PM_{2.5}$ Cu content (ng/m$^3$), (E) $PM_{2.5}$ Fe content (μg/m$^3$), and (F) $PM_{2.5}$ Zn content (ng/m$^3$) further adjusted for having kitchen hood.

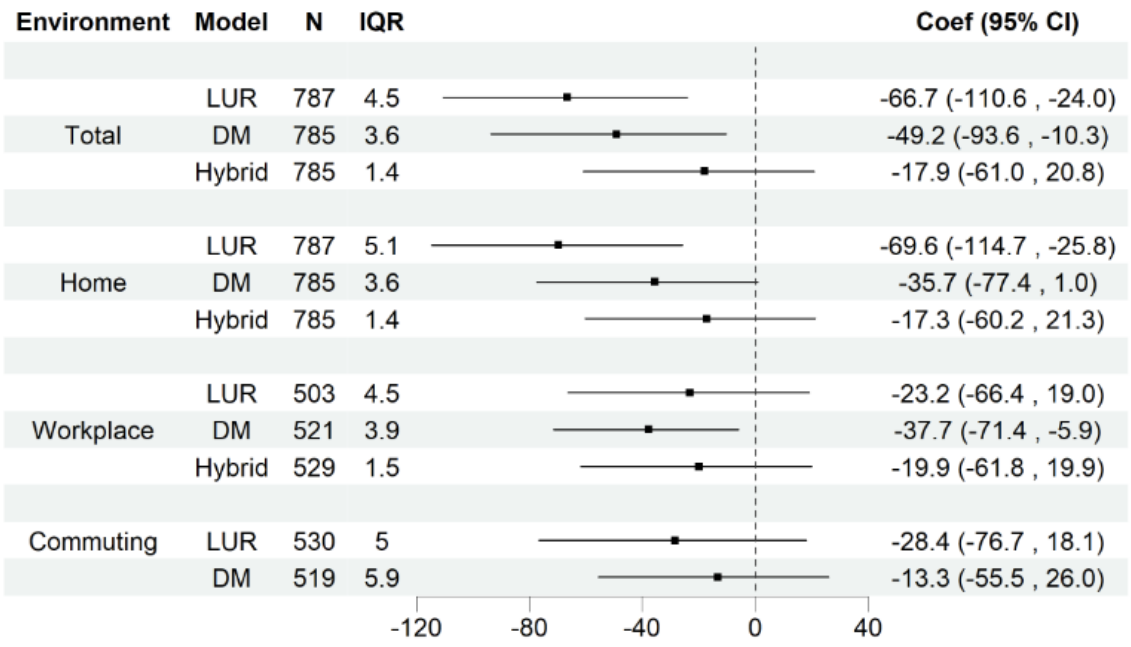
**(A) $NO_2$**



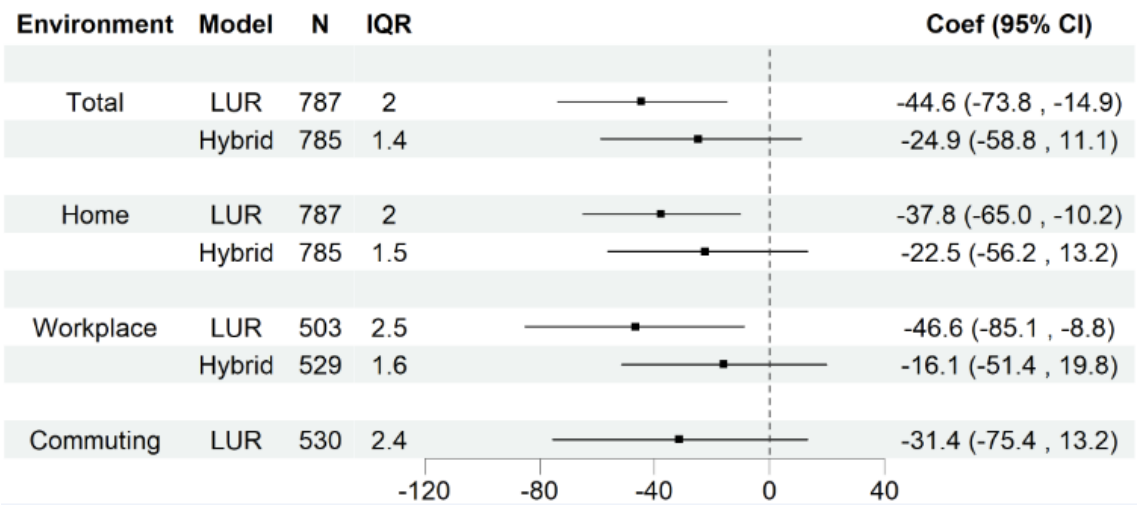

**(B) Black Carbon**



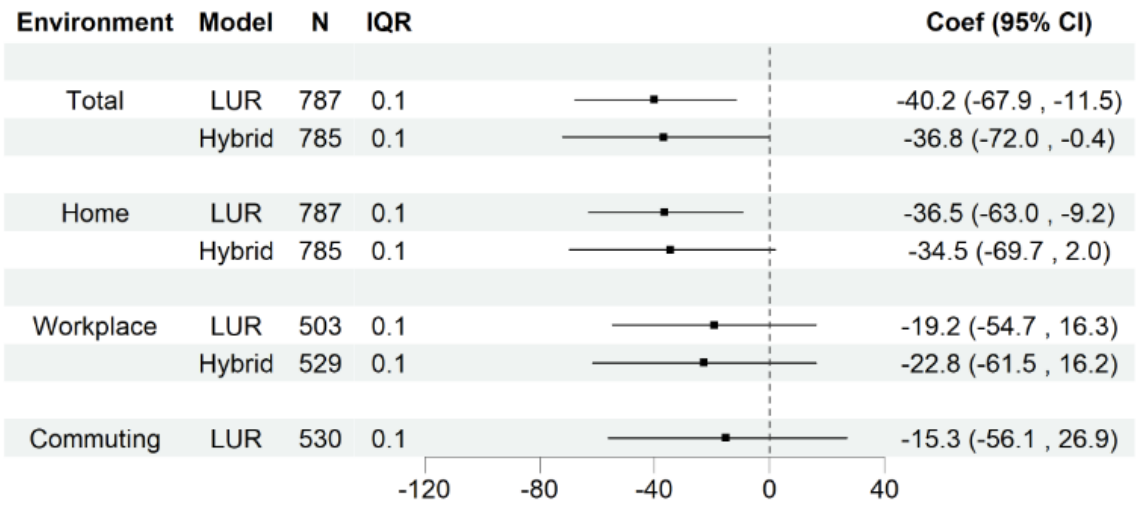
**(C) $PM_{2.5}$**



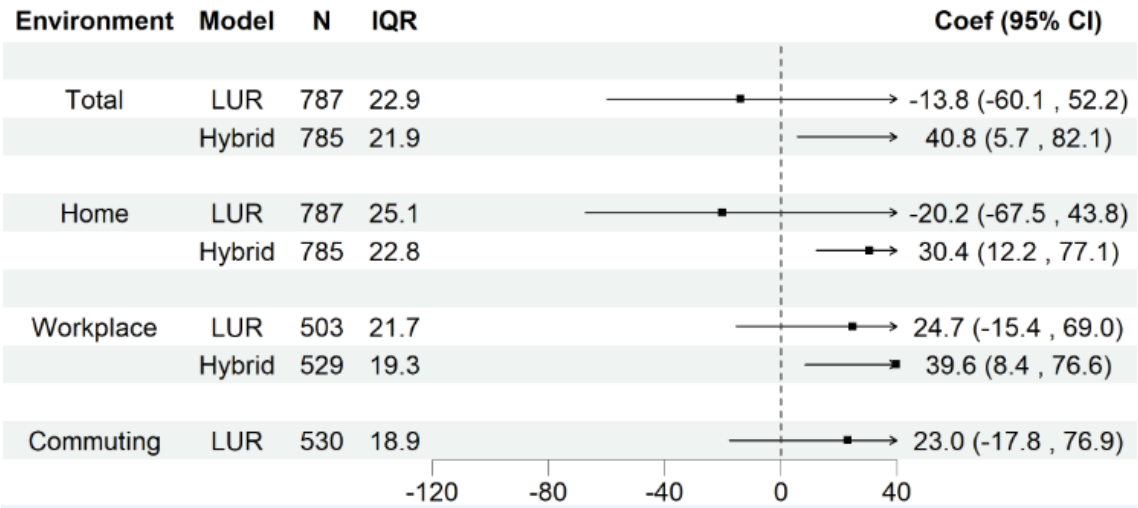

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**



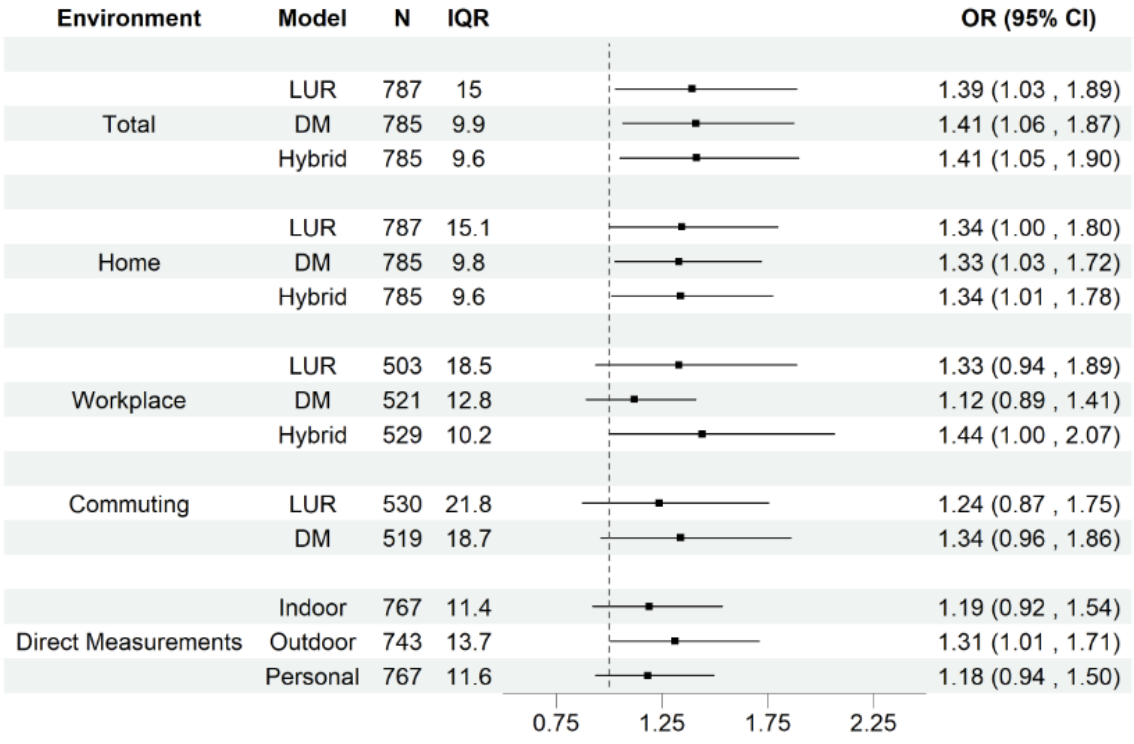

[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), sex of the neonate (girl vs. boy), and having kitchen hood (categorical, yes/no).

**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-

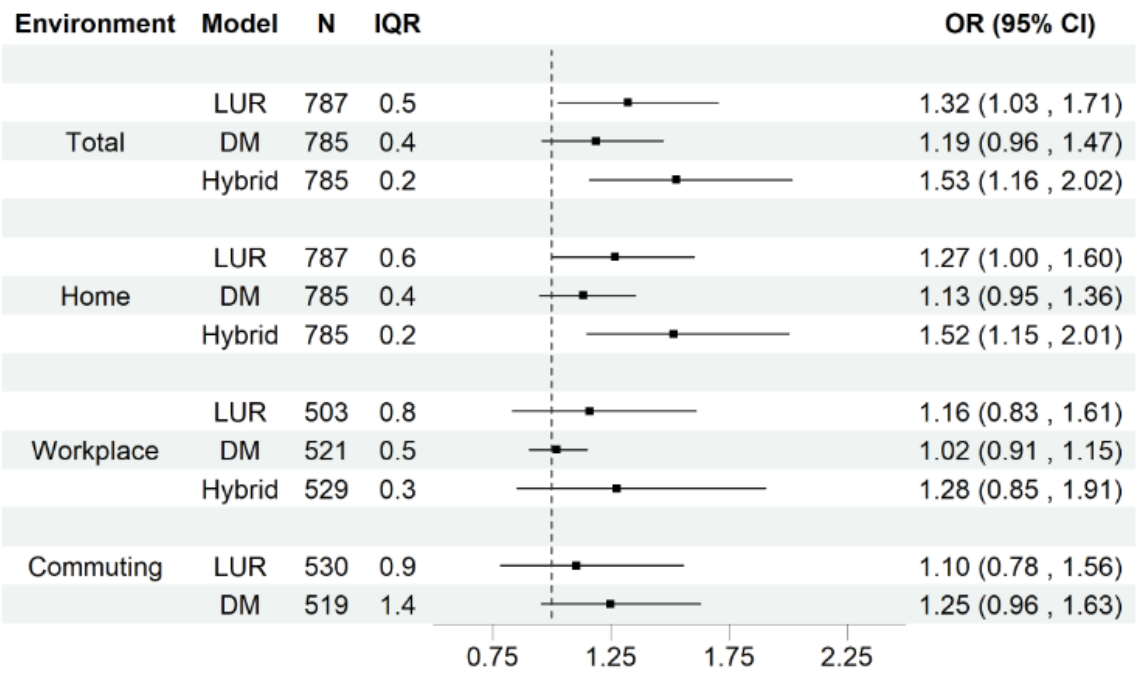
outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 18.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for having kitchen hood.

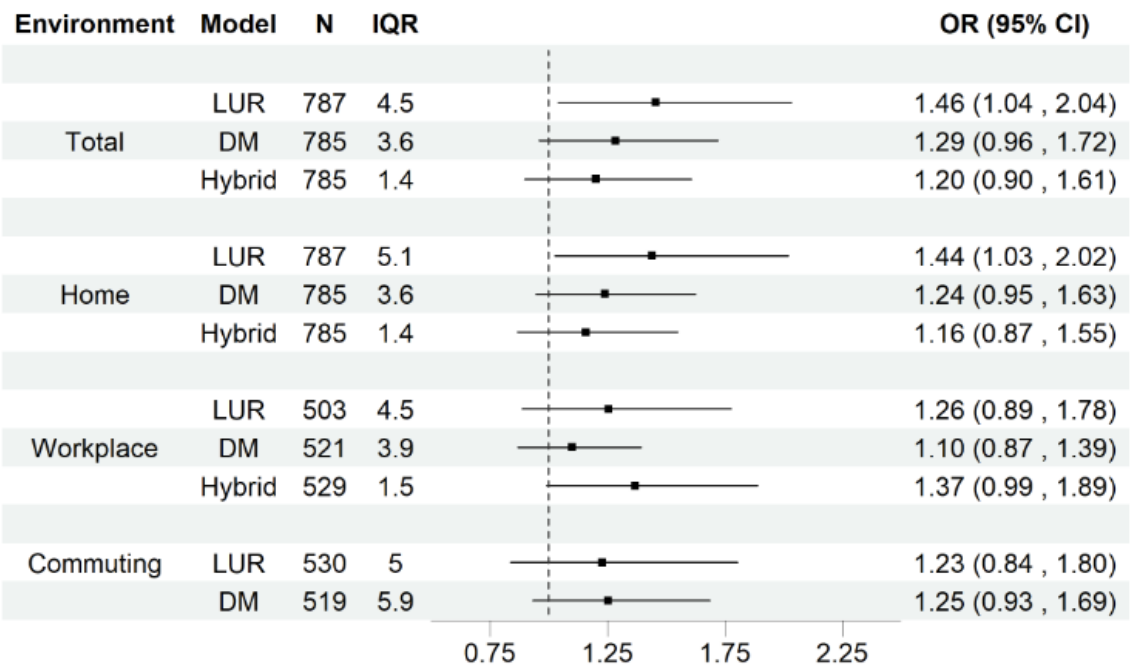
**(A) $NO_2$**



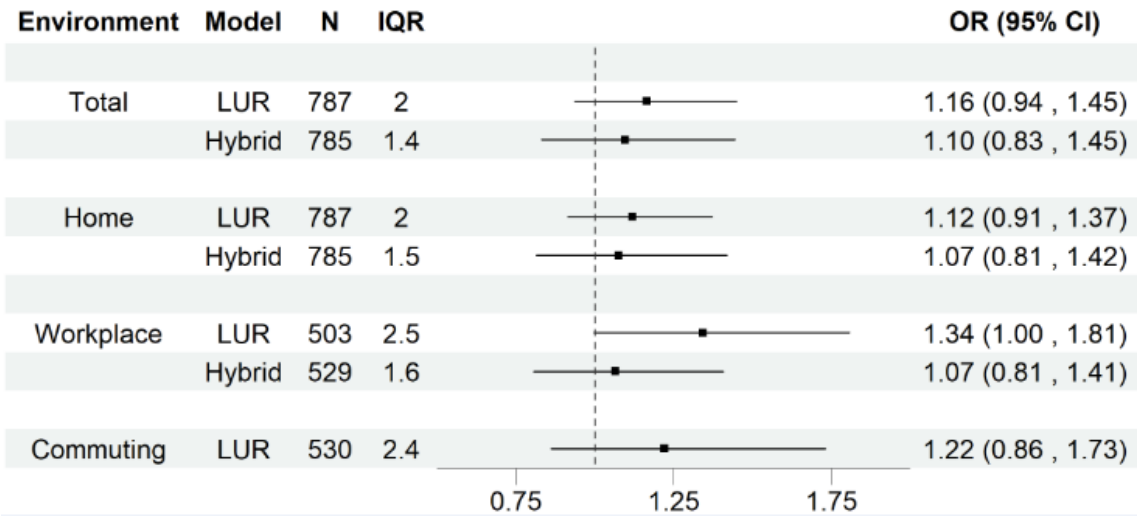

**(B) Black Carbon**



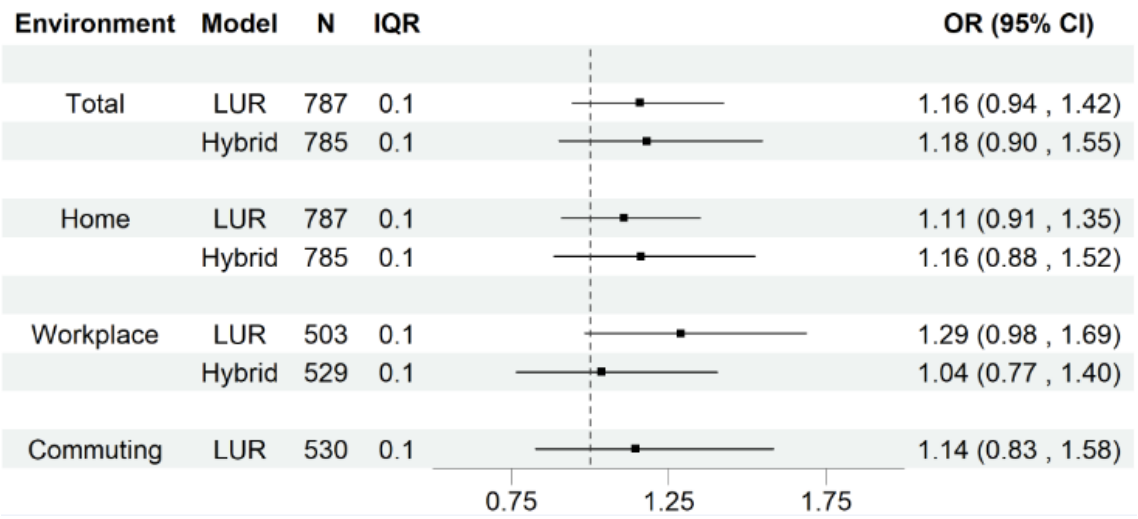
**(C) $PM_{2.5}$**



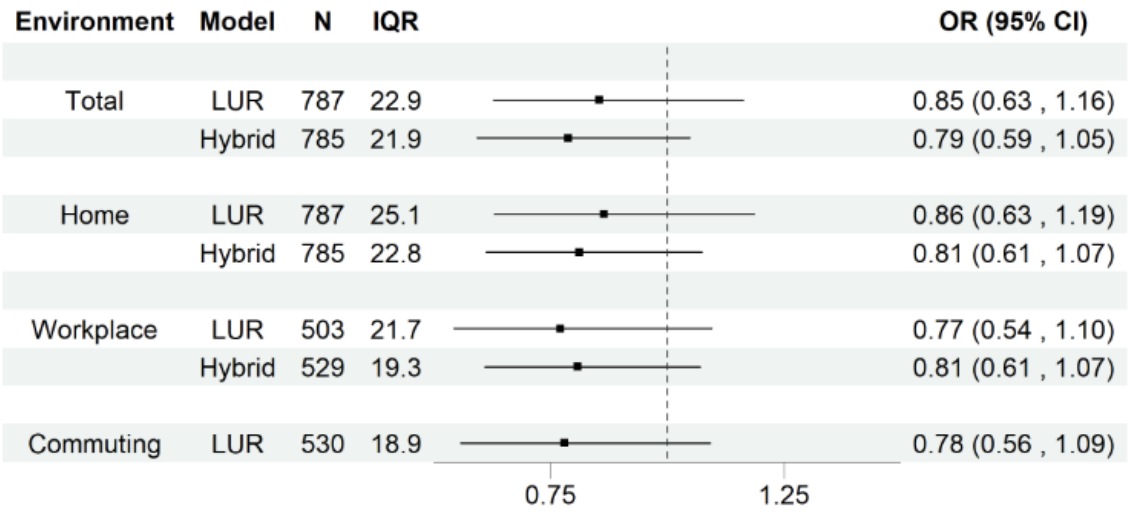

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

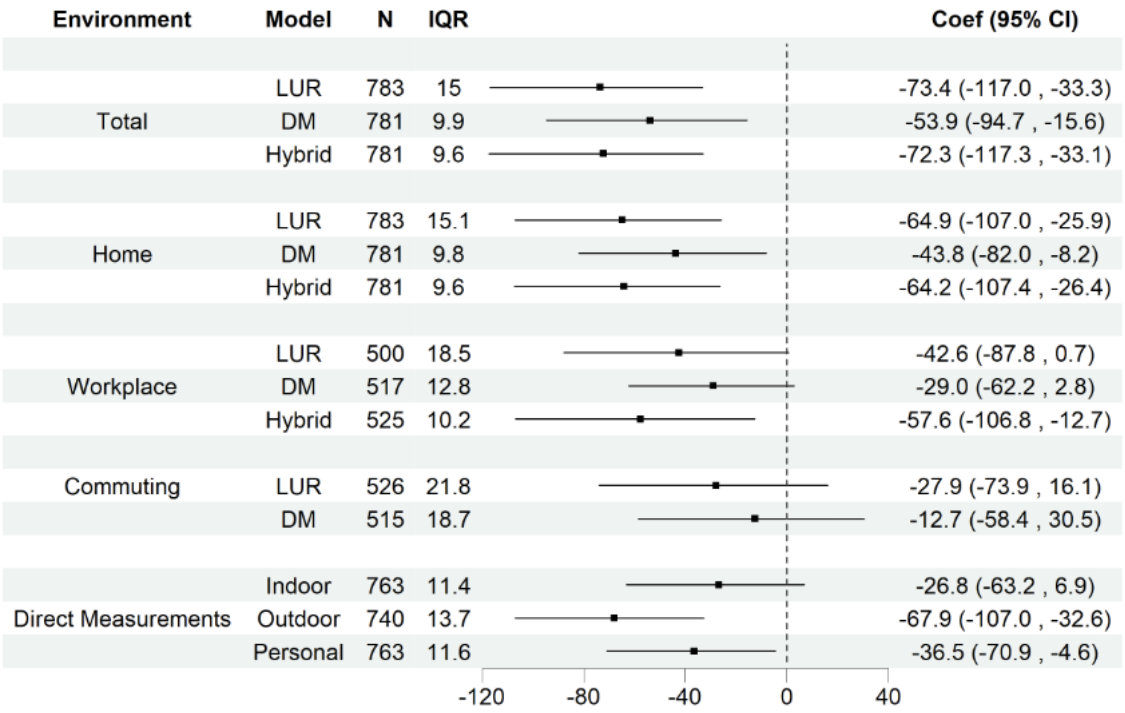



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no), and having kitchen hood (categorical, yes/no).

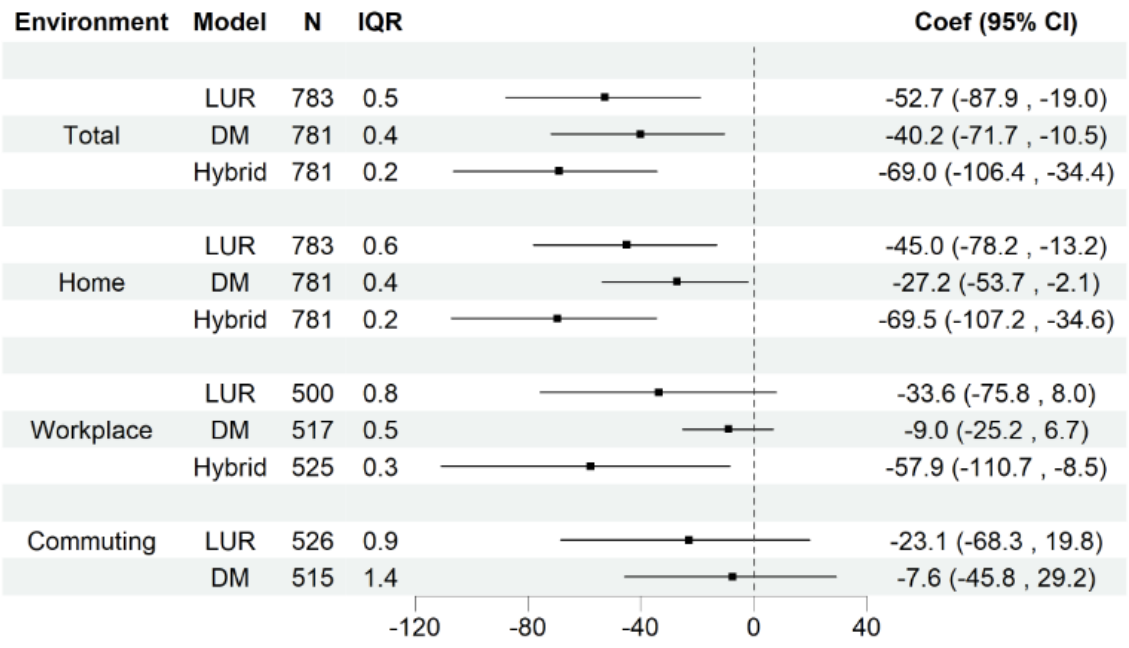
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 19.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for using kitchen hood.

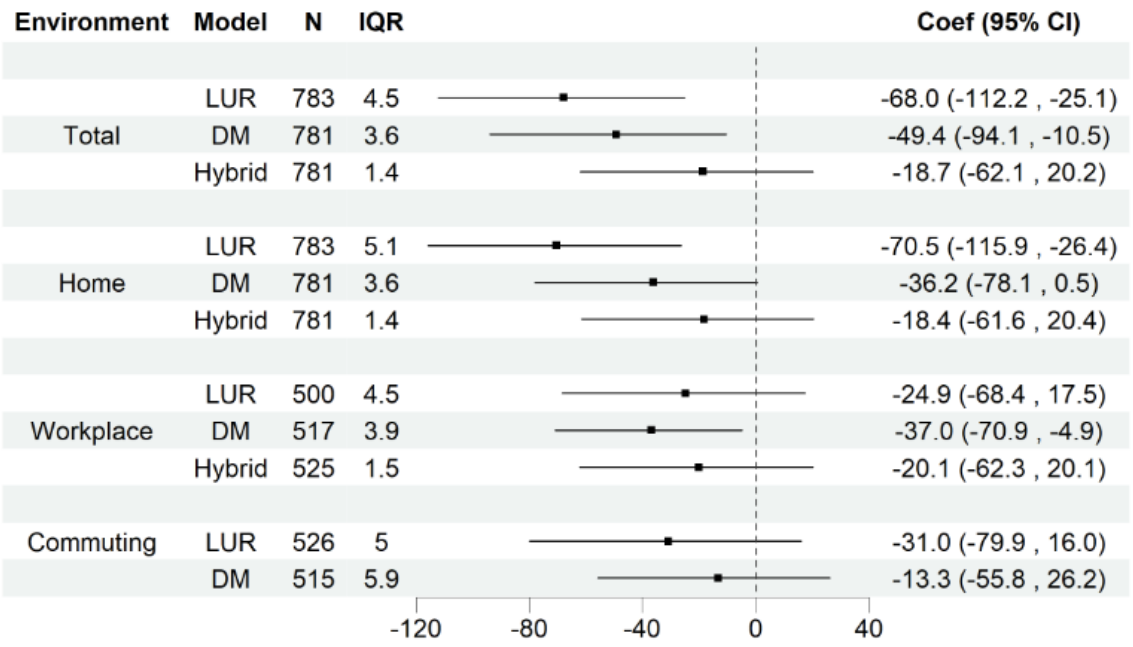
**(A) $NO_2$**



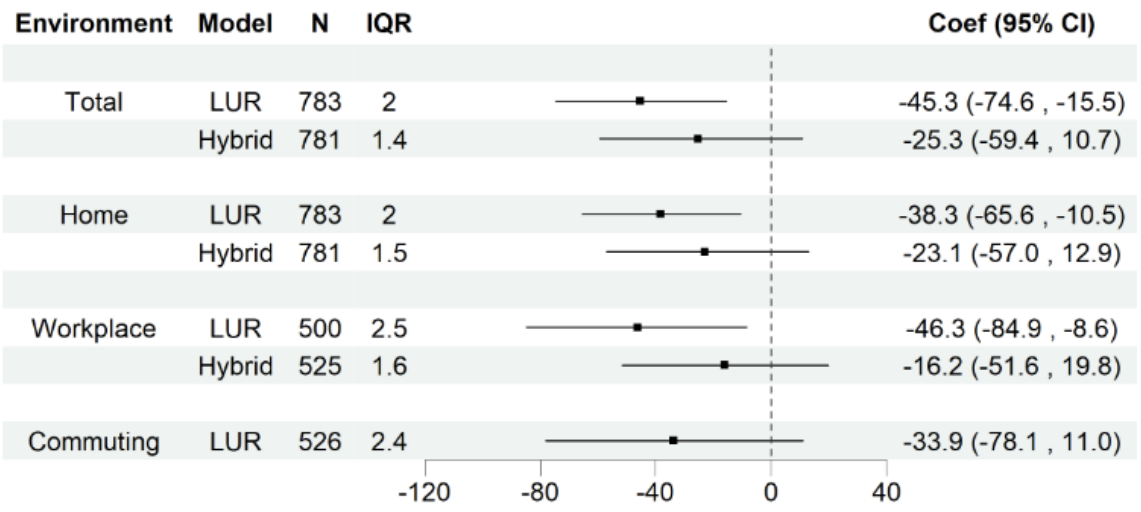

**(B) Black Carbon**



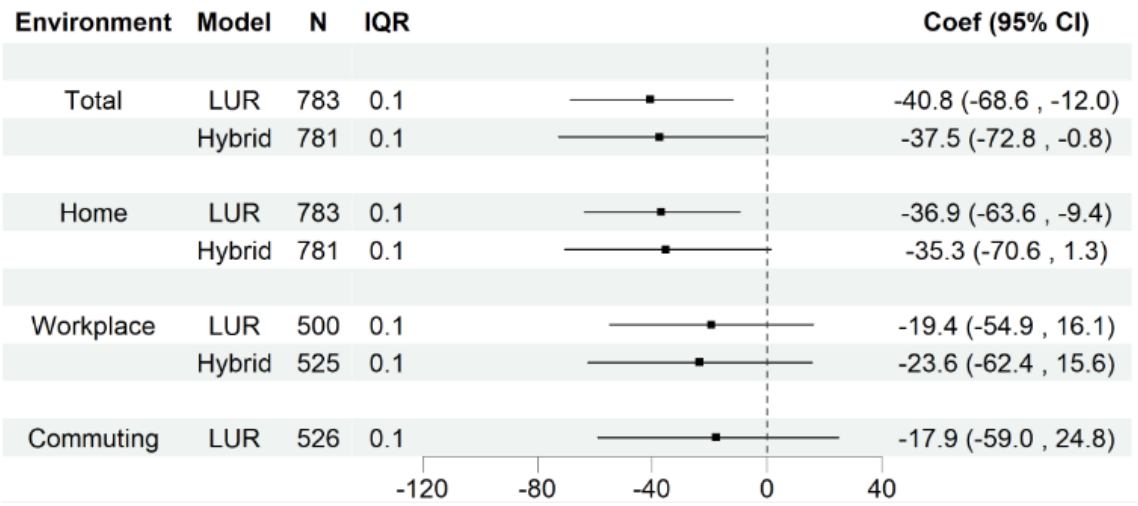
**(C) $PM_{2.5}$**



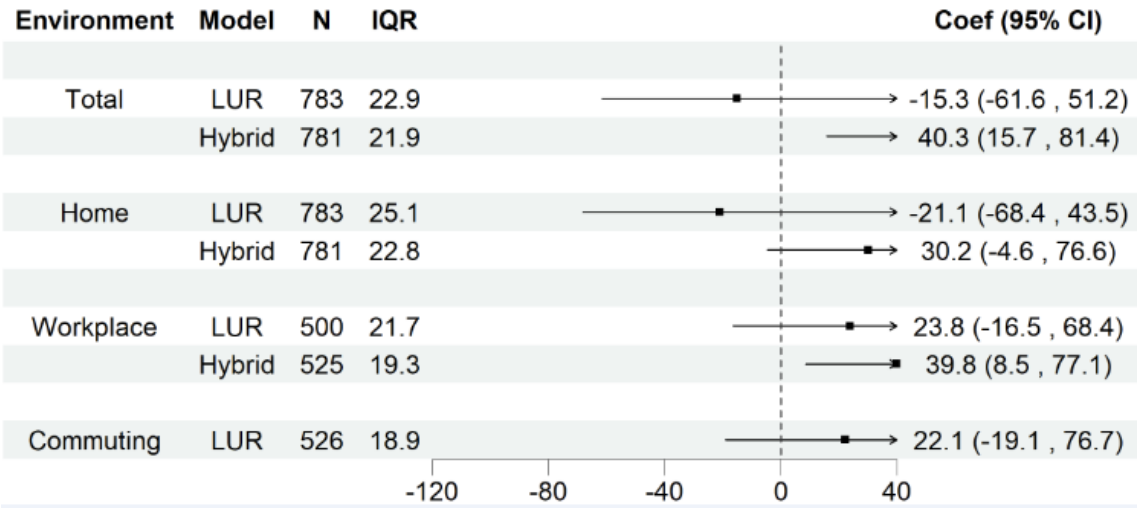

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

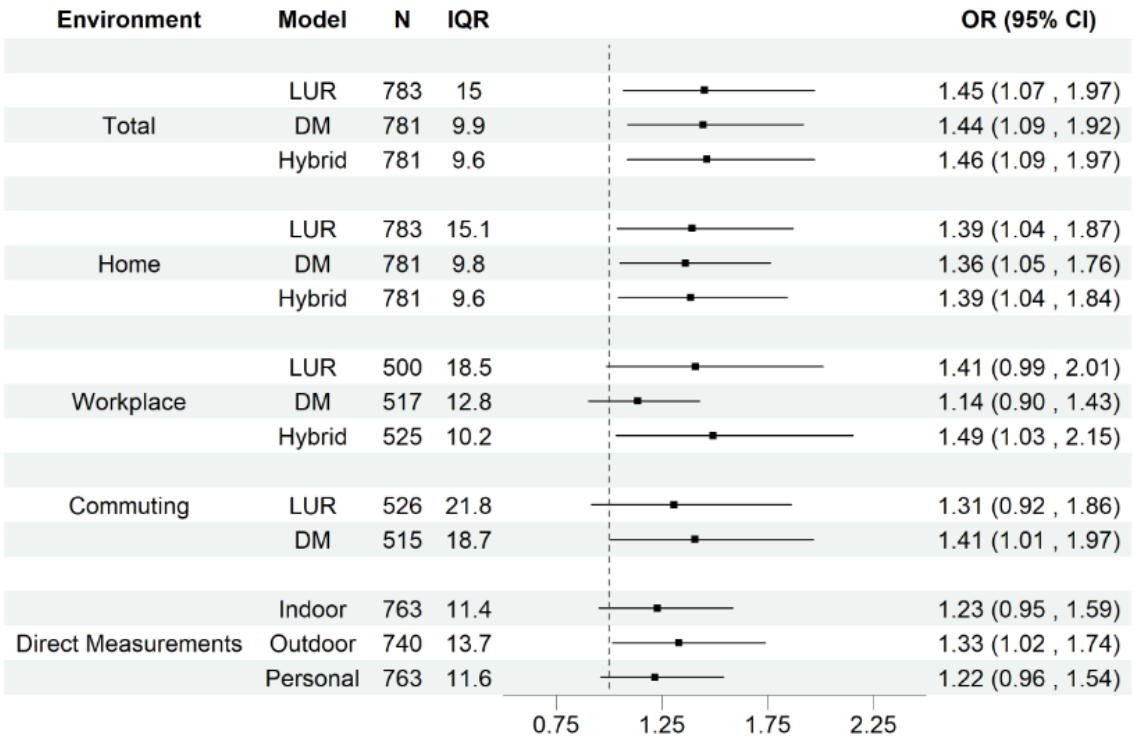



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), sex of the neonate (girl vs. boy), and using kitchen hood (categorical, always/sometimes or never).

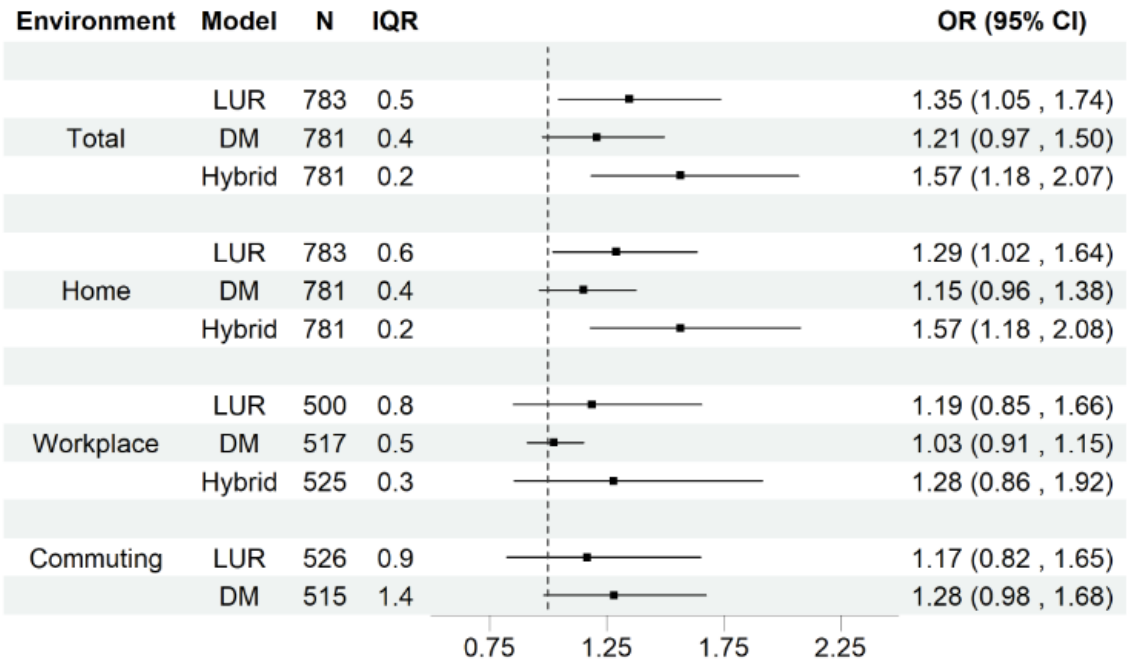
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 20.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) further adjusted for using kitchen hood.

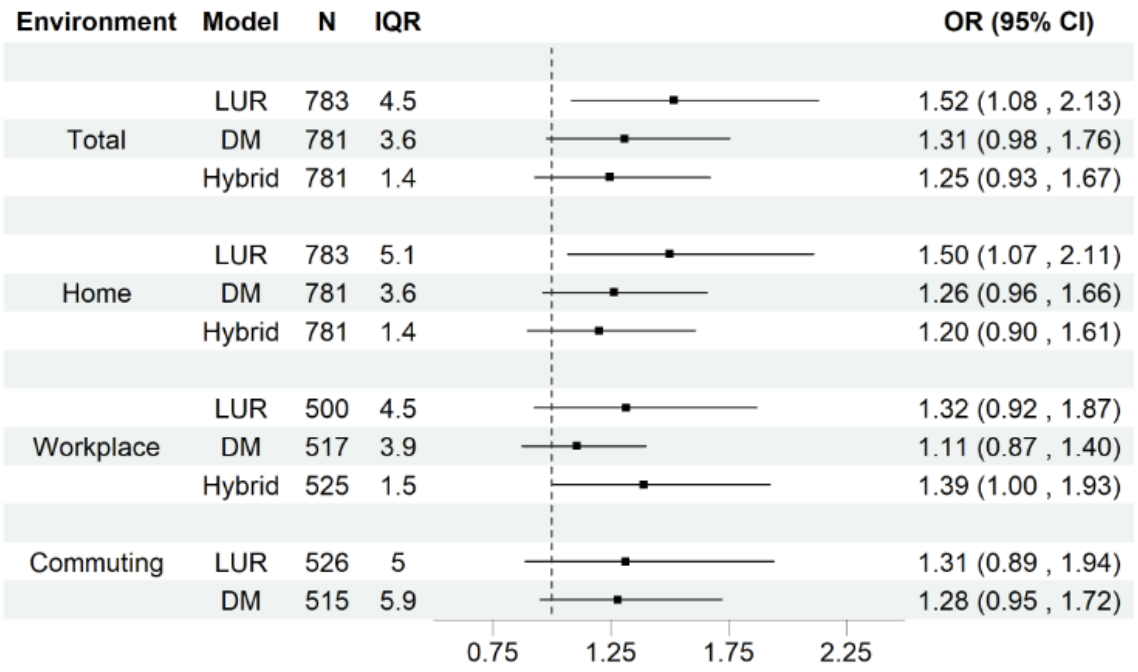
**(A) $NO_2$**



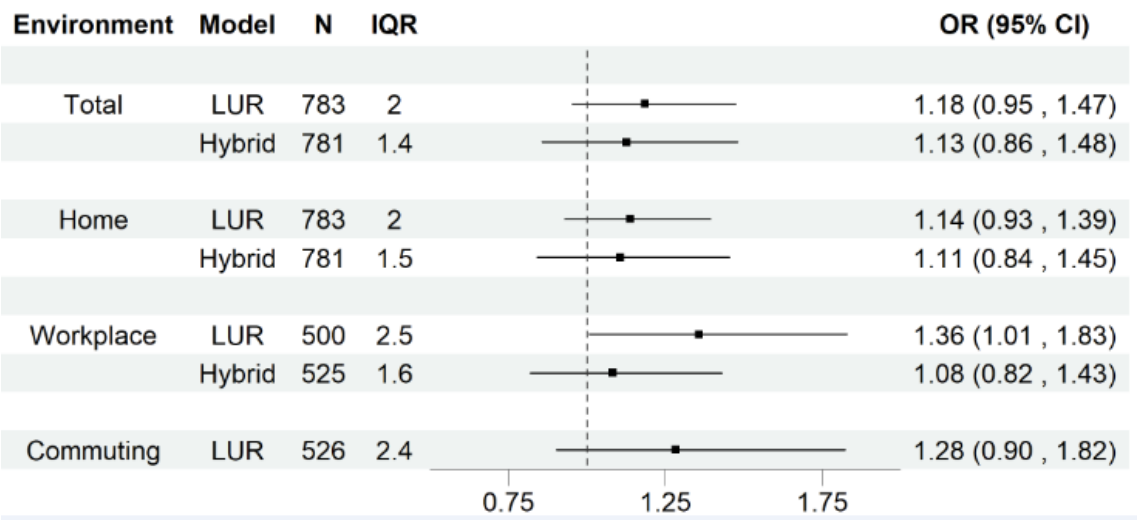

**(B) Black Carbon**



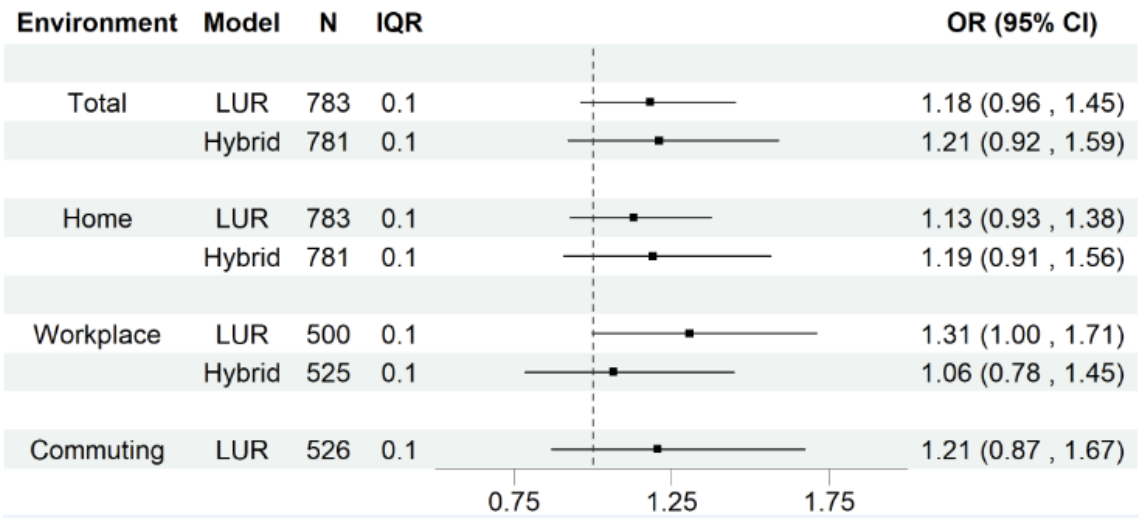
**(C) $PM_{2.5}$**



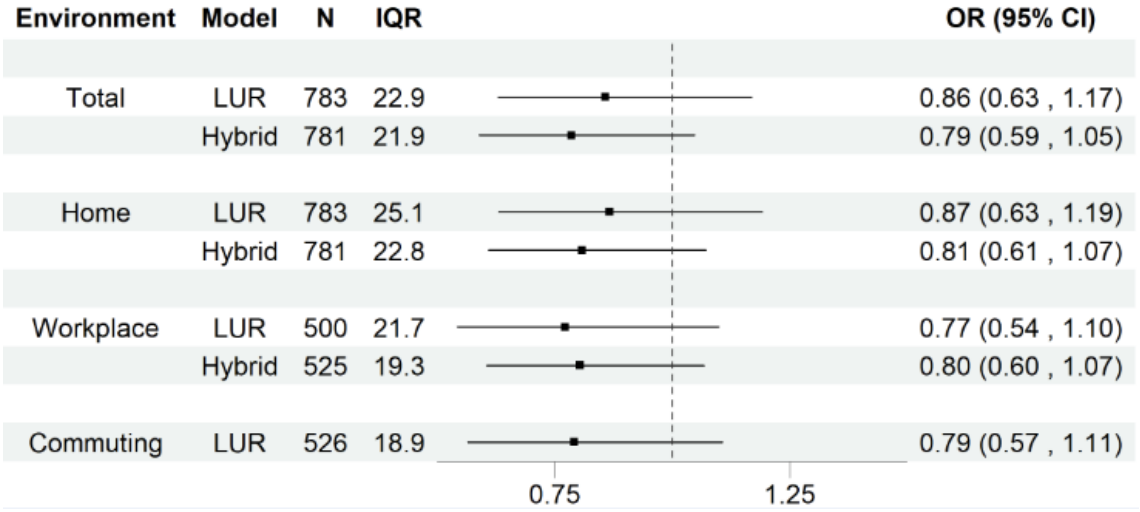

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

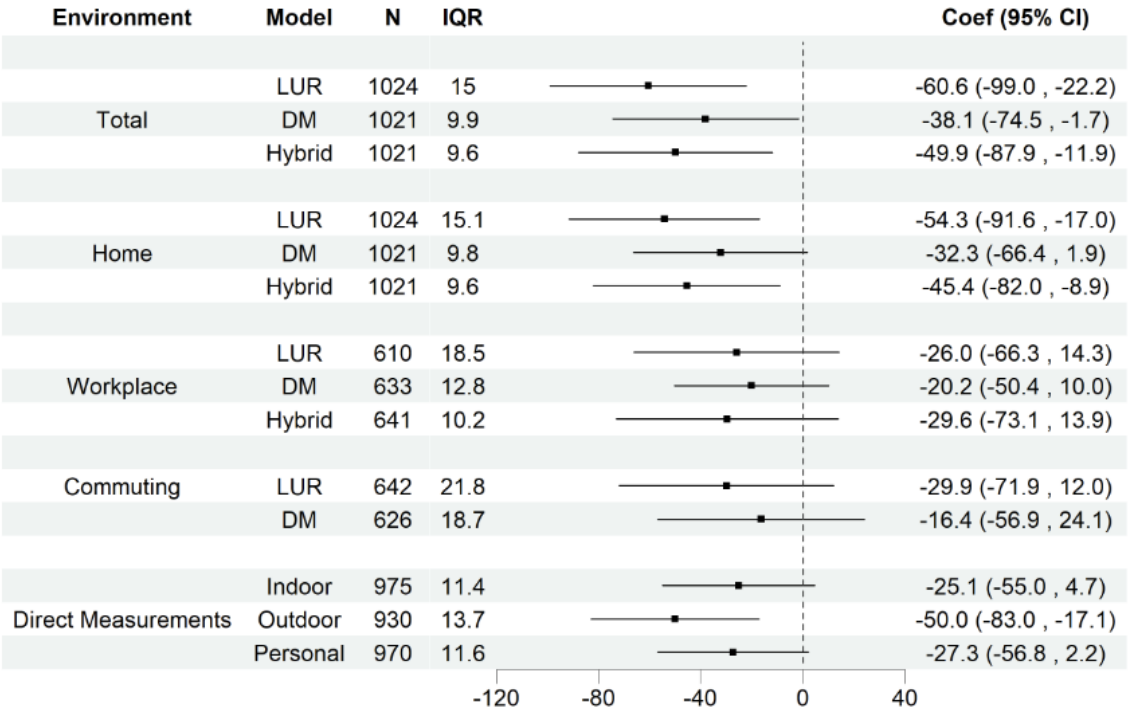



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no), and using kitchen hood (categorical, always/sometimes or never).

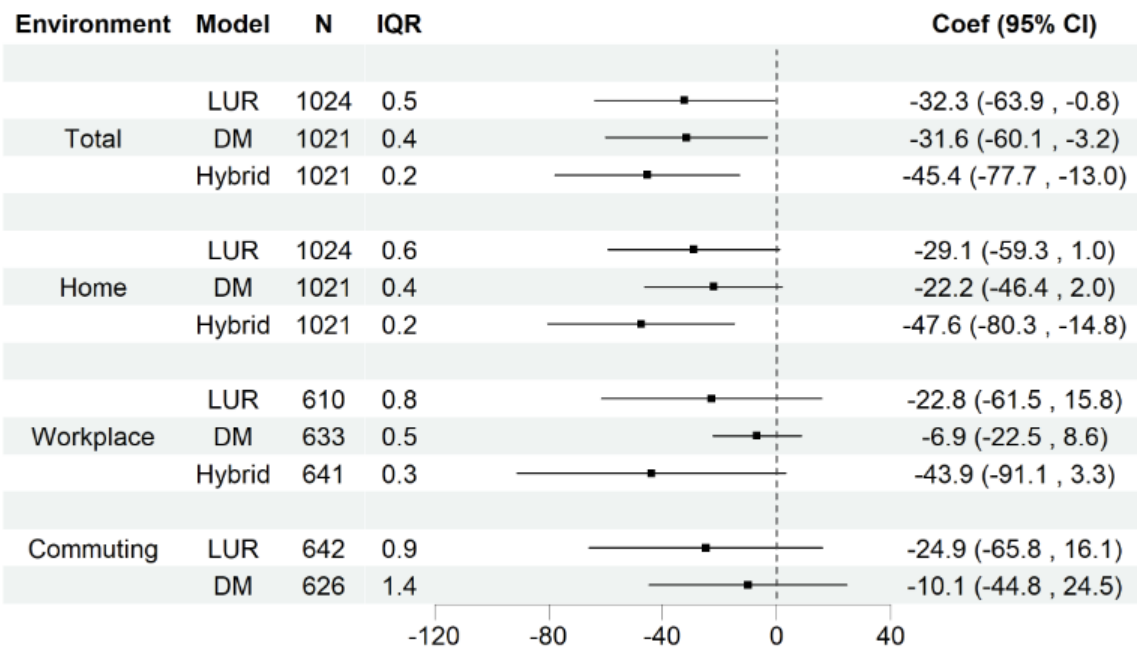
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 21.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) developing linear regression models with hospital as a fixed effect covariate.

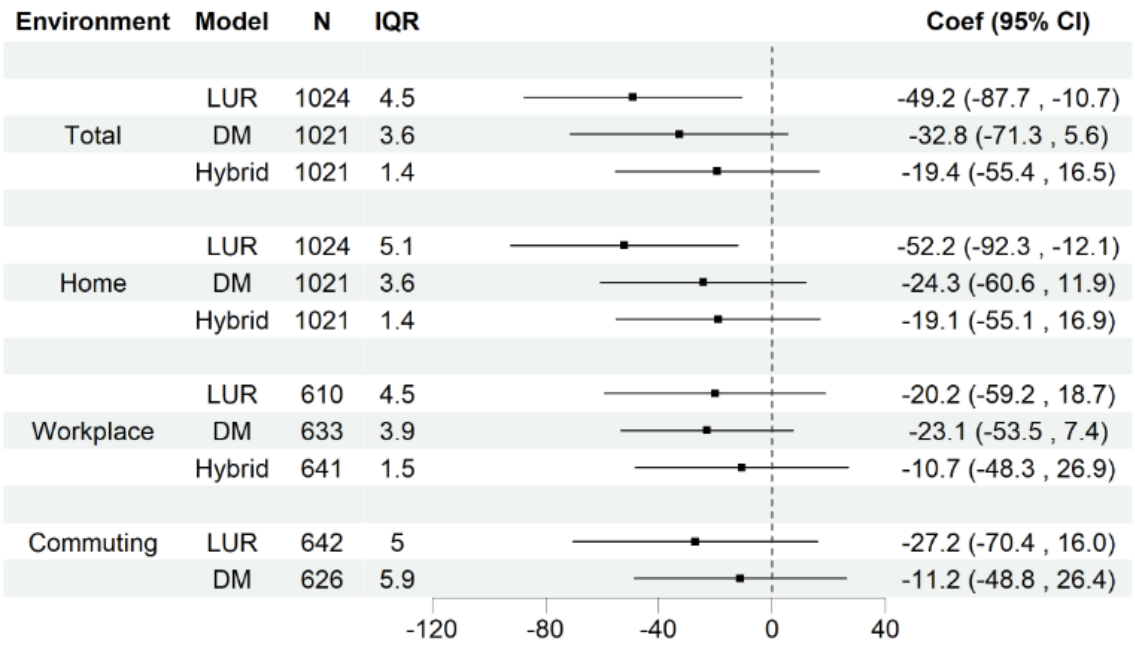
**(A) $NO_2$**



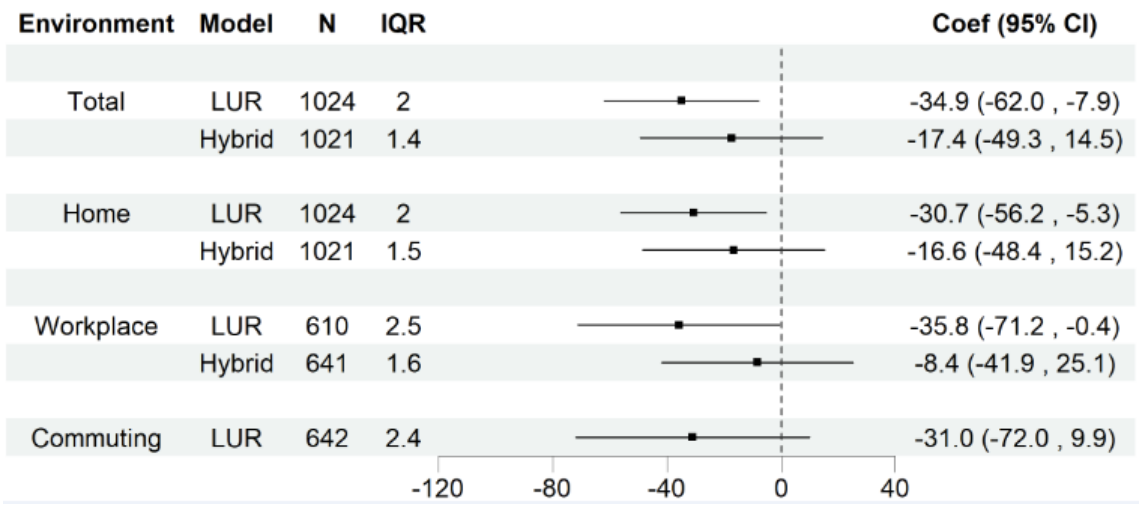

**(B) Black Carbon**



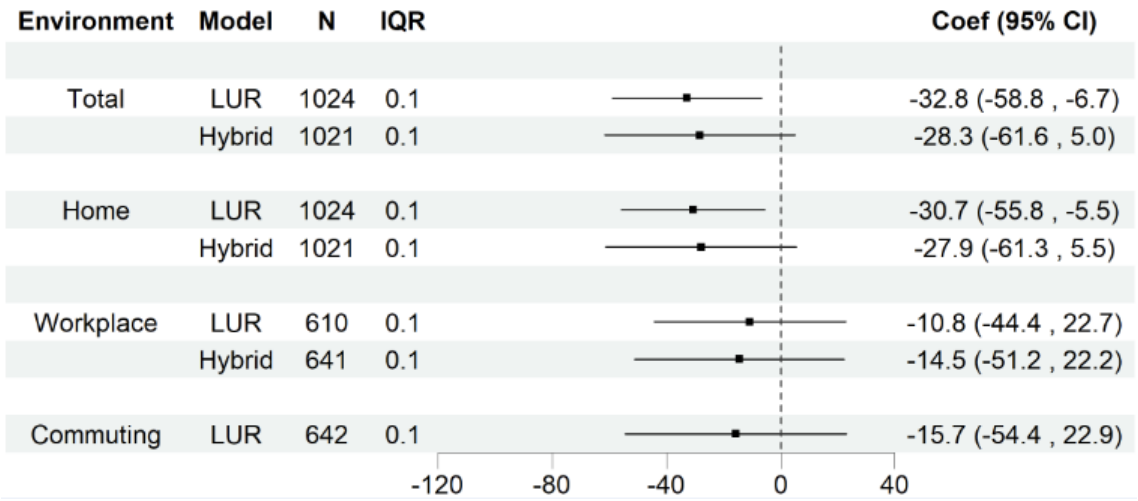
**(C) $PM_{2.5}$**



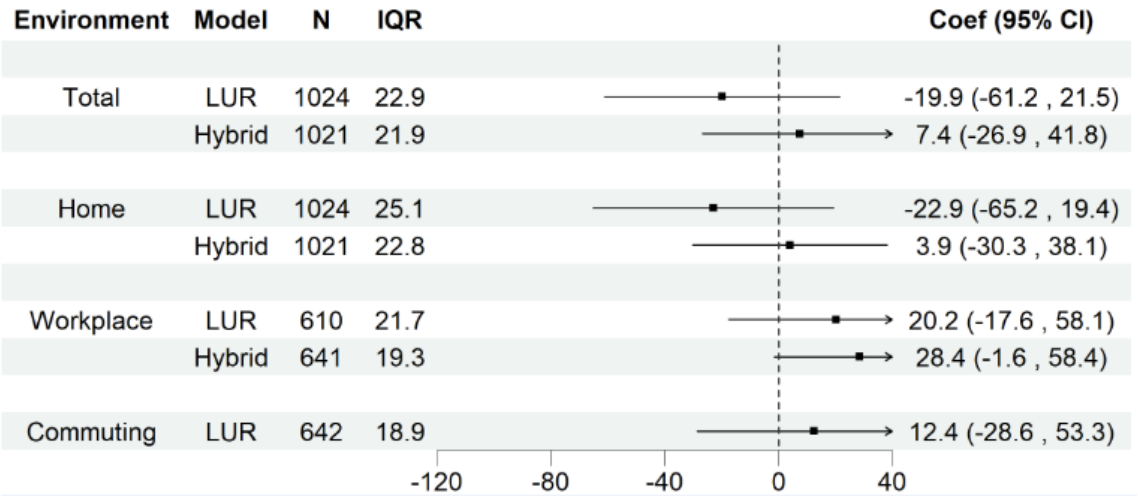

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), sex of the neonate (girl vs. boy), and hospital (categorical).

**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

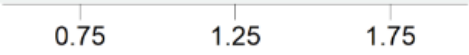
**Appendix 22.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) developing logistic regression models with hospital as a fixed effect covariate.

**(A) $NO_2$**

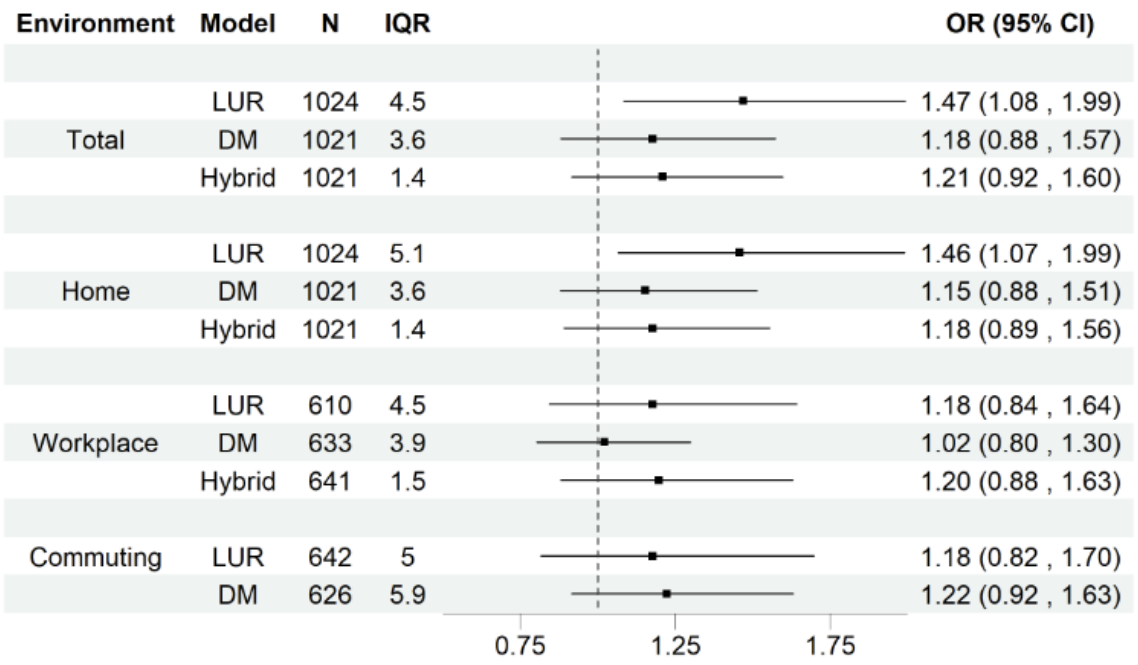
| Environment | Model | N | IQR | OR (95% CI) |
|---|---|---|---|---|
| Total | LUR | 1024 | 15 | 1.36 (1.01 , 1.82) |
| | DM | 1021 | 9.9 | 1.34 (1.02 , 1.76) |
| | Hybrid | 1021 | 9.6 | 1.35 (1.01 , 1.80) |
| Home | LUR | 1024 | 15.1 | 1.33 (1.00 , 1.77) |
| | DM | 1021 | 9.8 | 1.28 (1.00 , 1.65) |
| | Hybrid | 1021 | 9.6 | 1.30 (0.99 , 1.72) |
| Workplace | LUR | 610 | 18.5 | 1.15 (0.83 , 1.60) |
| | DM | 633 | 12.8 | 1.06 (0.84 , 1.33) |
| | Hybrid | 641 | 10.2 | 1.23 (0.87 , 1.75) |
| Commuting | LUR | 642 | 21.8 | 1.19 (0.85 , 1.67) |
| | DM | 626 | 18.7 | 1.32 (0.96 , 1.82) |
| Direct Measurements | Indoor | 975 | 11.4 | 1.18 (0.93 , 1.48) |
| | Outdoor | 930 | 13.7 | 1.25 (0.97 , 1.60) |
| | Personal | 970 | 11.6 | 1.12 (0.90 , 1.40) |


**(B) Black Carbon**

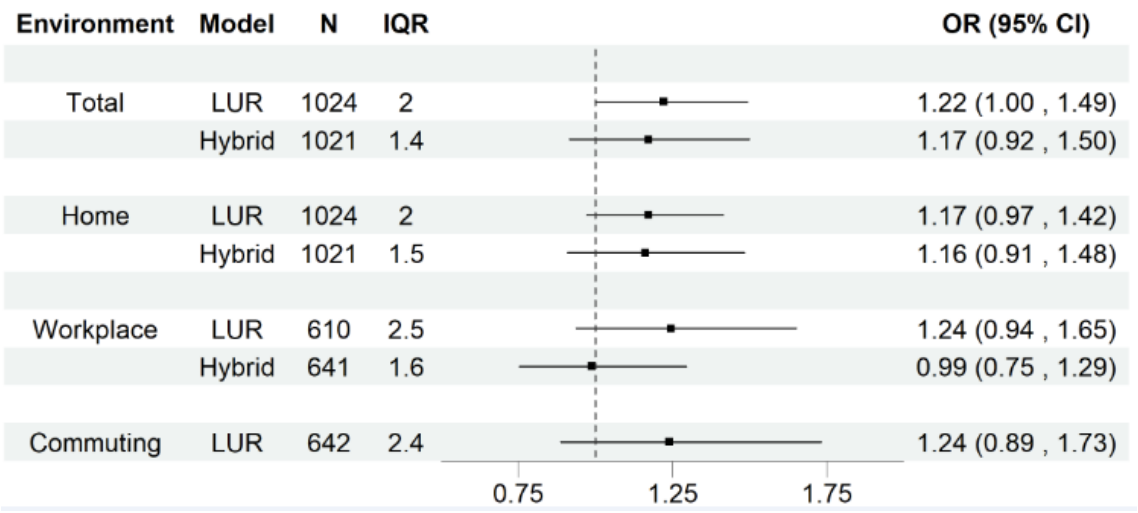
| Environment | Model | N | IQR | OR (95% CI) |
|---|---|---|---|---|
| Total | LUR | 1024 | 0.5 | 1.31 (1.03 , 1.67) |
| | DM | 1021 | 0.4 | 1.17 (0.95 , 1.44) |
| | Hybrid | 1021 | 0.2 | 1.44 (1.11 , 1.87) |
| Home | LUR | 1024 | 0.6 | 1.28 (1.02 , 1.60) |
| | DM | 1021 | 0.4 | 1.12 (0.95 , 1.33) |
| | Hybrid | 1021 | 0.2 | 1.44 (1.11 , 1.87) |
| Workplace | LUR | 610 | 0.8 | 1.13 (0.83 , 1.55) |
| | DM | 633 | 0.5 | 1.00 (0.89 , 1.13) |
| | Hybrid | 641 | 0.3 | 1.21 (0.82 , 1.77) |
| Commuting | LUR | 642 | 0.9 | 1.12 (0.80 , 1.56) |
| | DM | 626 | 1.4 | 1.24 (0.96 , 1.61) |



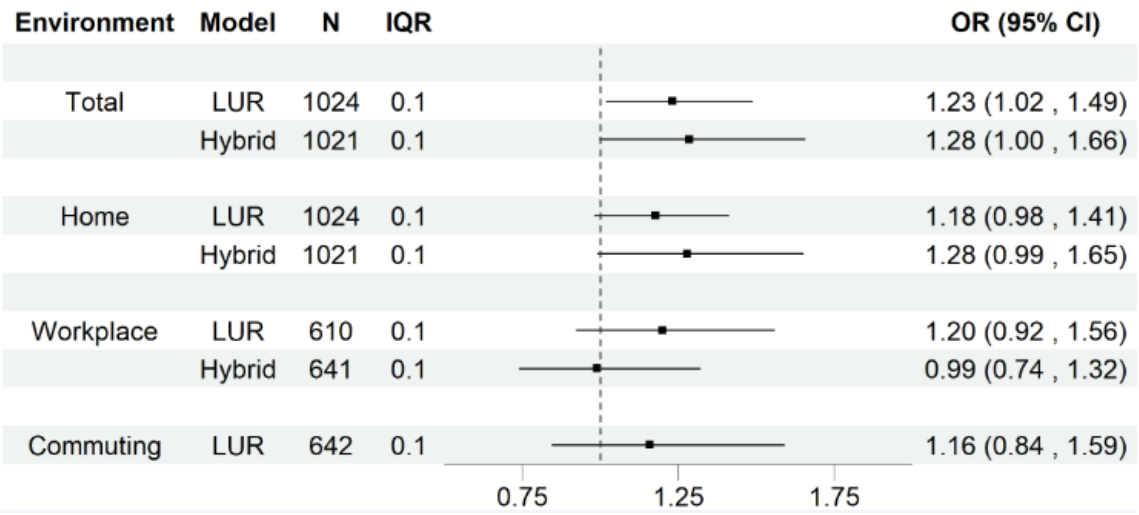
**(C) $PM_{2.5}$**



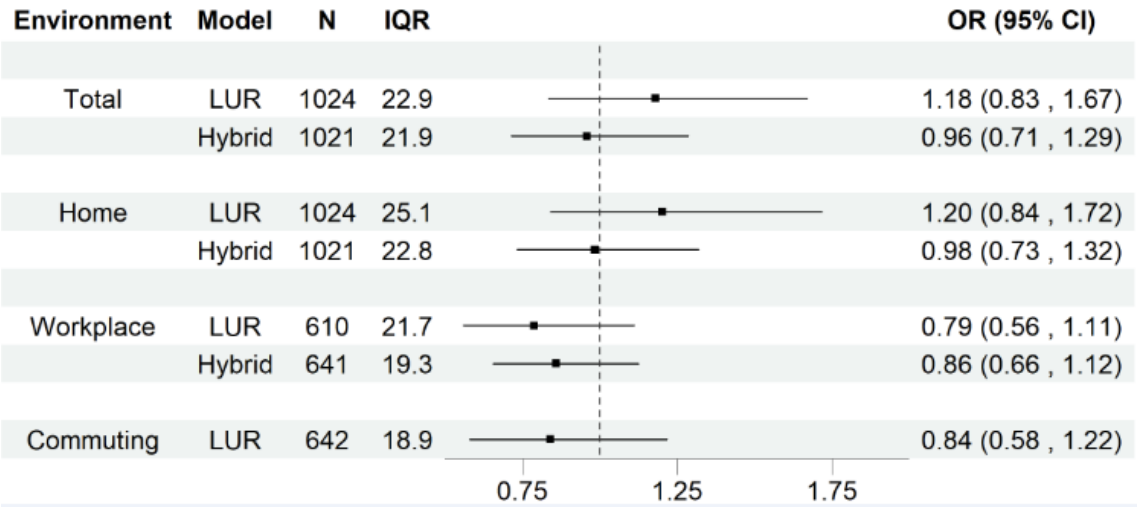

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

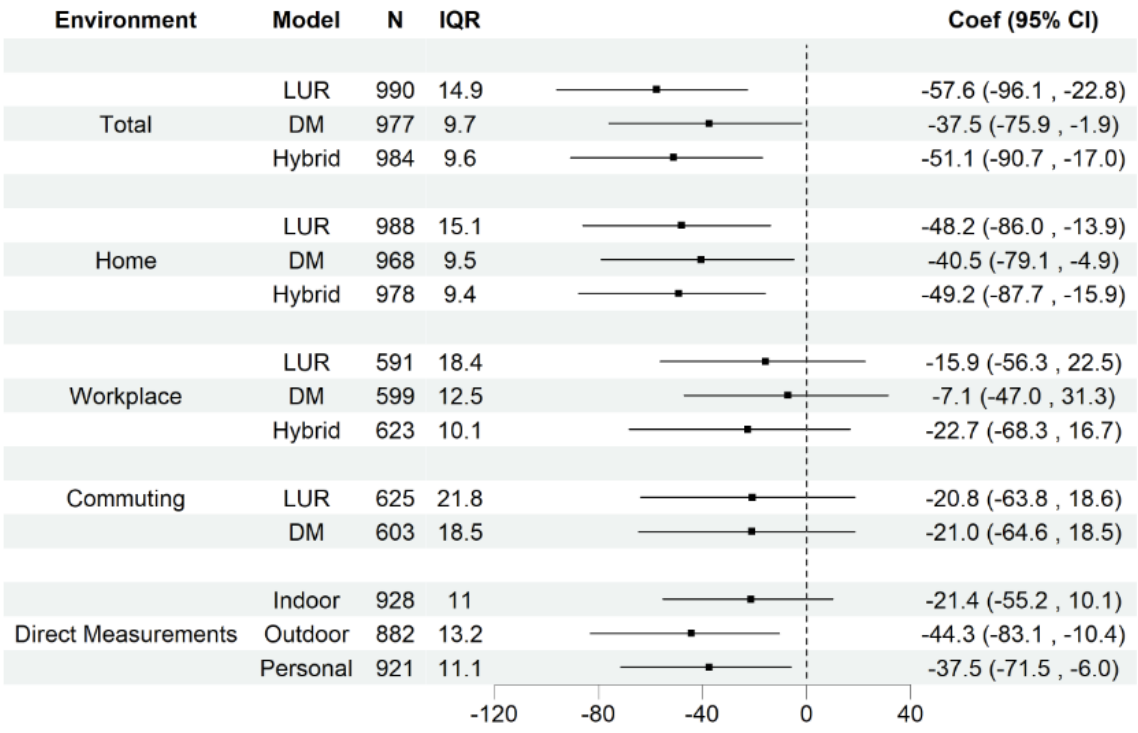



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no), and hospital (categorical).

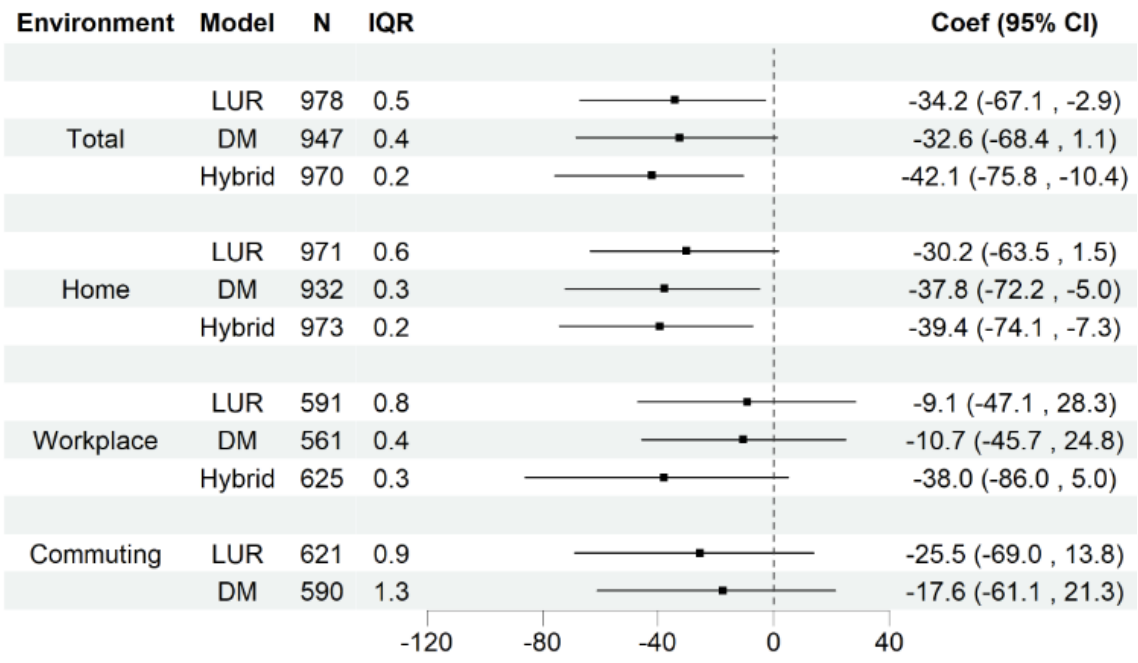
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 23.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) removing outliers in birth weight or exposure variables outside 1.5 times IQR above the upper quartile and below the lower quartile.

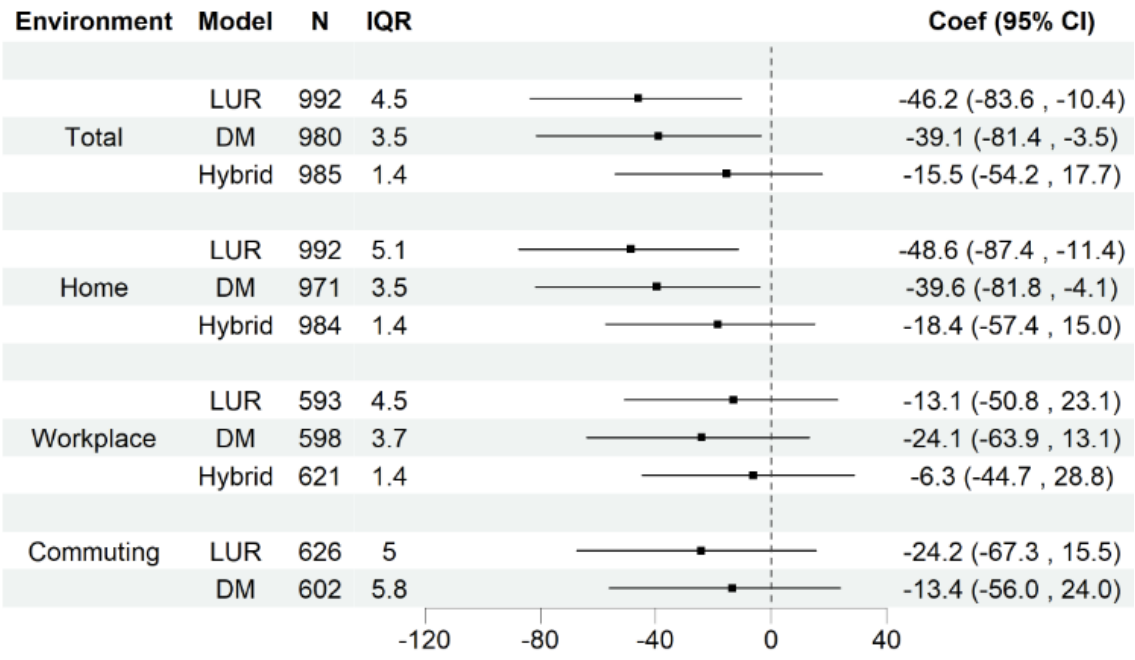
**(A) $NO_2$**



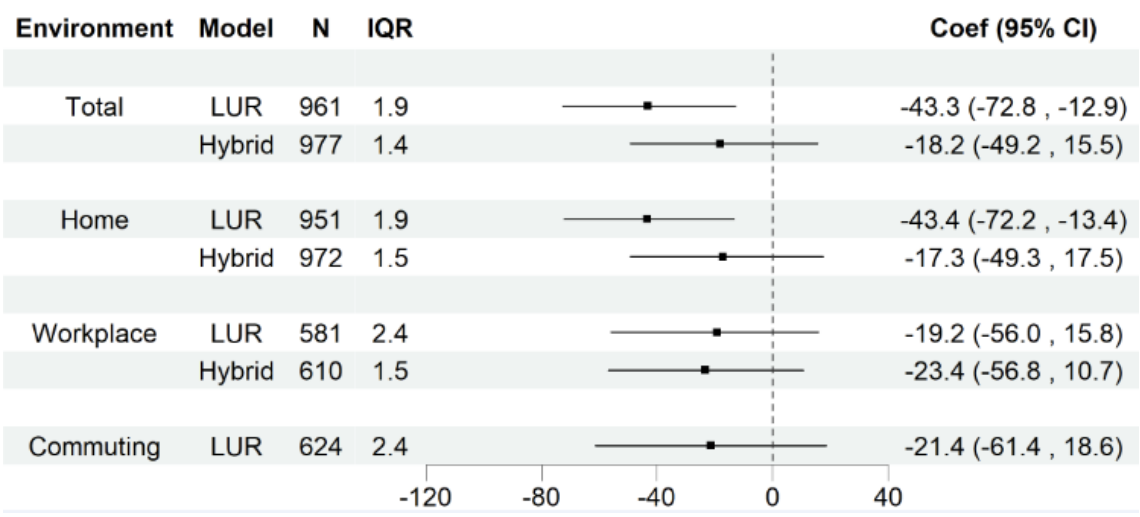

**(B) Black Carbon**



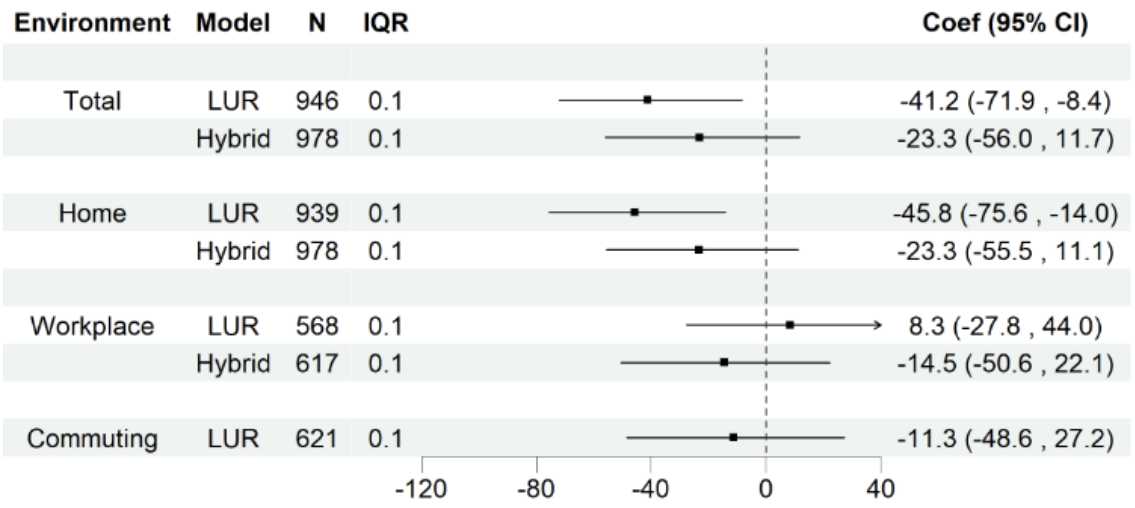
**(C) $PM_{2.5}$**



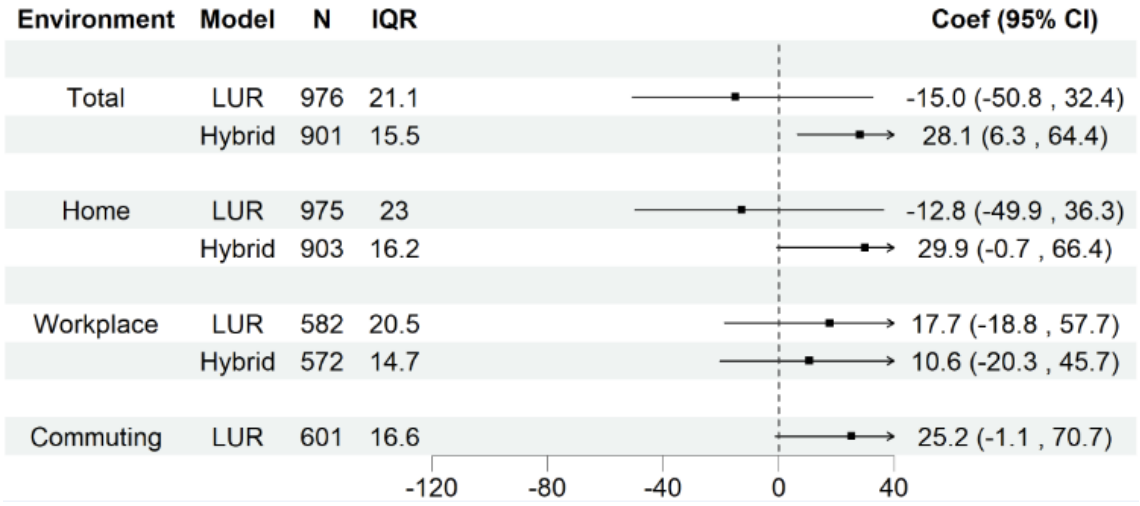

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

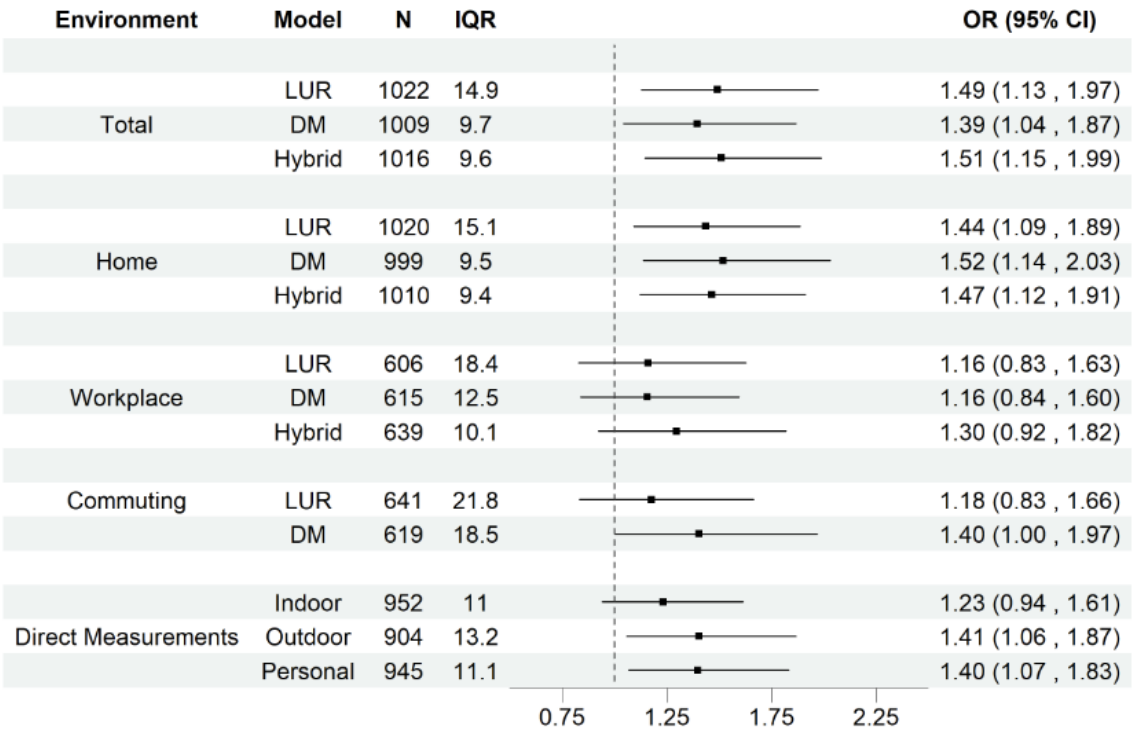



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

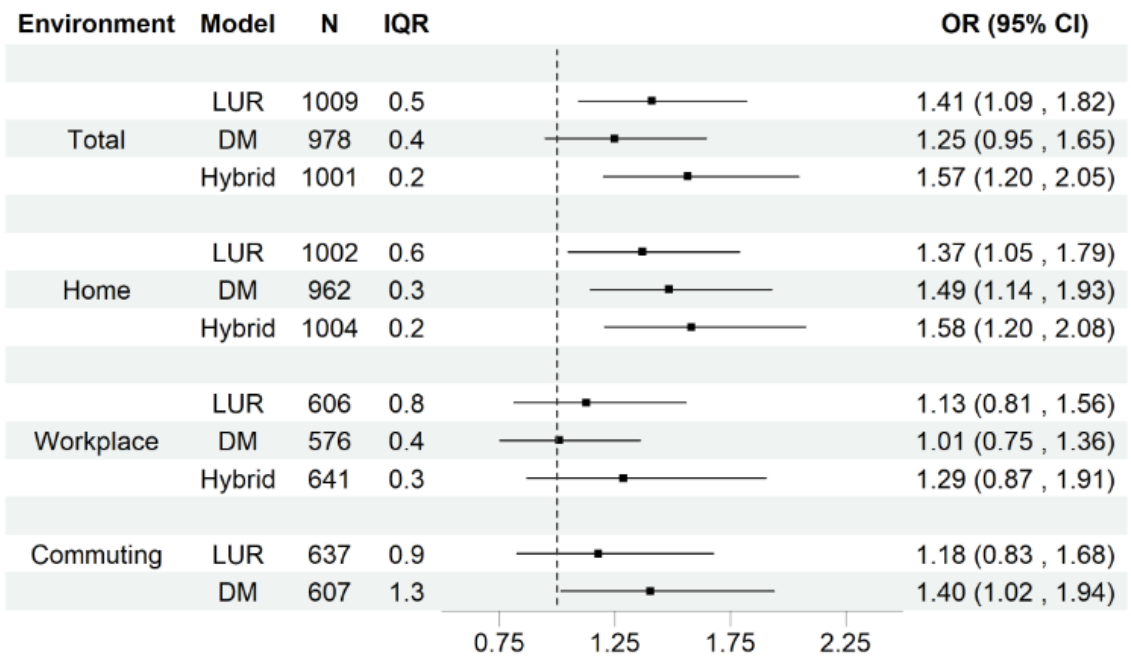
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 24.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) removing outliers in exposure variables outside 1.5 times IQR above the upper quartile and below the lower quartile.

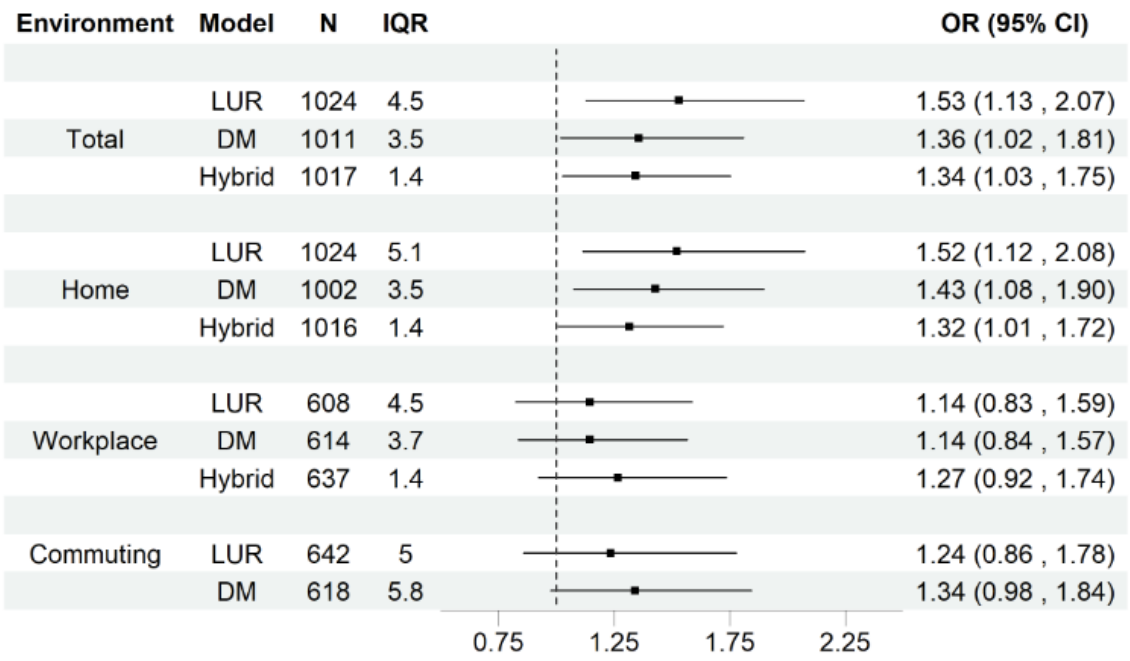
**(A) $NO_2$**



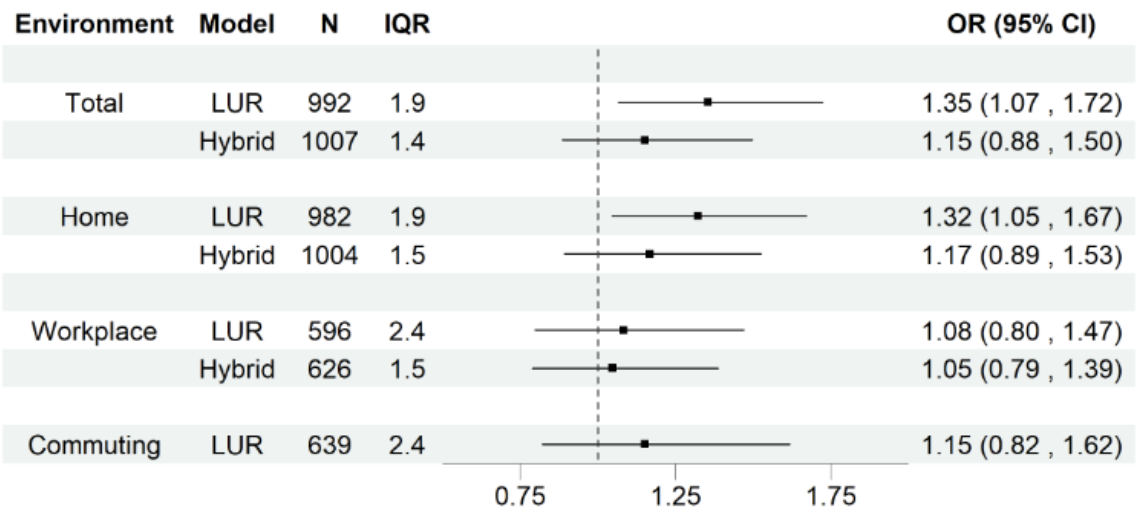

**(B) Black Carbon**



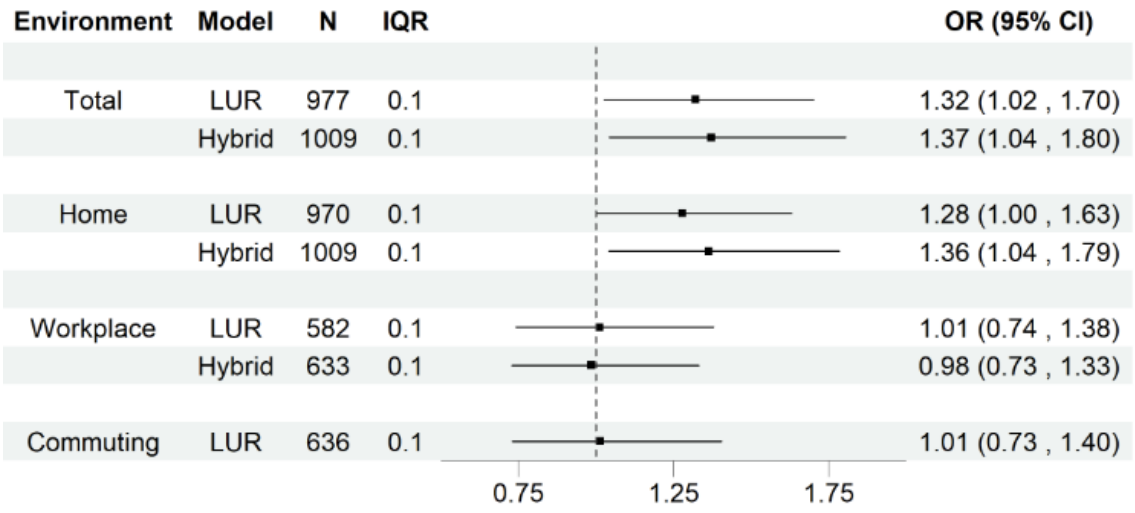
**(C) $PM_{2.5}$**



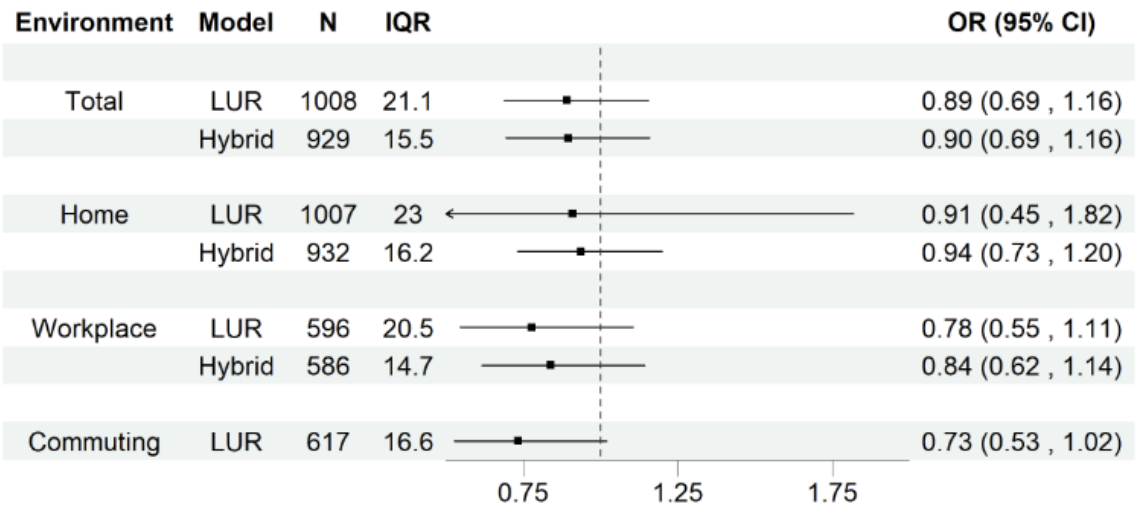

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

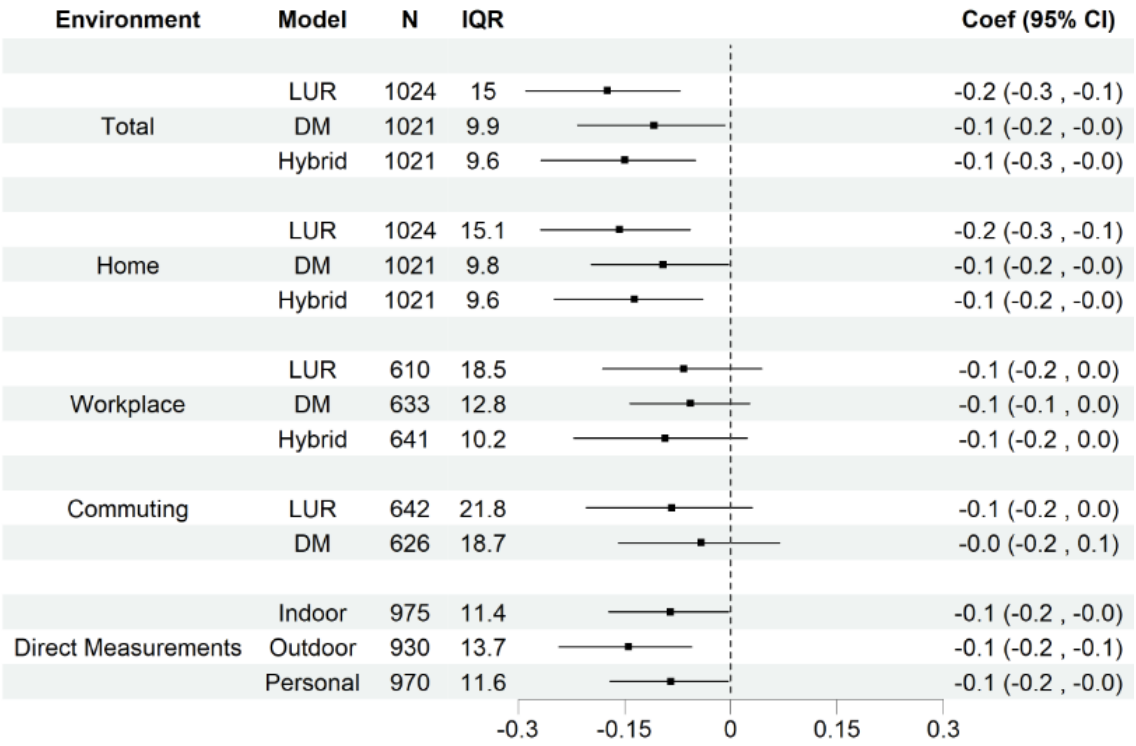



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

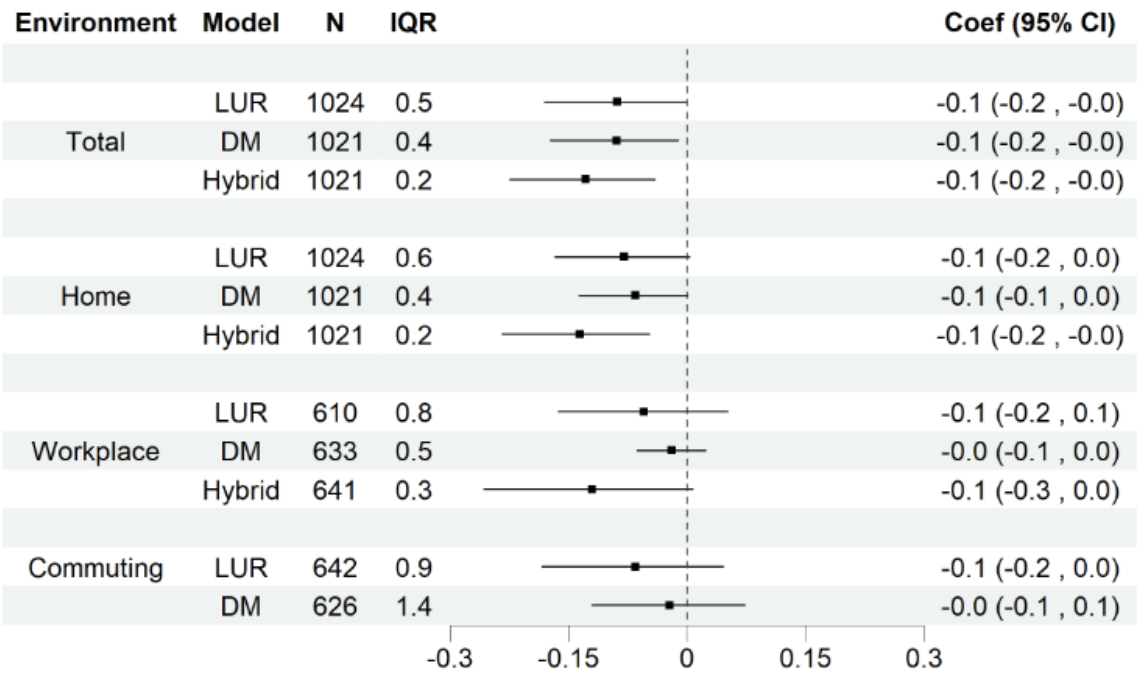
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 25.** Adjusted[a] change in birth weight z-score associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$).

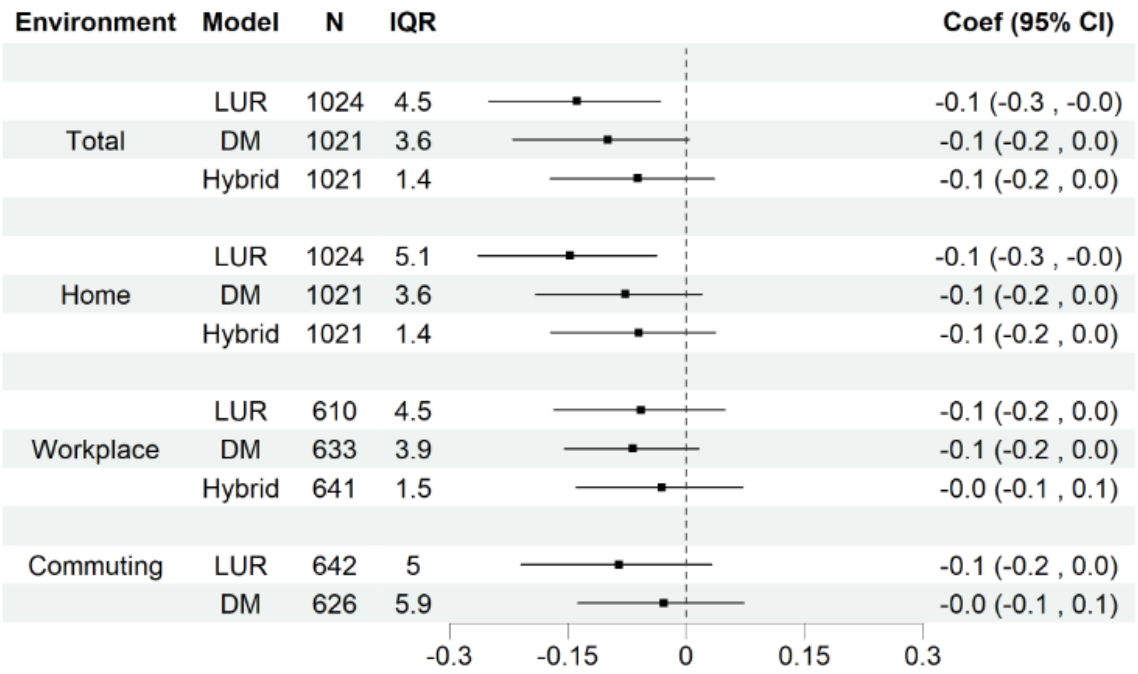
**(A) $NO_2$**



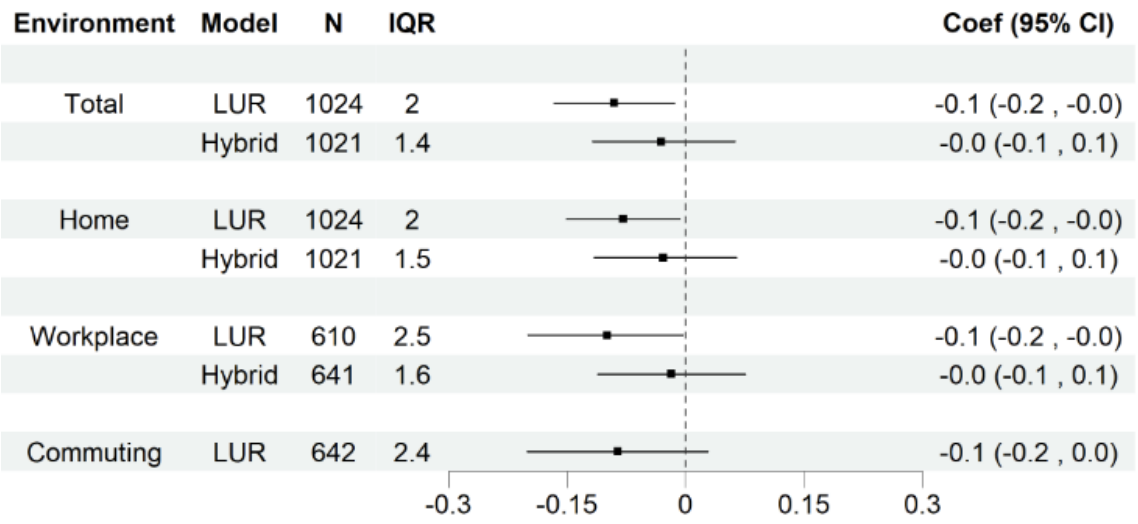

**(B) Black Carbon**



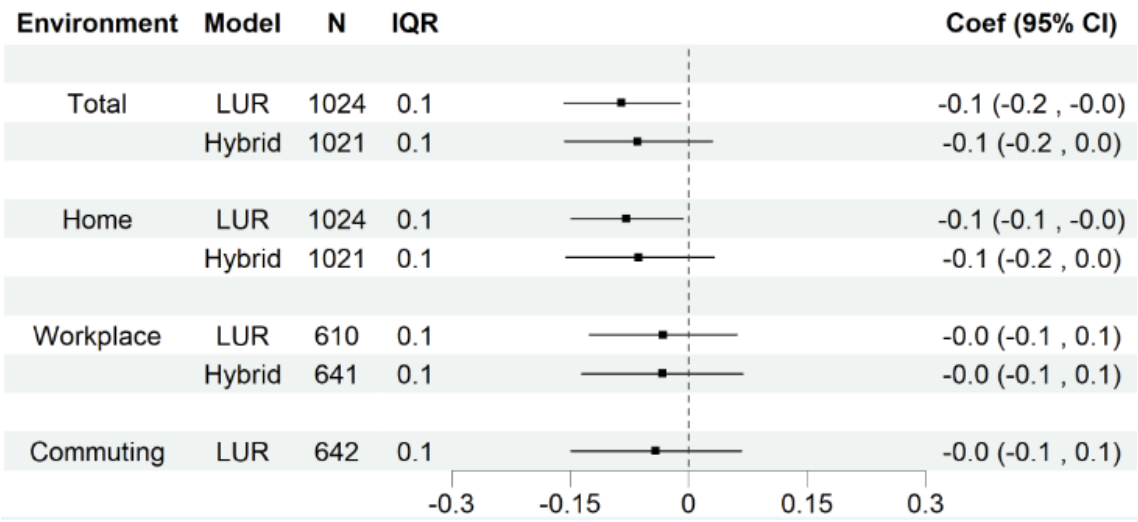
**(C) $PM_{2.5}$**



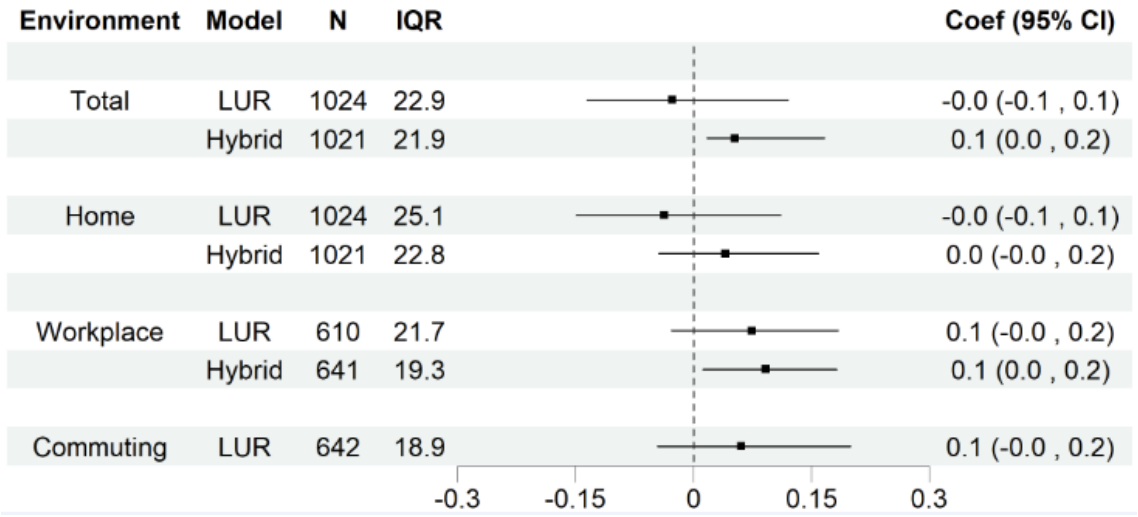

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**

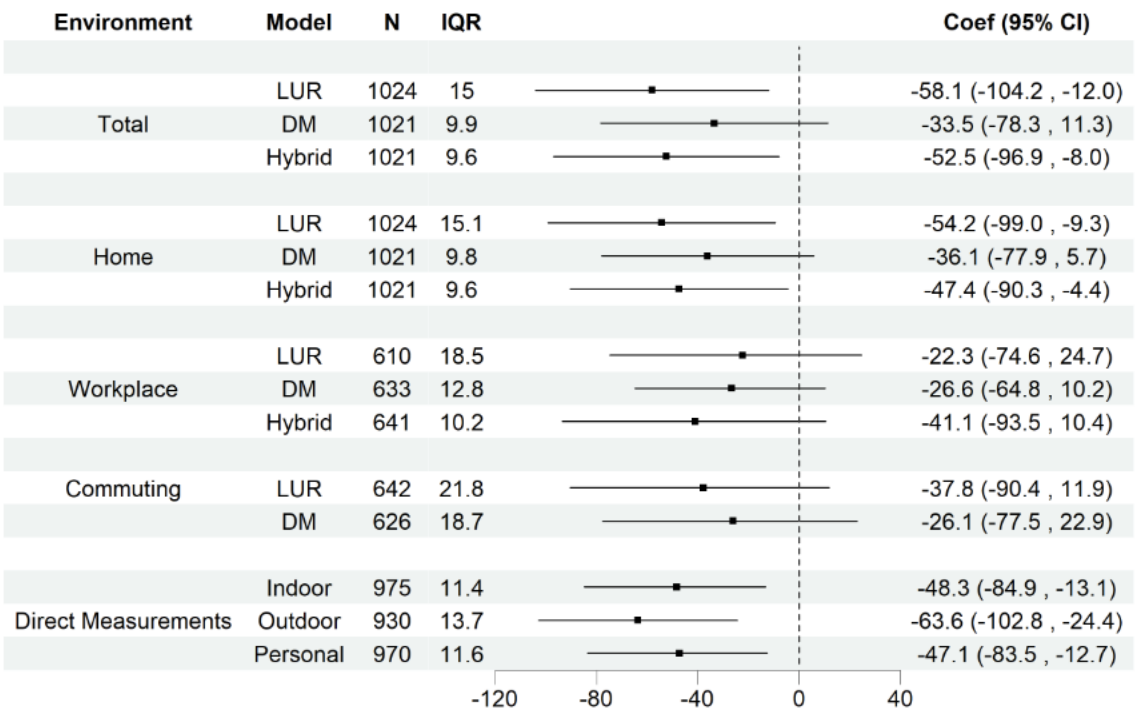



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no) and history of low birth weight in previous pregnancies (categorical, yes/no).

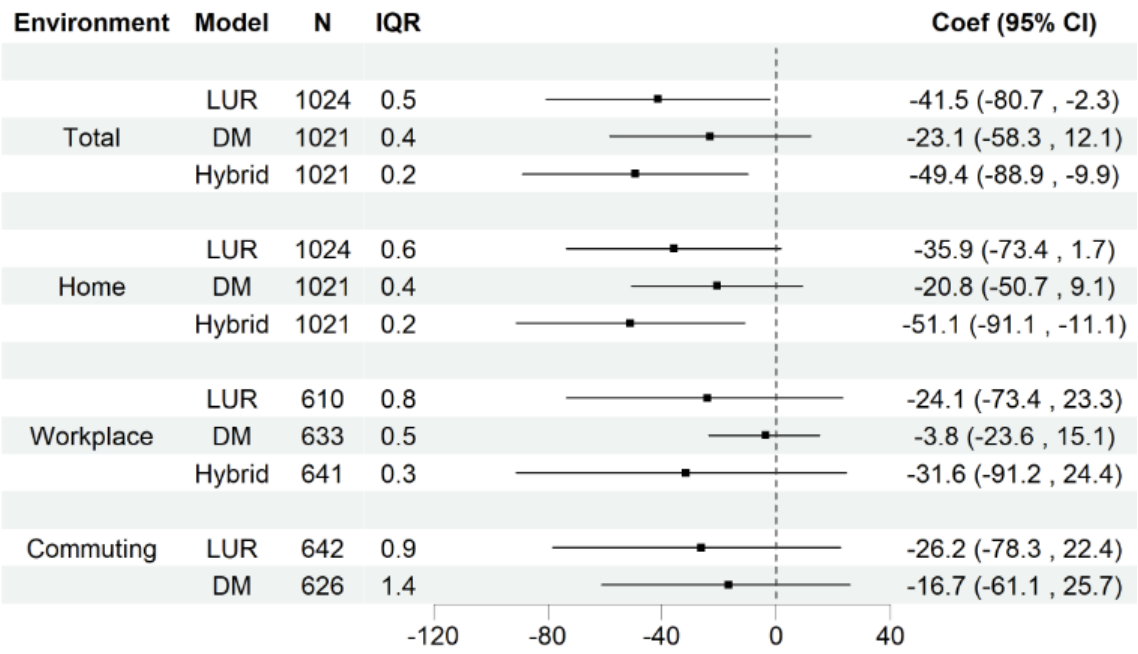
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 26.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) without gestational age at delivery as a covariate.

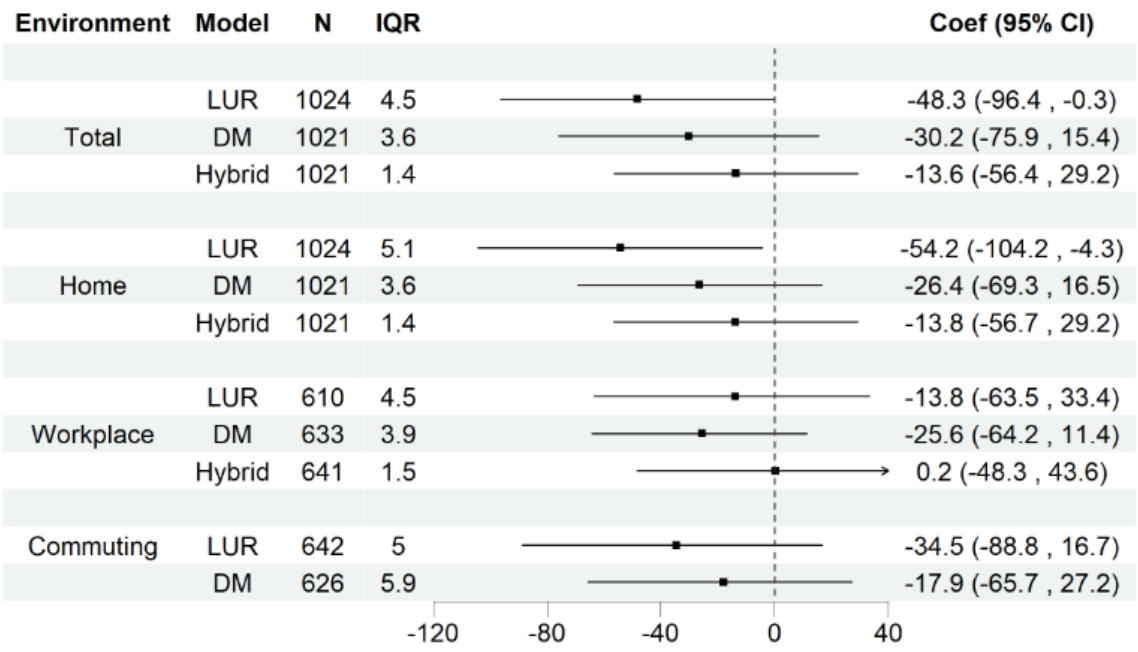
**(A) $NO_2$**



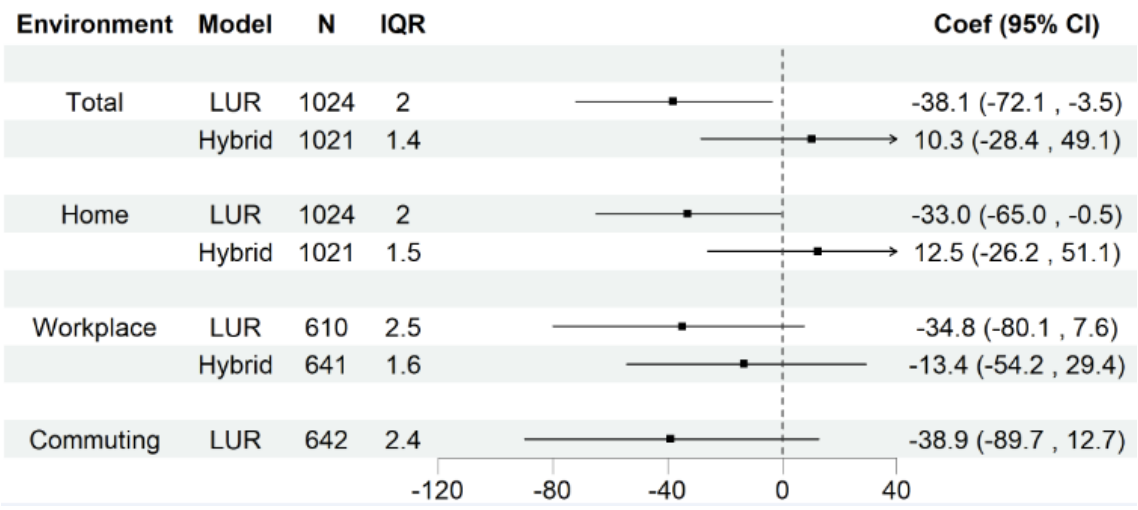

**(B) Black Carbon**



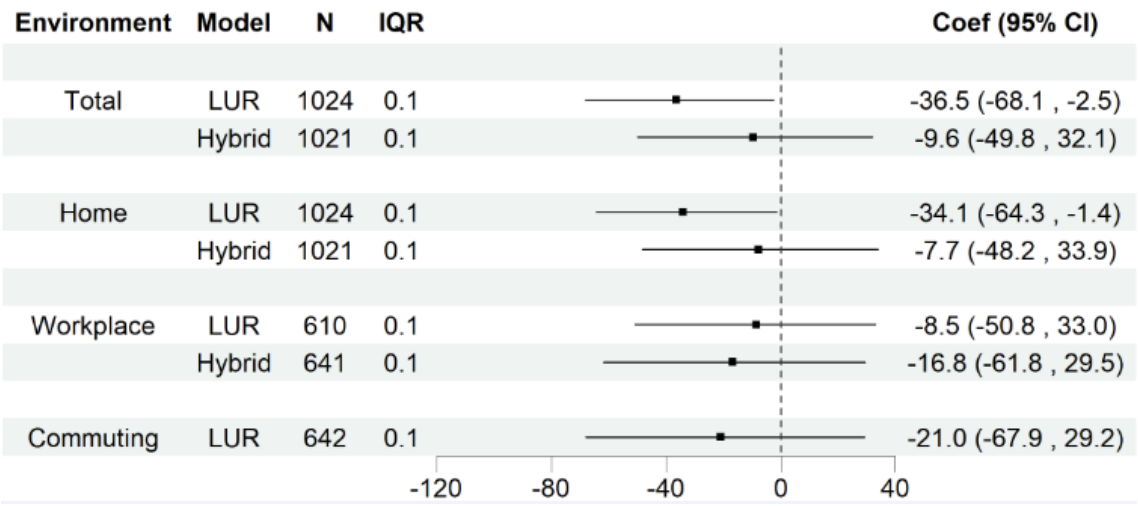
**(C) $PM_{2.5}$**



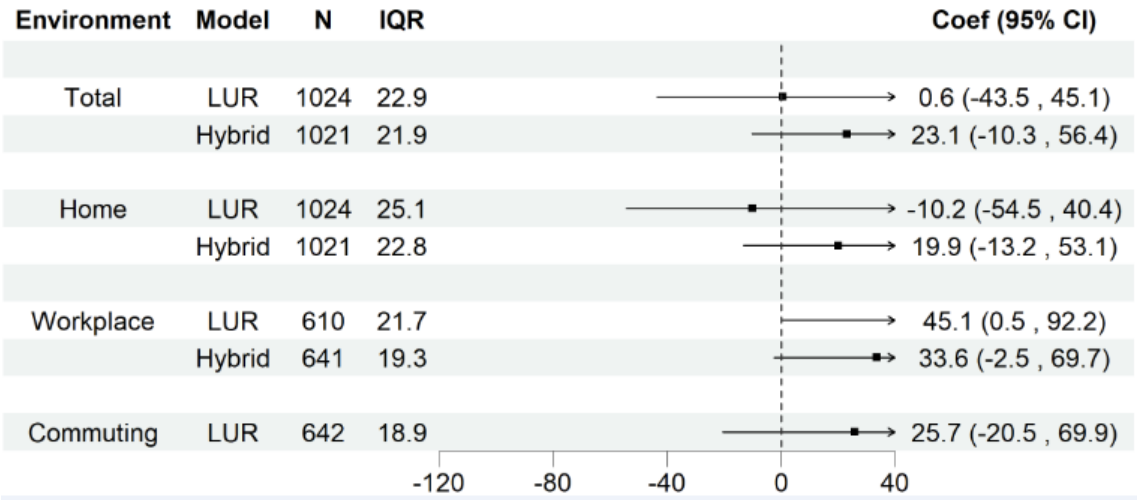

**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**




**(F) $PM_{2.5}$ Zn content**



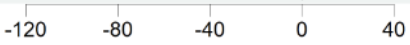

[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 27.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$). The original p-values and those adjusted for multiple comparisons (pvalue adj) are presented.

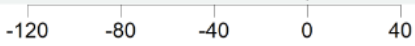
### (A) $NO_2$

| Environment | Model | N | IQR | Coef (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 15 | -64.4 (-104.6 , -28.5) | <0.01 | <0.01 |
| | DM | 1021 | 9.9 | -41.1 (-78.9 , -6.3) | 0.03 | 0.03 |
| | Hybrid | 1021 | 9.6 | -55.0 (-96.4 , -20.0) | <0.01 | 0.01 |
| Home | LUR | 1024 | 15.1 | -58.0 (-96.9 , -22.9) | <0.01 | <0.01 |
| | DM | 1021 | 9.8 | -35.3 (-70.9 , -2.7) | 0.04 | 0.04 |
| | Hybrid | 1021 | 9.6 | -50.3 (-90.0 , -16.5) | 0.01 | 0.02 |
| Workplace | LUR | 610 | 18.5 | -27.8 (-68.7 , 11.2) | 0.17 | 0.7 |
| | DM | 633 | 12.8 | -21.2 (-51.7 , 8.2) | 0.17 | 0.17 |
| | Hybrid | 641 | 10.2 | -34.2 (-80.1 , 7.0) | 0.12 | 0.47 |
| Commuting | LUR | 642 | 21.8 | -33.0 (-76.1 , 7.2) | 0.12 | 0.36 |
| | DM | 626 | 18.7 | -18.7 (-60.2 , 20.4) | 0.36 | 0.36 |



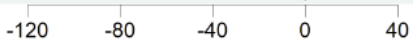

### (B) Black Carbon

| Environment | Model | N | IQR | Coef (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 0.5 | -34.3 (-66.5 , -3.8) | 0.03 | 0.13 |
| | DM | 1021 | 0.4 | -33.8 (-63.3 , -6.5) | 0.02 | 0.02 |
| | Hybrid | 1021 | 0.2 | -48.3 (-82.2 , -17.6) | <0.01 | 0.01 |
| Home | LUR | 1024 | 0.6 | -30.9 (-61.7 , -1.8) | 0.04 | 0.17 |
| | DM | 1021 | 0.4 | -24.0 (-49.1 , -0.7) | 0.05 | 0.05 |
| | Hybrid | 1021 | 0.2 | -50.6 (-85.0 , -19.6) | <0.01 | <0.01 |
| Workplace | LUR | 610 | 0.8 | -23.4 (-62.0 , 14.6) | 0.23 | 0.94 |
| | DM | 633 | 0.5 | -7.3 (-22.8 , 7.9) | 0.36 | 0.36 |
| | Hybrid | 641 | 0.3 | -47.4 (-96.2 , -2.1) | 0.05 | 0.19 |
| Commuting | LUR | 642 | 0.9 | -27.5 (-69.6 , 11.9) | 0.19 | 0.56 |
| | DM | 626 | 1.4 | -11.3 (-46.4 , 22.5) | 0.52 | 0.52 |



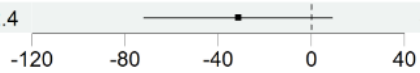
**(C) $PM_{2.5}$**

| Environment | Model | N | IQR | Coef (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 4.5 | -51.3 (-90.5 , -14.1) | 0.01 | 0.03 |
| | DM | 1021 | 3.6 | -37.8 (-79.8 , -1.7) | 0.05 | 0.05 |
| | Hybrid | 1021 | 1.4 | -23.7 (-62.6 , 10.3) | 0.19 | 0.76 |
| Home | LUR | 1024 | 5.1 | -54.4 (-95.1 , -15.7) | 0.01 | 0.03 |
| | DM | 1021 | 3.6 | -29.0 (-68.6 , 5.1) | 0.11 | 0.11 |
| | Hybrid | 1021 | 1.4 | -23.3 (-62.2 , 10.8) | 0.2 | 0.79 |
| Workplace | LUR | 610 | 4.5 | -21.8 (-61.1 , 16.0) | 0.27 | 1 |
| | DM | 633 | 3.9 | -24.2 (-55.1 , 5.4) | 0.12 | 0.12 |
| | Hybrid | 641 | 1.5 | -13.4 (-52.1 , 22.8) | 0.48 | 1 |
| Commuting | LUR | 642 | 5 | -30.1 (-74.1 , 11.4) | 0.17 | 0.51 |
| | DM | 626 | 5.9 | -13.6 (-52.3 , 22.6) | 0.48 | 0.48 |



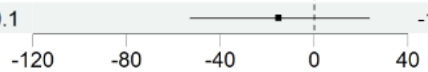

**(D) $PM_{2.5}$ Cu content**

| Environment | Model | N | IQR | Coef (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 2 | -34.8 (-61.6 , -7.8) | 0.01 | 0.05 |
| | Hybrid | 1021 | 1.4 | -15.7 (-46.5 , 17.0) | 0.33 | 1 |
| Home | LUR | 1024 | 2 | -30.6 (-55.8 , -5.2) | 0.02 | 0.07 |
| | Hybrid | 1021 | 1.5 | -14.9 (-45.6 , 17.8) | 0.36 | 1 |
| Workplace | LUR | 610 | 2.5 | -37.2 (-73.0 , -2.8) | 0.04 | 0.15 |
| | Hybrid | 641 | 1.6 | -8.3 (-41.4 , 24.9) | 0.62 | 1 |
| Commuting | LUR | 642 | 2.4 | -31.4 (-72.1 , 8.9) | 0.13 | 0.4 |

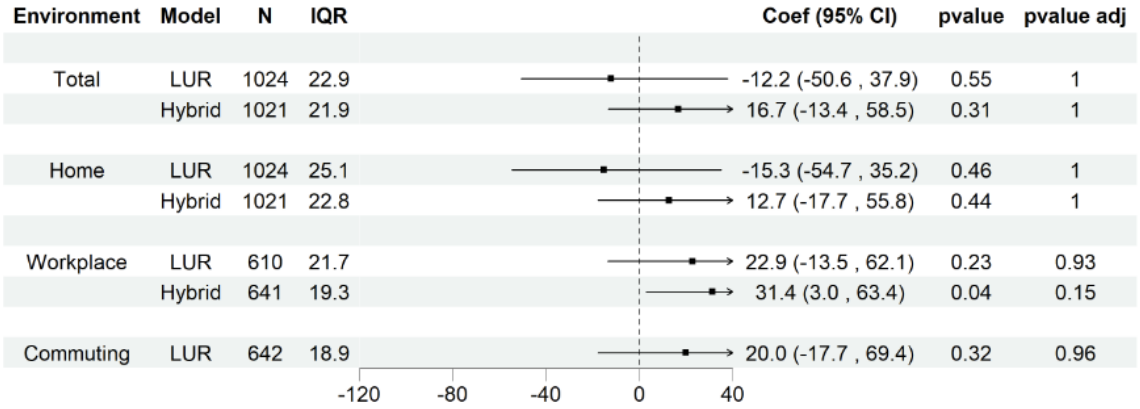



**(E) $PM_{2.5}$ Fe content**

| Environment | Model | N | IQR | Coef (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 0.1 | -32.2 (-57.8 , -6.0) | 0.02 | 0.06 |
| | Hybrid | 1021 | 0.1 | -27.4 (-59.7 , 6.1) | 0.1 | 0.42 |
| Home | LUR | 1024 | 0.1 | -30.2 (-54.8 , -5.0) | 0.02 | 0.07 |
| | Hybrid | 1021 | 0.1 | -27.0 (-59.4 , 6.6) | 0.11 | 0.44 |
| Workplace | LUR | 610 | 0.1 | -11.1 (-44.5 , 22.0) | 0.52 | 1 |
| | Hybrid | 641 | 0.1 | -14.9 (-51.2 , 21.2) | 0.42 | 1 |
| Commuting | LUR | 642 | 0.1 | -15.2 (-53.1 , 23.4) | 0.44 | 1 |



**(F) $PM_{2.5}$ Zn content**



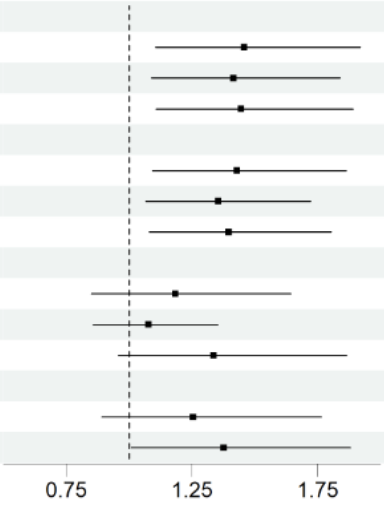

[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 28.** Adjusted[a] odds ratio of small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$). The original p-values and those adjusted for multiple comparisons (pvalue adj) are presented.

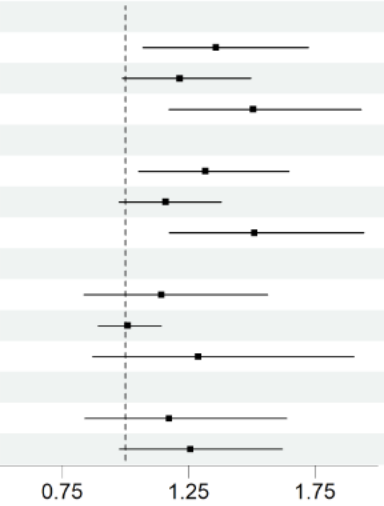
**(A) $NO_2$**

| Environment | Model | N | IQR | OR (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 15 | 1.46 (1.10 , 1.92) | 0.01 | 0.03 |
| | DM | 1021 | 9.9 | 1.41 (1.09 , 1.84) | 0.01 | <0.01 |
| | Hybrid | 1021 | 9.6 | 1.45 (1.11 , 1.89) | 0.01 | 0.03 |
| Home | LUR | 1024 | 15.1 | 1.43 (1.09 , 1.86) | 0.01 | 0.04 |
| | DM | 1021 | 9.8 | 1.35 (1.07 , 1.72) | 0.01 | 0.01 |
| | Hybrid | 1021 | 9.6 | 1.40 (1.08 , 1.80) | 0.01 | 0.04 |
| Workplace | LUR | 610 | 18.5 | 1.18 (0.85 , 1.64) | 0.32 | 1 |
| | DM | 633 | 12.8 | 1.08 (0.86 , 1.35) | 0.53 | 0.53 |
| | Hybrid | 641 | 10.2 | 1.33 (0.96 , 1.86) | 0.09 | 0.36 |
| Commuting | LUR | 642 | 21.8 | 1.25 (0.89 , 1.77) | 0.2 | 0.59 |
| | DM | 626 | 18.7 | 1.38 (1.01 , 1.88) | 0.04 | 0.04 |



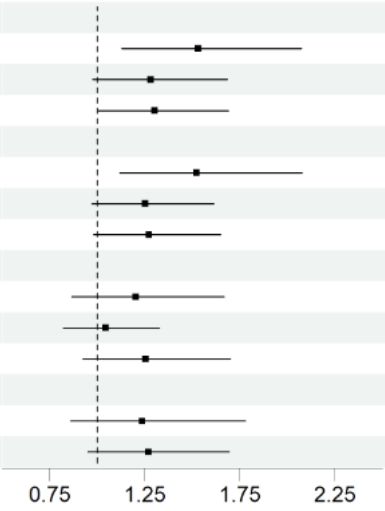

**(B) Black Carbon**

| Environment | Model | N | IQR | OR (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 0.5 | 1.36 (1.07 , 1.73) | 0.01 | 0.05 |
| | DM | 1021 | 0.4 | 1.22 (0.99 , 1.50) | 0.07 | 0.07 |
| | Hybrid | 1021 | 0.2 | 1.51 (1.17 , 1.93) | <0.01 | <0.01 |
| Home | LUR | 1024 | 0.6 | 1.32 (1.05 , 1.65) | 0.02 | 0.06 |
| | DM | 1021 | 0.4 | 1.16 (0.97 , 1.38) | 0.1 | 0.1 |
| | Hybrid | 1021 | 0.2 | 1.51 (1.17 , 1.95) | <0.01 | <0.01 |
| Workplace | LUR | 610 | 0.8 | 1.14 (0.84 , 1.56) | 0.41 | 1 |
| | DM | 633 | 0.5 | 1.01 (0.89 , 1.14) | 0.9 | 0.9 |
| | Hybrid | 641 | 0.3 | 1.29 (0.87 , 1.91) | 0.21 | 0.83 |
| Commuting | LUR | 642 | 0.9 | 1.17 (0.84 , 1.64) | 0.35 | 1 |
| | DM | 626 | 1.4 | 1.26 (0.98 , 1.62) | 0.08 | 0.08 |



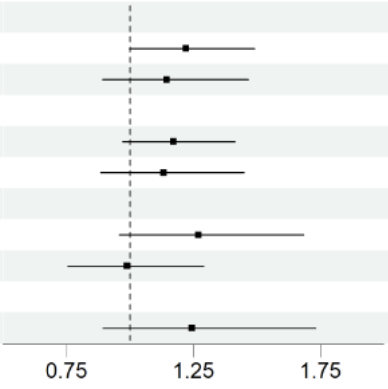
**(C) $PM_{2.5}$**

| Environment | Model | N | IQR | OR (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 4.5 | 1.53 (1.13 , 2.07) | 0.01 | 0.02 |
| | DM | 1021 | 3.6 | 1.28 (0.97 , 1.68) | 0.08 | 0.08 |
| | Hybrid | 1021 | 1.4 | 1.30 (1.00 , 1.69) | 0.05 | 0.19 |
| Home | LUR | 1024 | 5.1 | 1.52 (1.12 , 2.08) | 0.01 | 0.03 |
| | DM | 1021 | 3.6 | 1.25 (0.97 , 1.61) | 0.09 | 0.09 |
| | Hybrid | 1021 | 1.4 | 1.27 (0.98 , 1.65) | 0.07 | 0.29 |
| Workplace | LUR | 610 | 4.5 | 1.20 (0.86 , 1.67) | 0.28 | 1 |
| | DM | 633 | 3.9 | 1.04 (0.82 , 1.33) | 0.73 | 0.73 |
| | Hybrid | 641 | 1.5 | 1.25 (0.92 , 1.70) | 0.15 | 0.59 |
| Commuting | LUR | 642 | 5 | 1.24 (0.86 , 1.78) | 0.25 | 0.76 |
| | DM | 626 | 5.9 | 1.27 (0.95 , 1.69) | 0.11 | 0.11 |



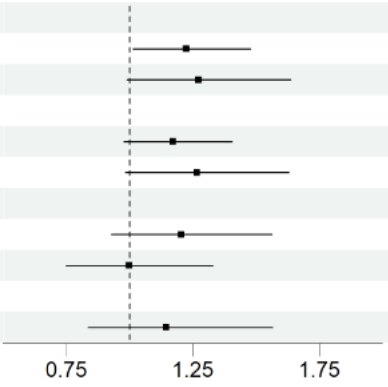

**(D) $PM_{2.5}$ Cu content**

| Environment | Model | N | IQR | OR (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 2 | 1.22 (1.00 , 1.49) | 0.05 | 0.21 |
| | Hybrid | 1021 | 1.4 | 1.14 (0.89 , 1.47) | 0.29 | 1 |
| Home | LUR | 1024 | 2 | 1.17 (0.97 , 1.41) | 0.1 | 0.39 |
| | Hybrid | 1021 | 1.5 | 1.13 (0.88 , 1.45) | 0.32 | 1 |
| Workplace | LUR | 610 | 2.5 | 1.27 (0.96 , 1.68) | 0.1 | 0.39 |
| | Hybrid | 641 | 1.6 | 0.99 (0.75 , 1.29) | 0.92 | 1 |
| Commuting | LUR | 642 | 2.4 | 1.24 (0.89 , 1.73) | 0.2 | 0.59 |

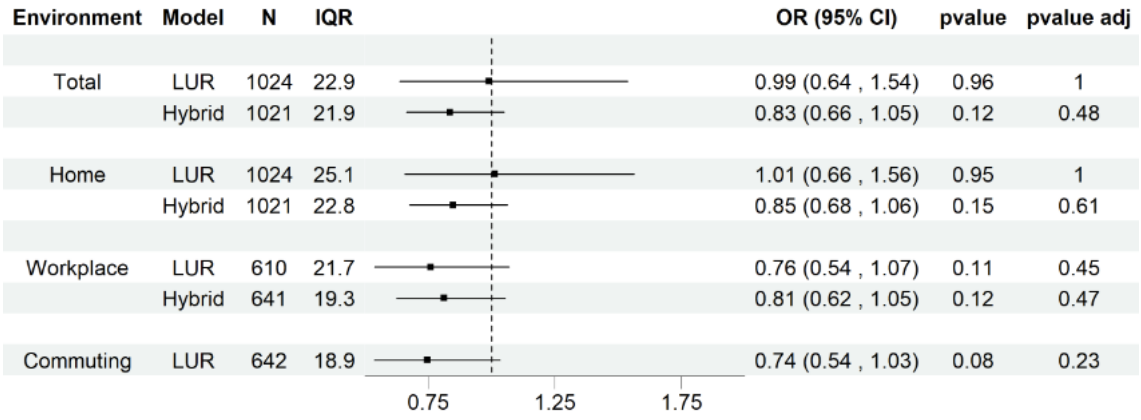



**(E) $PM_{2.5}$ Fe content**

| Environment | Model | N | IQR | OR (95% CI) | pvalue | pvalue adj |
|---|---|---|---|---|---|---|
| Total | LUR | 1024 | 0.1 | 1.22 (1.01 , 1.48) | 0.04 | 0.15 |
| | Hybrid | 1021 | 0.1 | 1.27 (0.99 , 1.64) | 0.06 | 0.25 |
| Home | LUR | 1024 | 0.1 | 1.17 (0.98 , 1.40) | 0.09 | 0.35 |
| | Hybrid | 1021 | 0.1 | 1.27 (0.98 , 1.63) | 0.07 | 0.27 |
| Workplace | LUR | 610 | 0.1 | 1.20 (0.93 , 1.56) | 0.16 | 0.66 |
| | Hybrid | 641 | 0.1 | 1.00 (0.75 , 1.33) | 0.98 | 1 |
| Commuting | LUR | 642 | 0.1 | 1.14 (0.84 , 1.57) | 0.4 | 1 |



**(F) $PM_{2.5}$ Zn content**

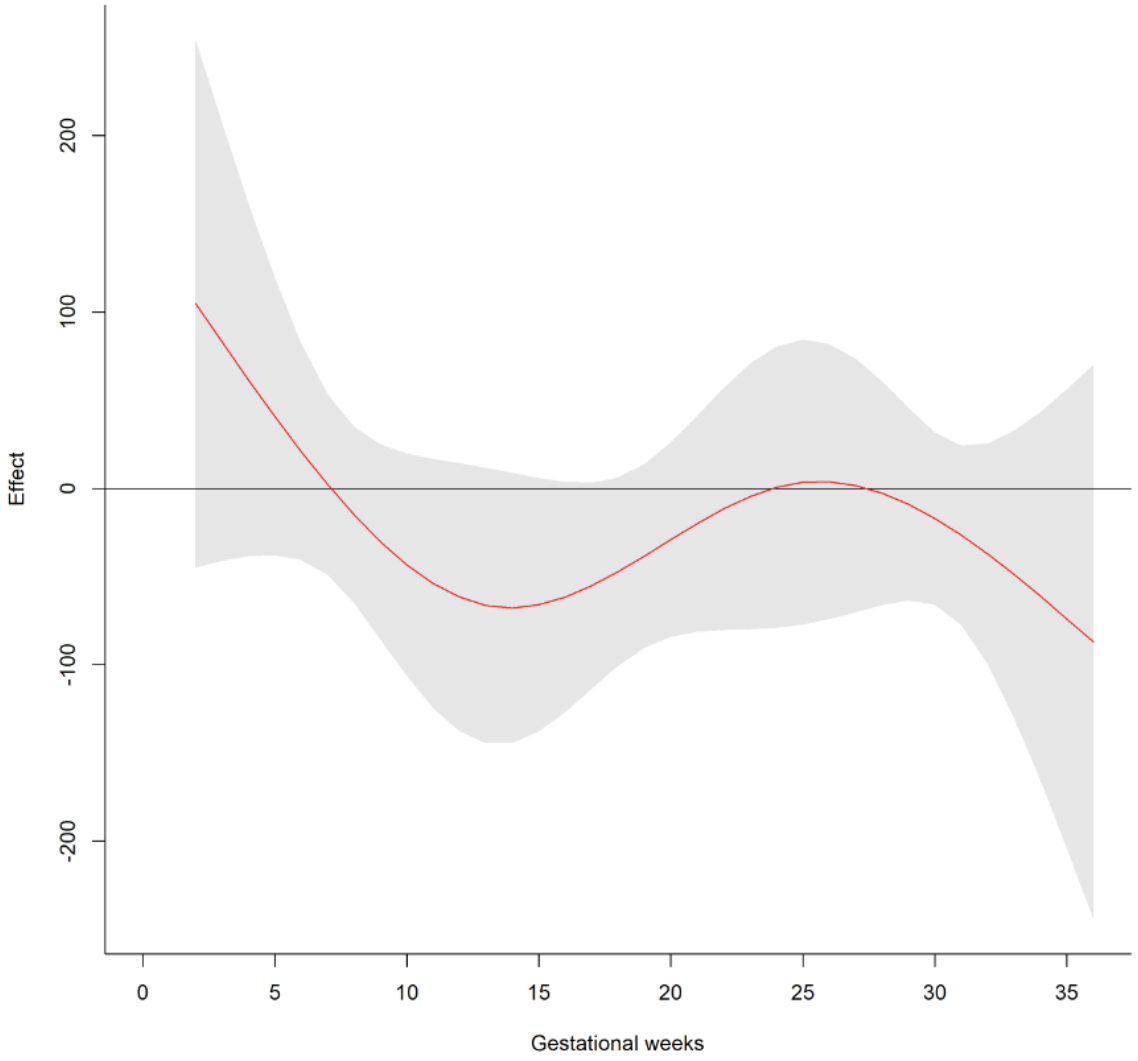



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

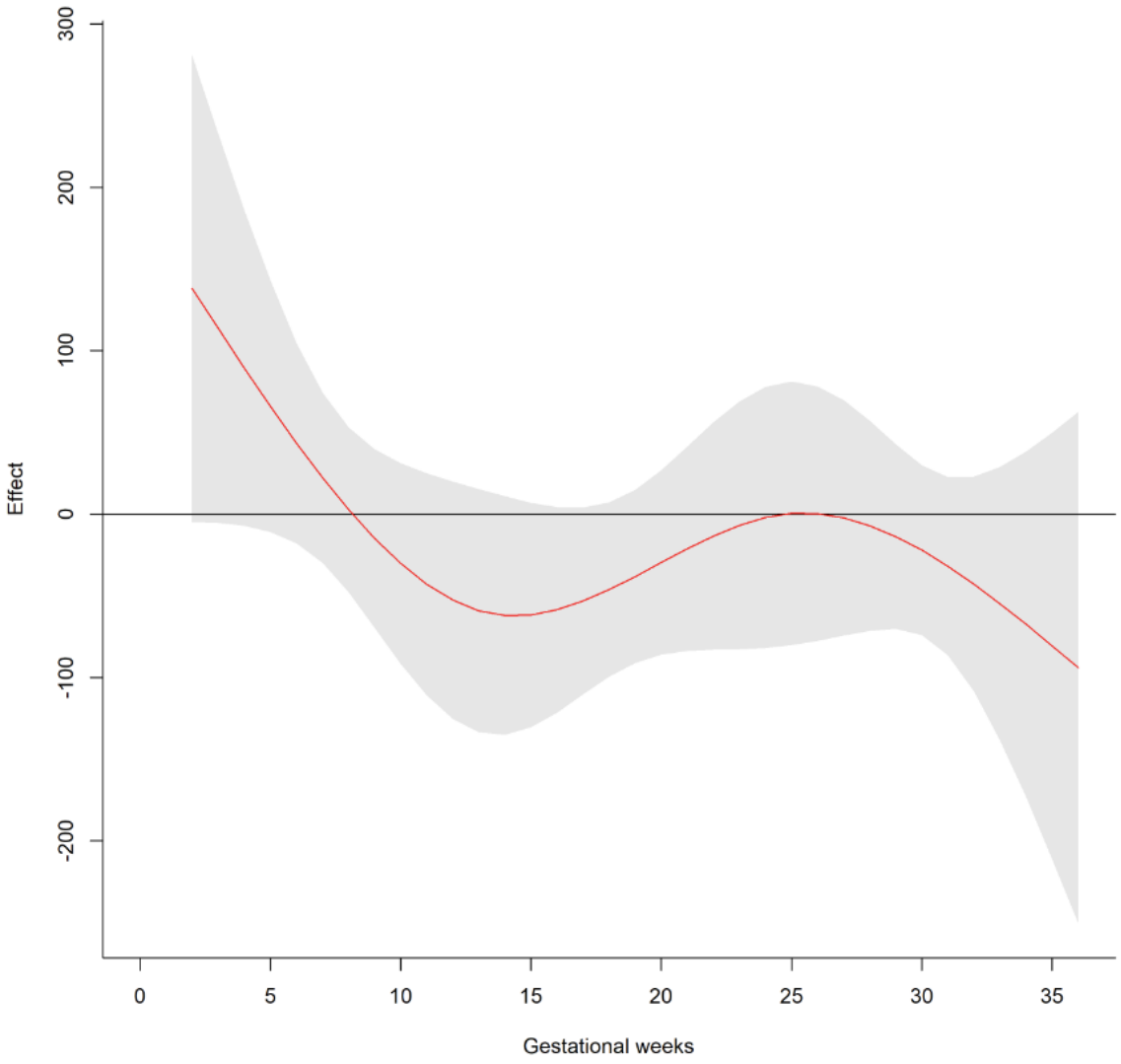
**Abbreviations:** LUR: Land use regression model; DM: Dispersion model; Hybrid: Hybrid LUR-DM model; Indoor: Measured home-indoor $NO_2$ level using passive samplers; Outdoor: Measured home-outdoor $NO_2$ level using passive samplers; Personal: Measured personal $NO_2$ level using passive samplers.

**Appendix 29.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) during each week of pregnancy without gestational age at delivery as a covariate.

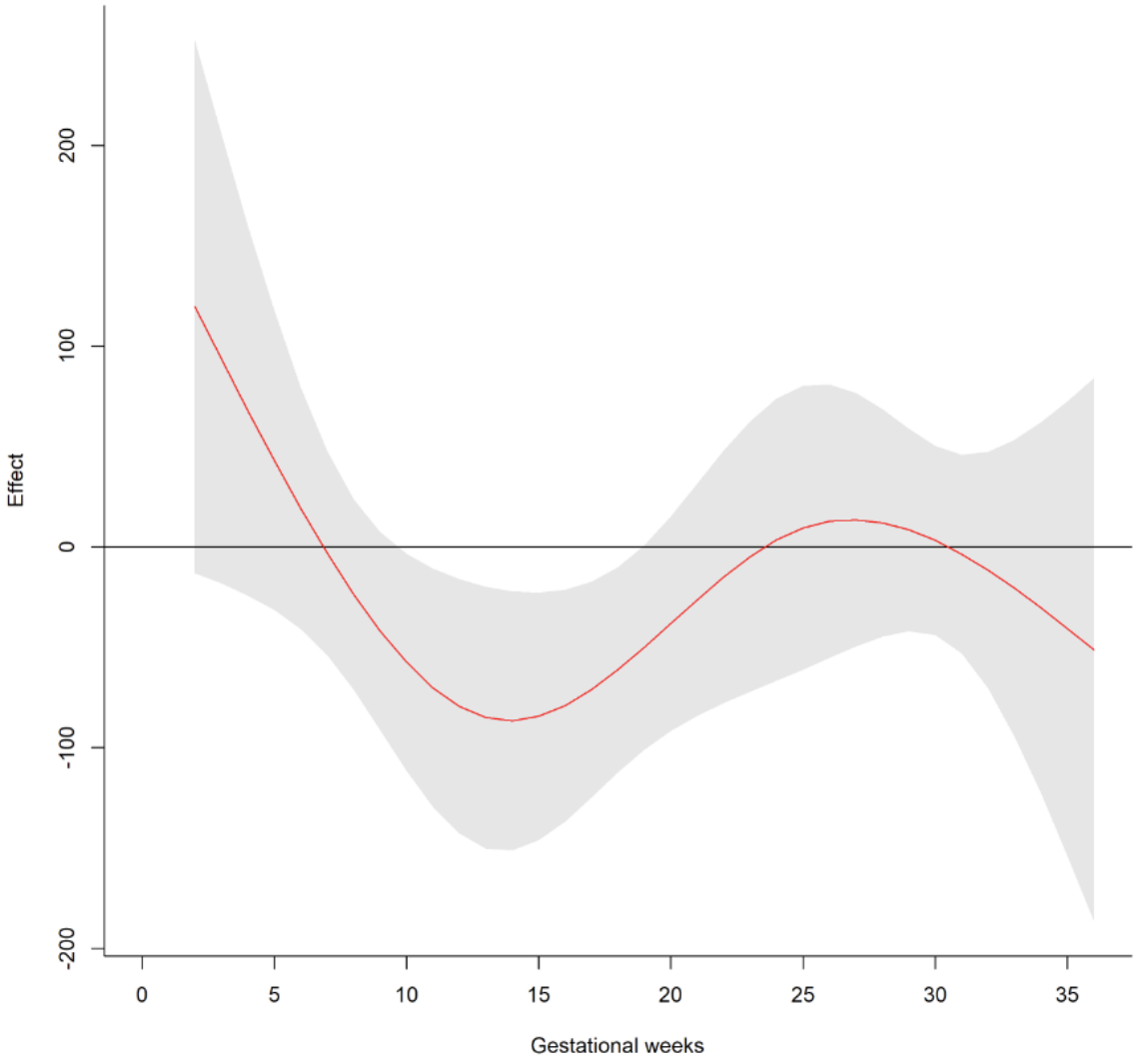
**(A) $NO_2$**



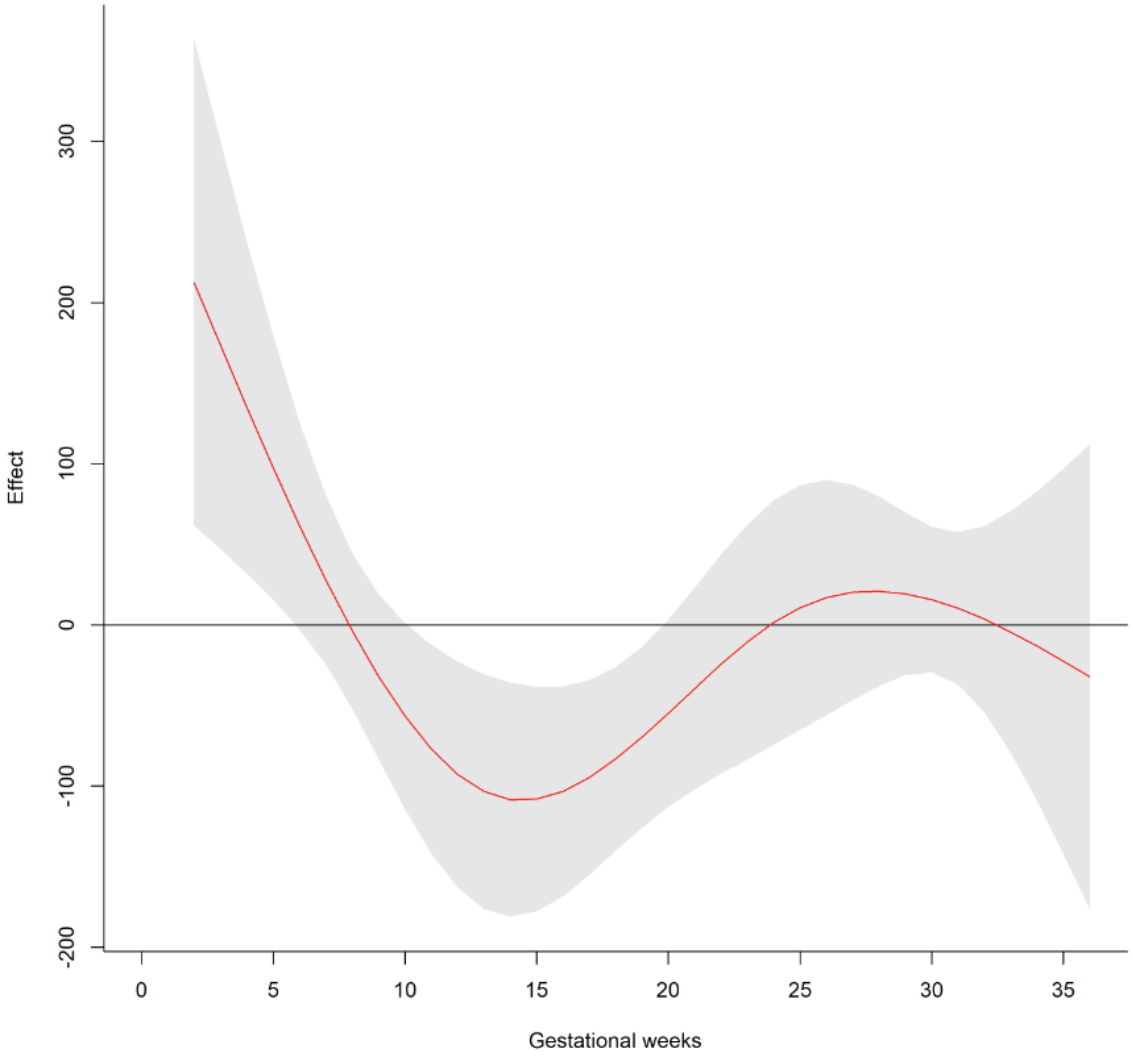
**(B) Black Carbon**



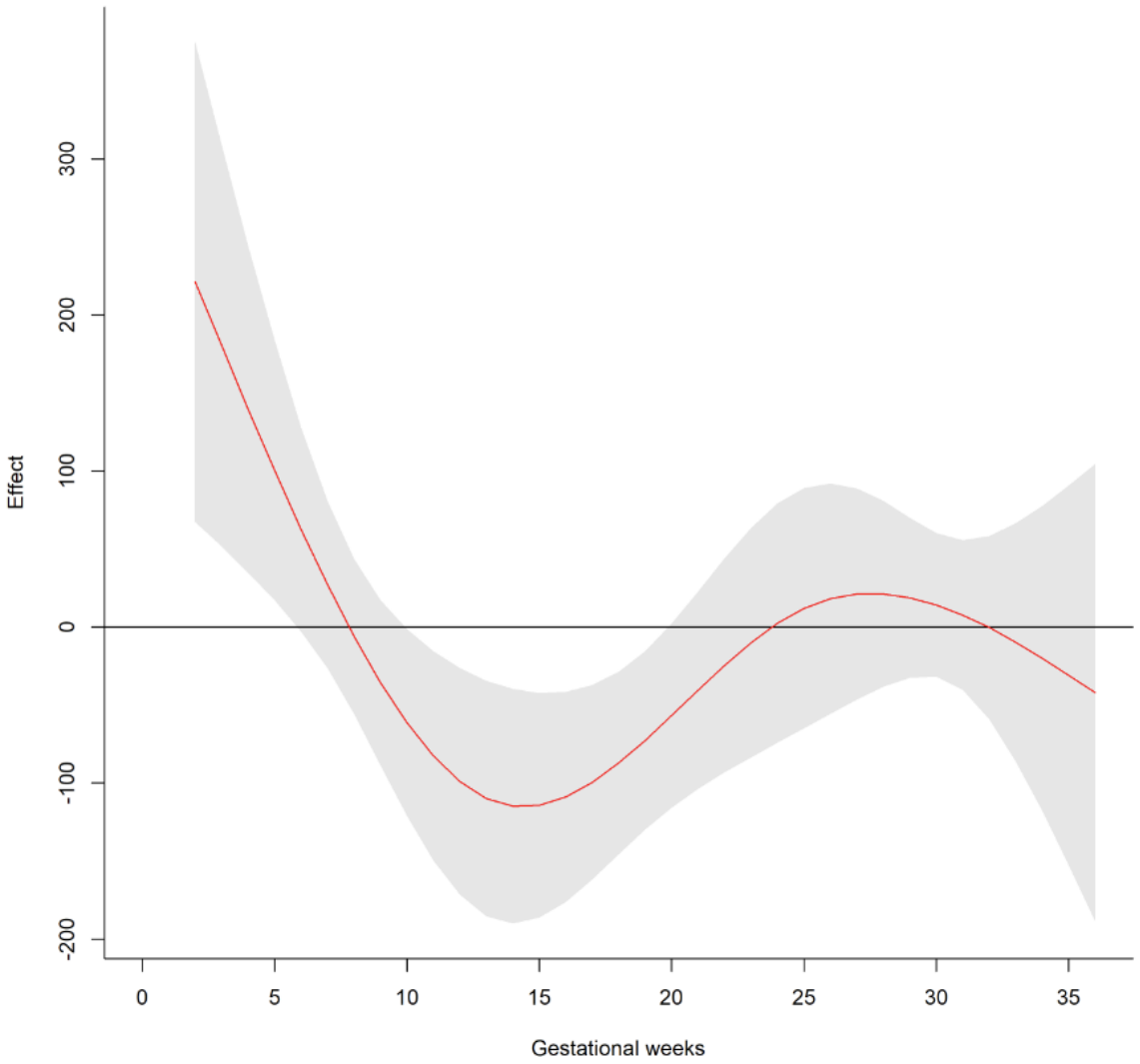
**(C) $PM_{2.5}$**



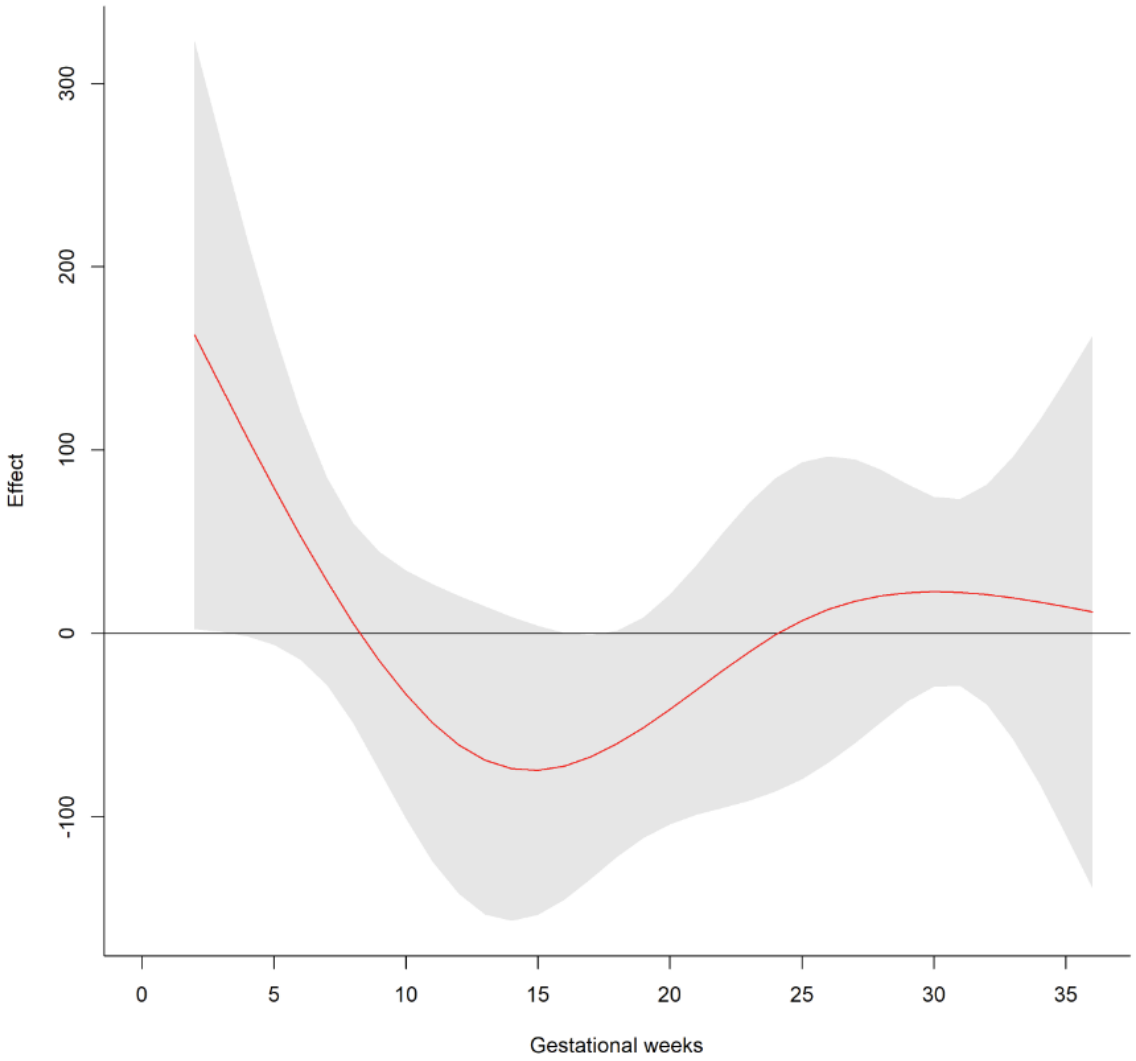
**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**



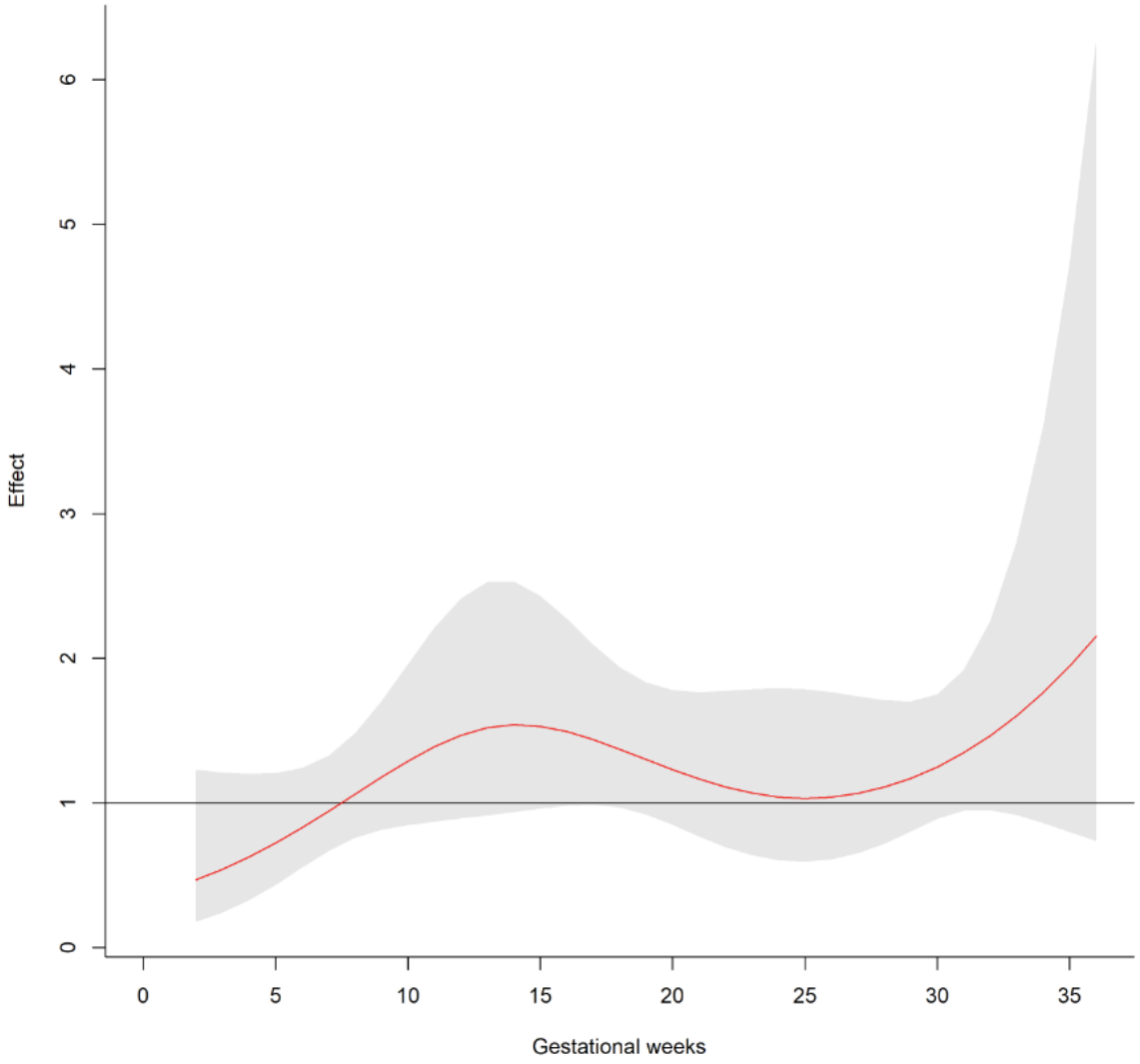
**(F) $PM_{2.5}$ Zn content**



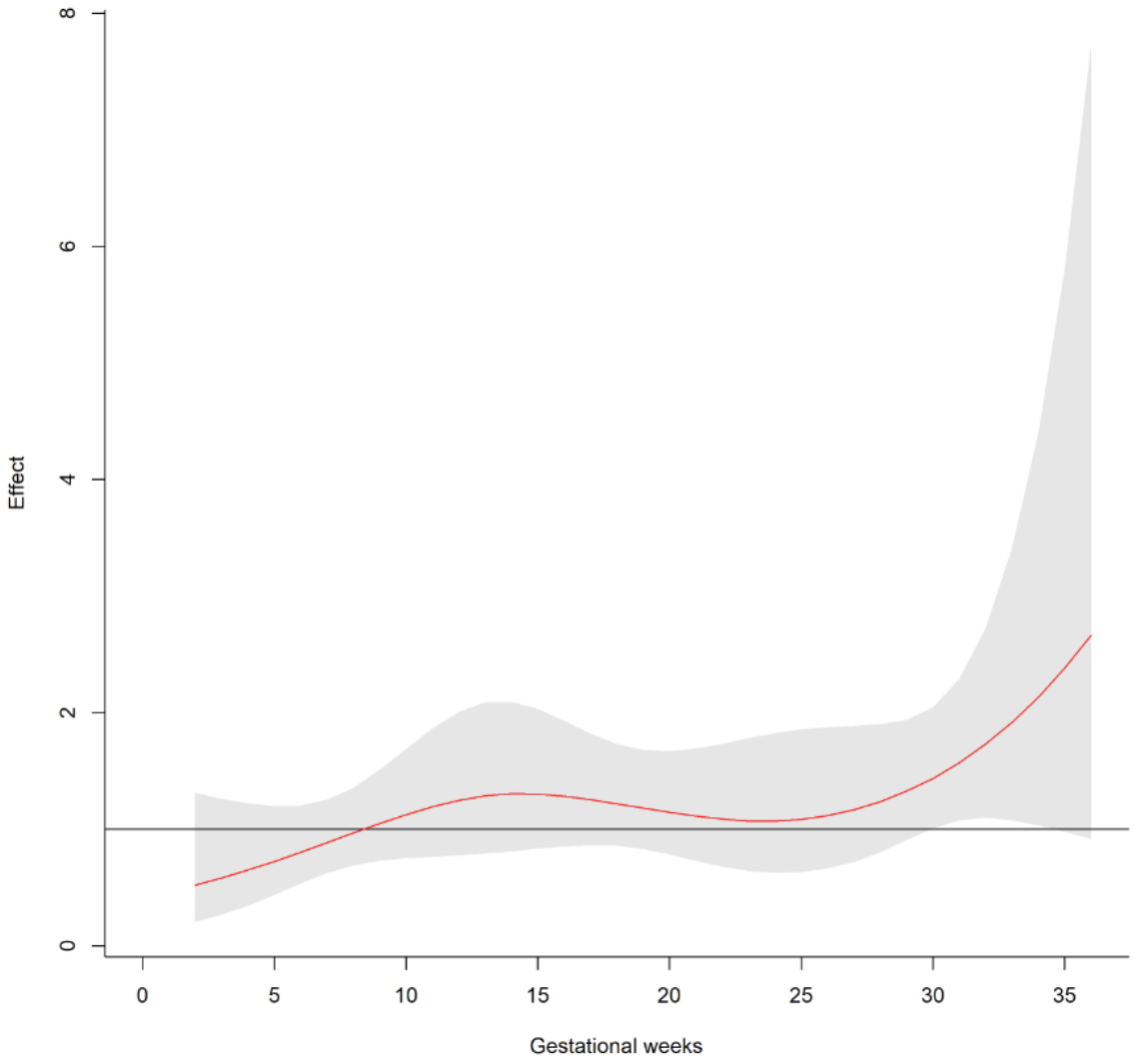

[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), history of low birth weight in previous pregnancies (categorical, yes/no) and sex of the neonate (girl vs. boy).

**Appendix 30.** Adjusted[a] odds ratio of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to (A) $NO_2$ ($\mu g/m^3$), (B) black carbon ($\mu g/m^3$), (C) $PM_{2.5}$ ($\mu g/m^3$), (D) $PM_{2.5}$ Cu content ($ng/m^3$), (E) $PM_{2.5}$ Fe content ($\mu g/m^3$), and (F) $PM_{2.5}$ Zn content ($ng/m^3$) during each week of pregnancy.

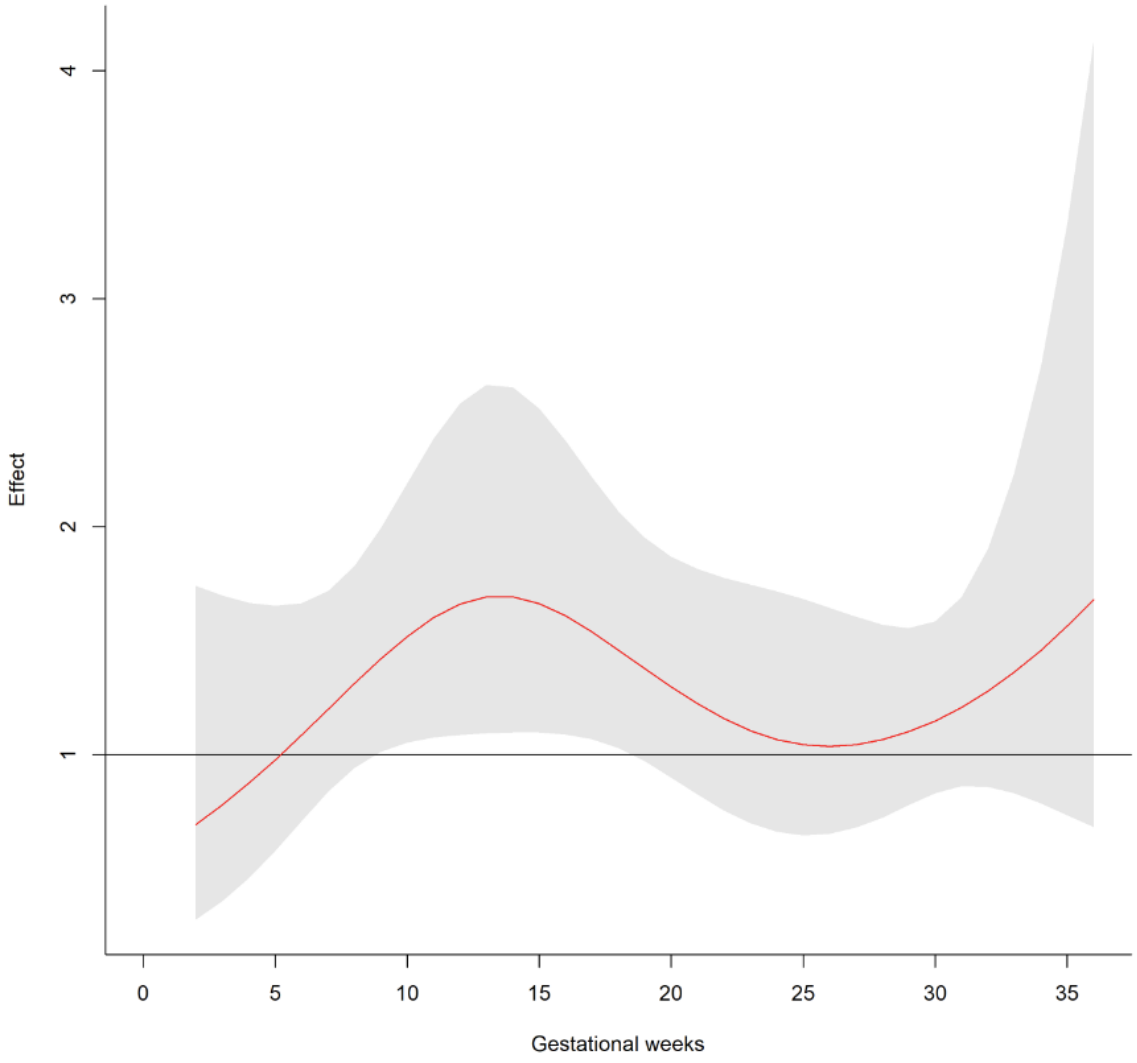
**(A) $NO_2$**



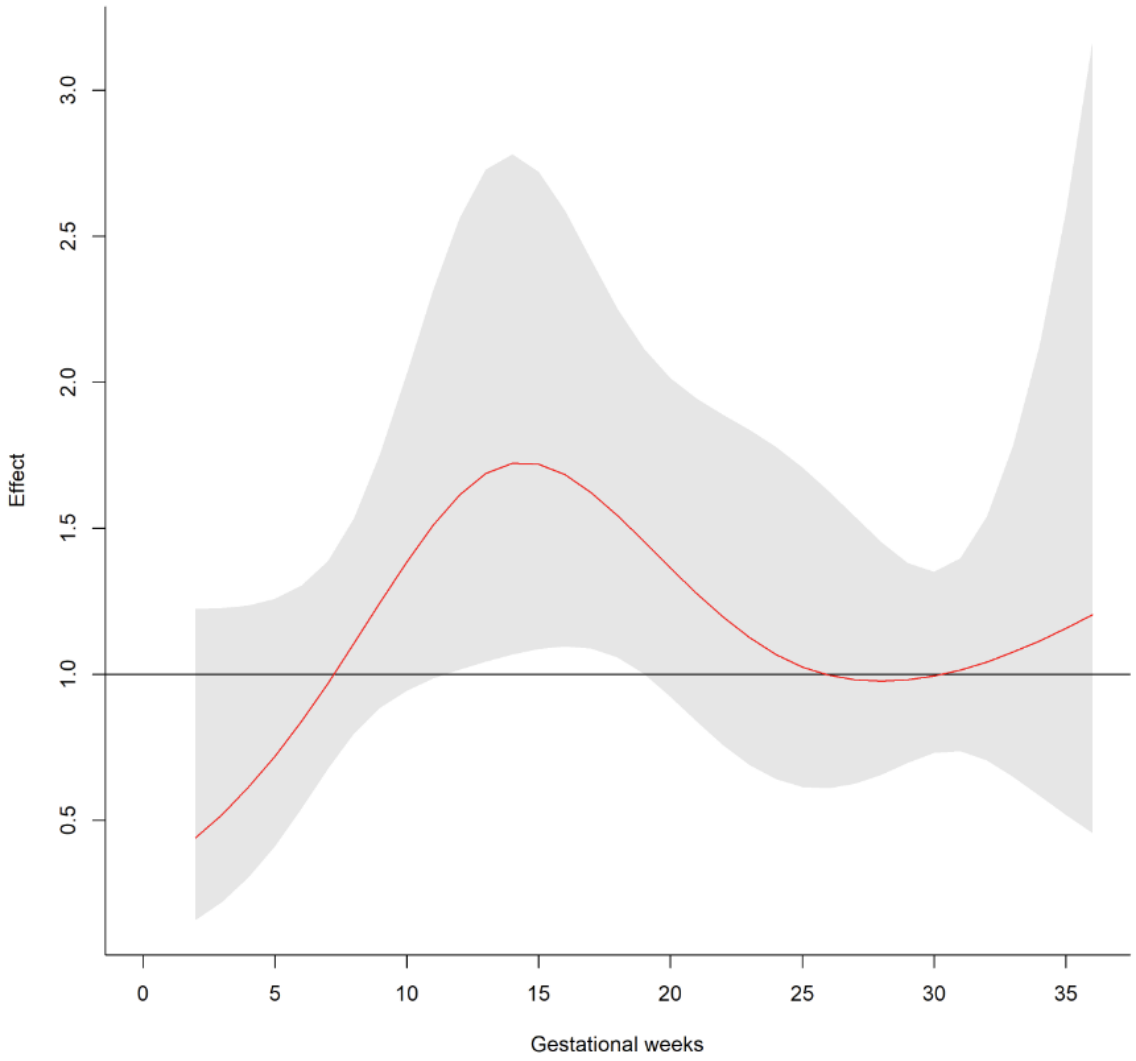
**(B) Black Carbon**



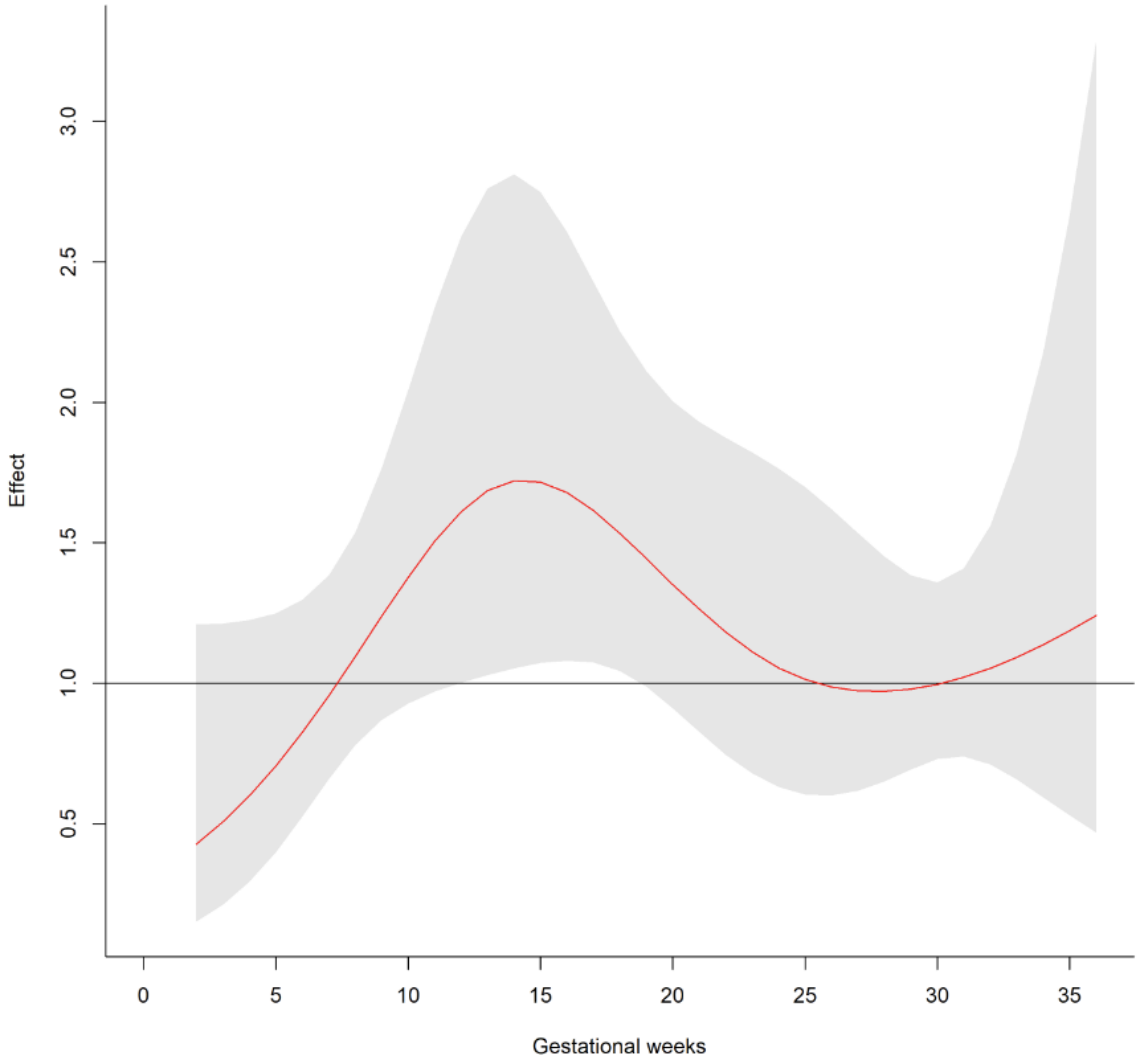
**(C) $PM_{2.5}$**



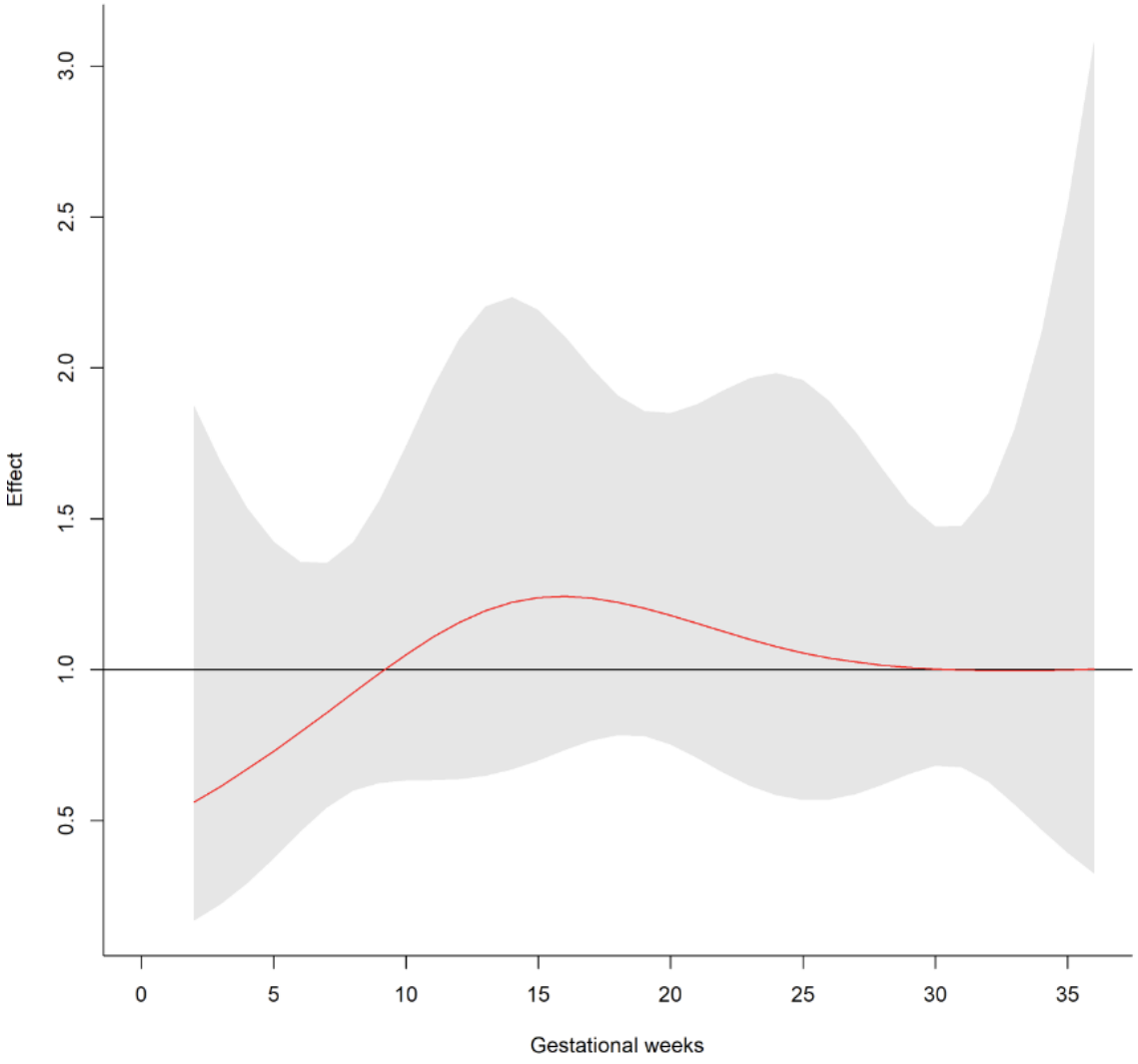
**(D) $PM_{2.5}$ Cu content**



**(E) $PM_{2.5}$ Fe content**

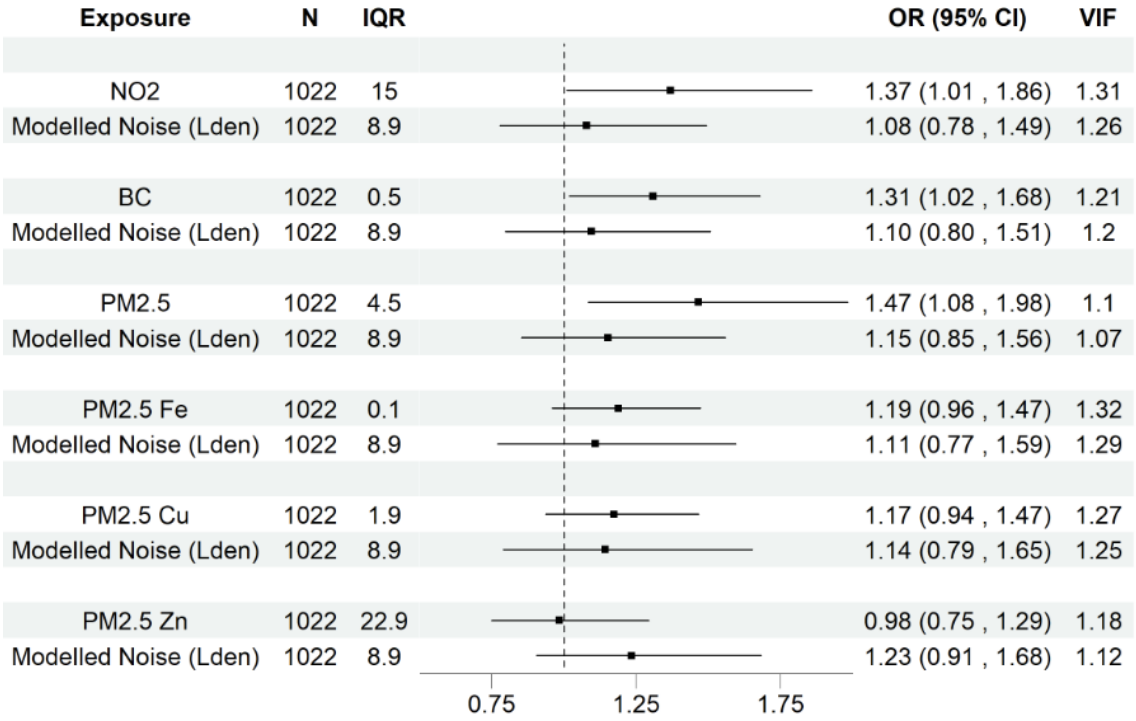


**(F) $PM_{2.5}$ Zn content**




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

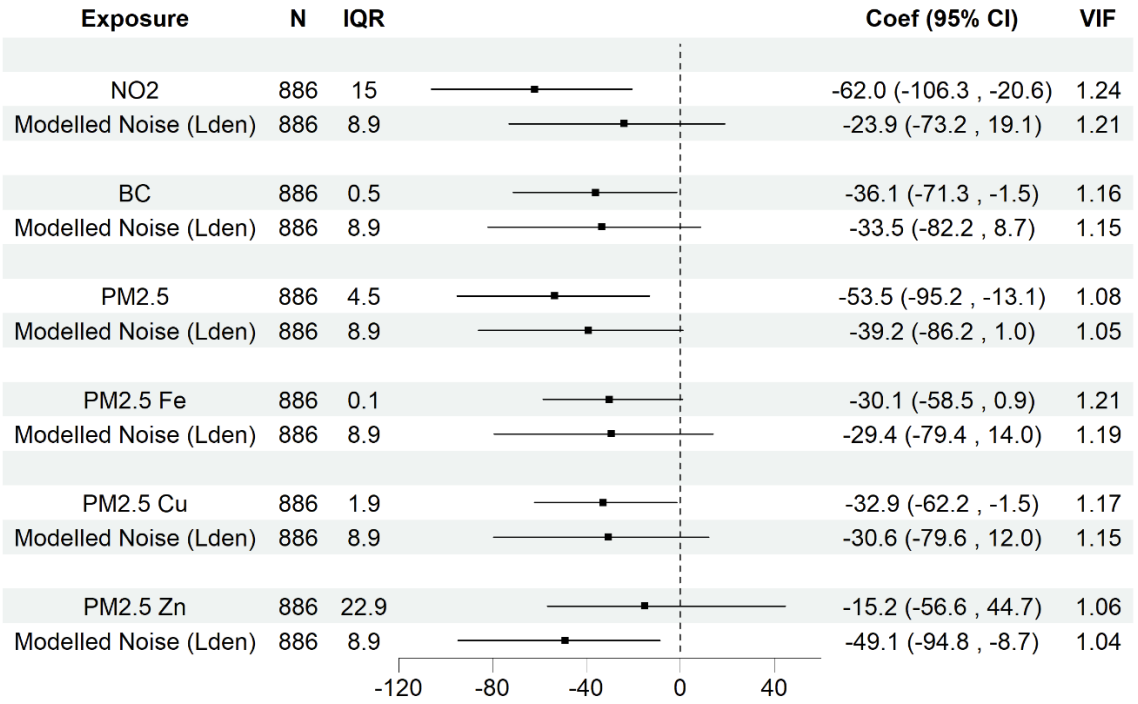
**Appendix 31.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined).




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

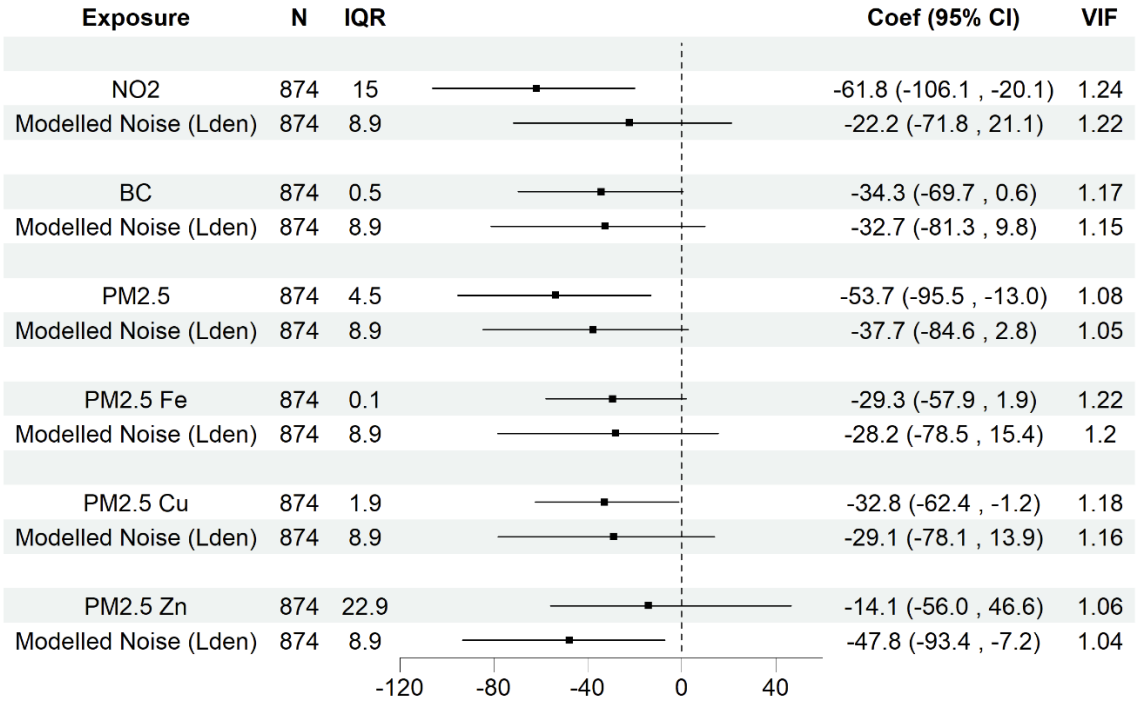
**Appendix 32.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for noise sensitivity.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

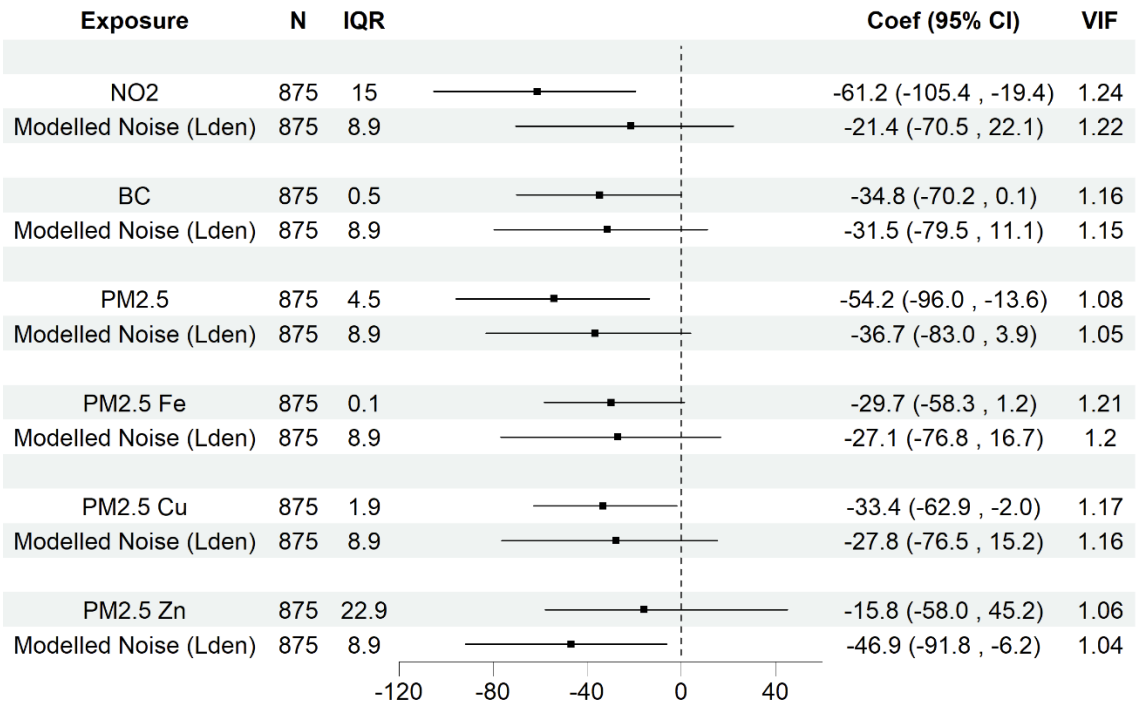
**Appendix 33.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for using earplugs.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

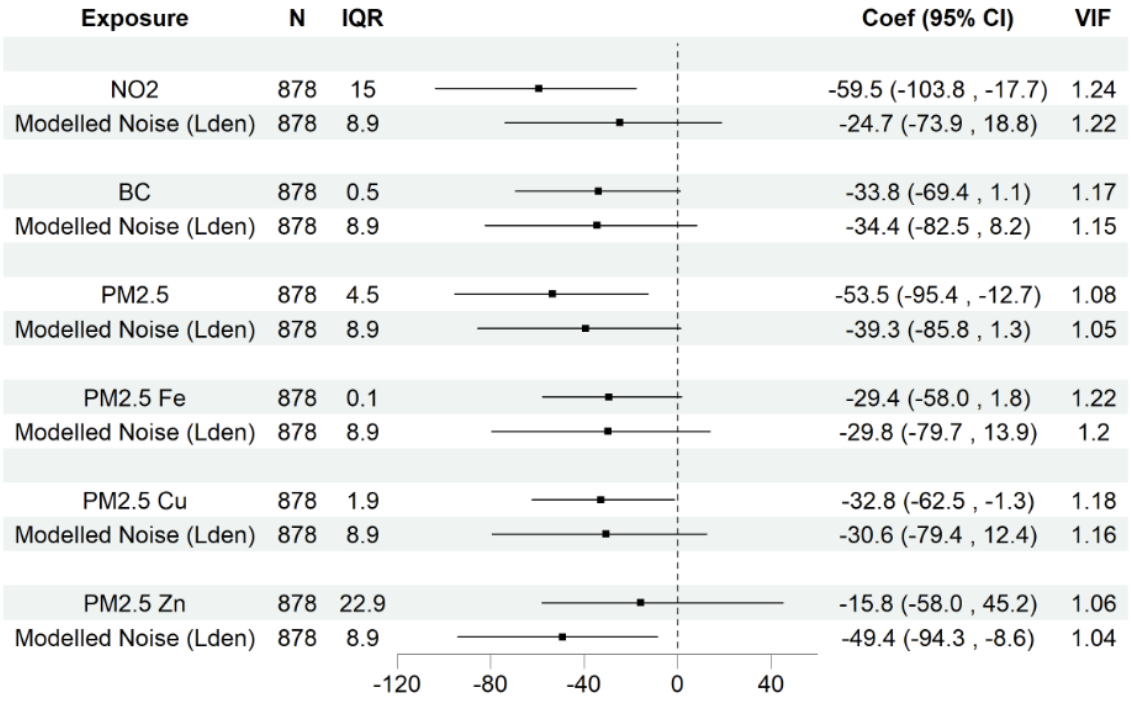
**Appendix 34.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for closing windows blinds.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

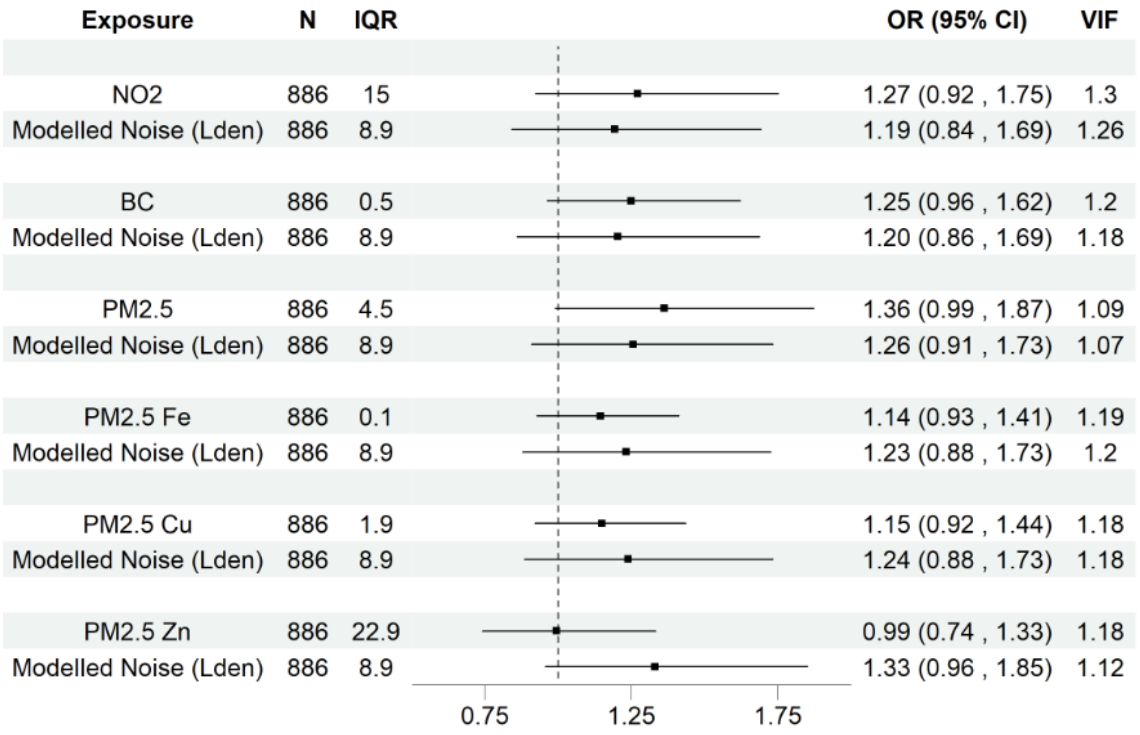
**Appendix 35.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for having window insultation.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

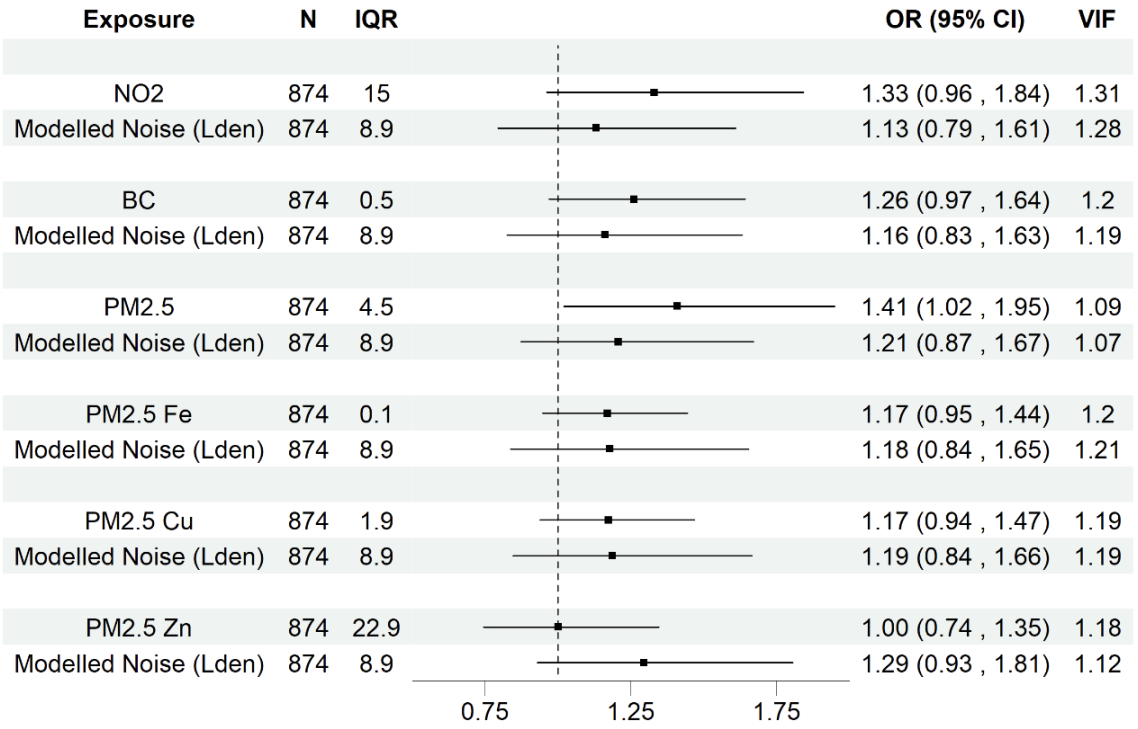
**Appendix 36.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for noise sensitivity.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

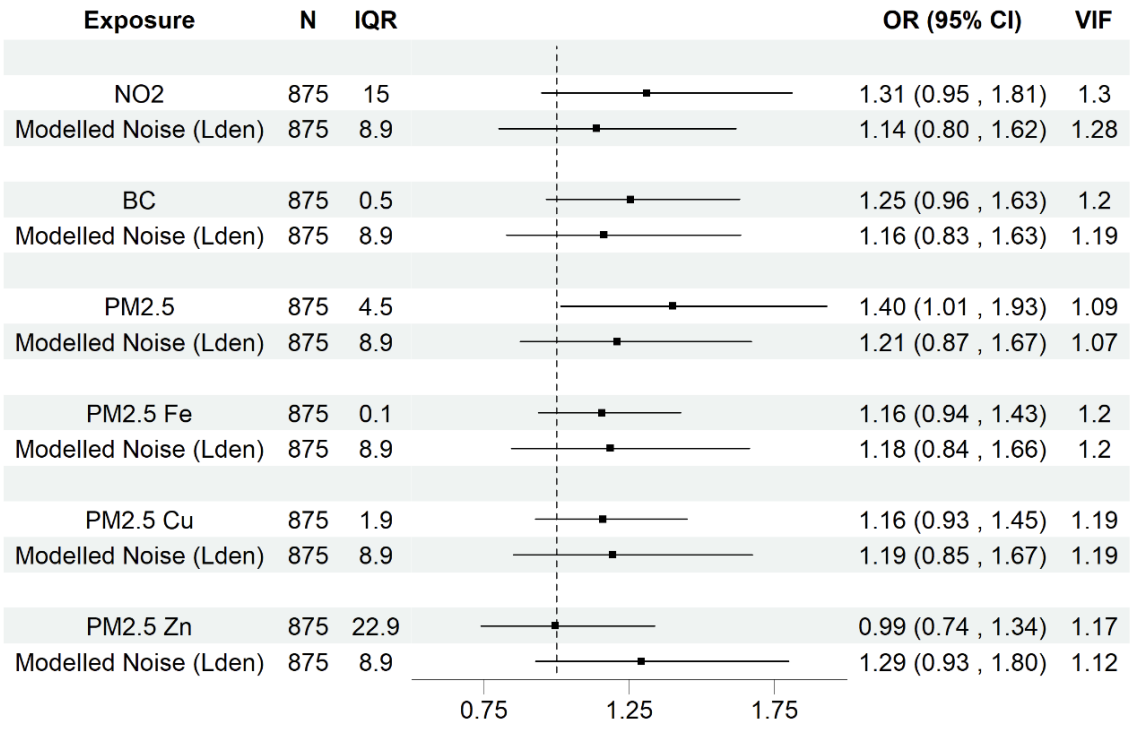
**Appendix 37.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for using earplugs.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

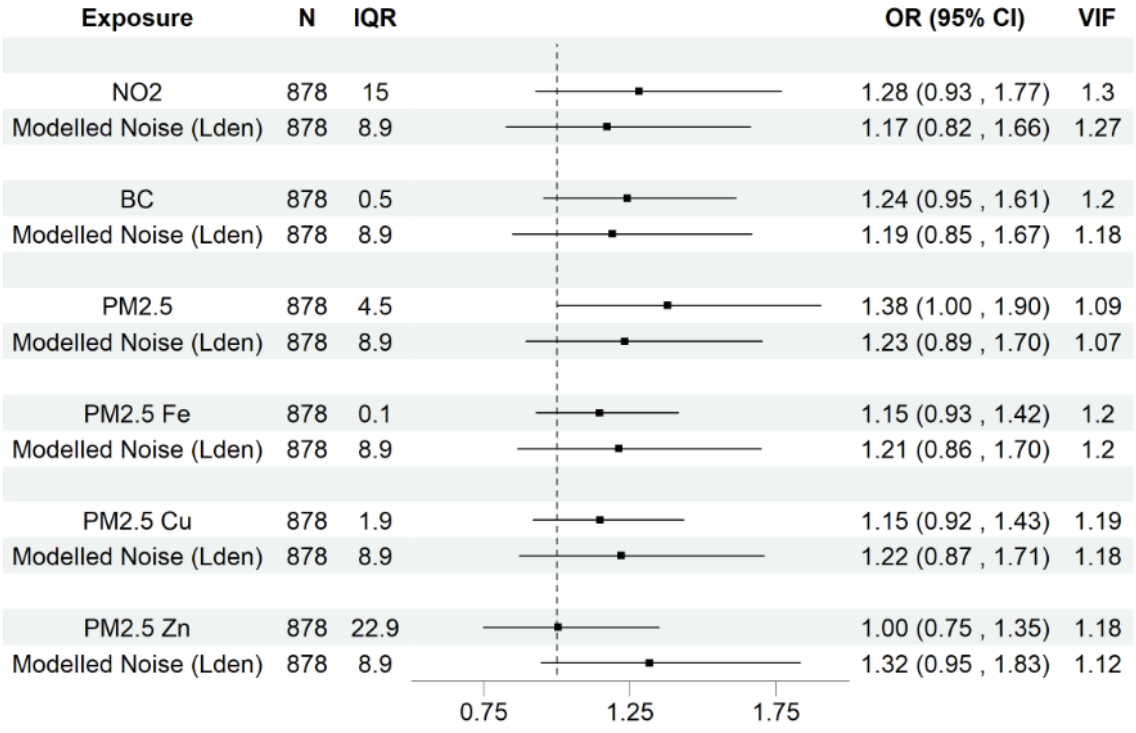
**Appendix 38.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for closing windows blinds.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

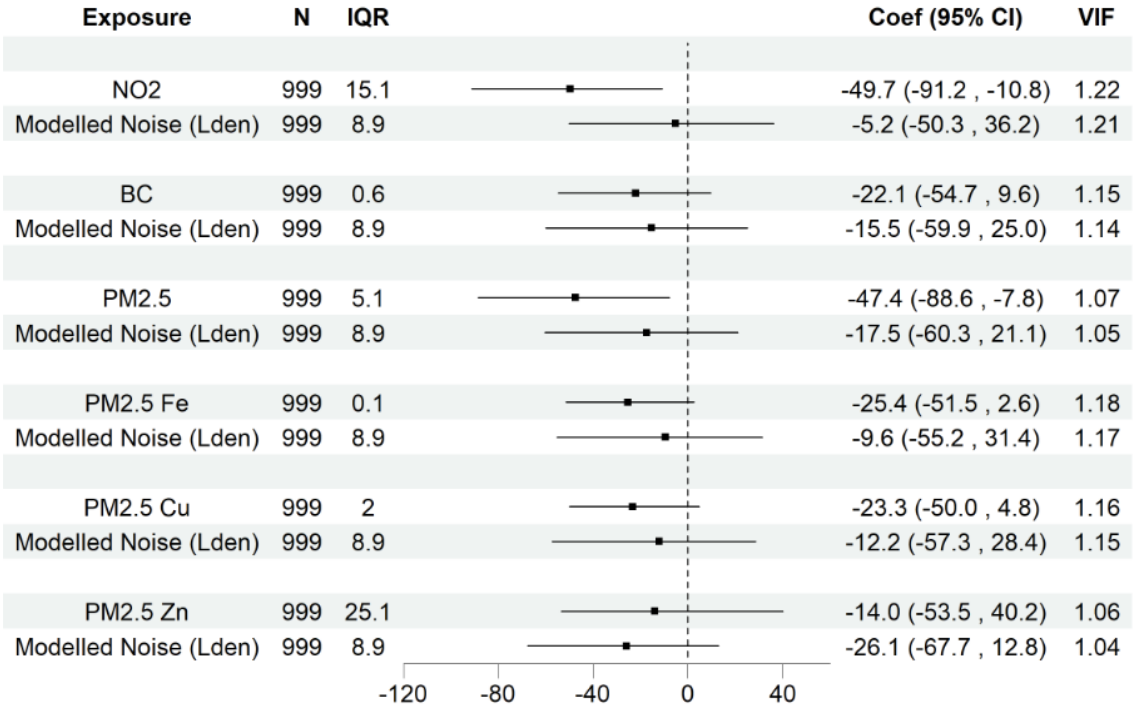
**Appendix 39.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) further adjusted for closing windows.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

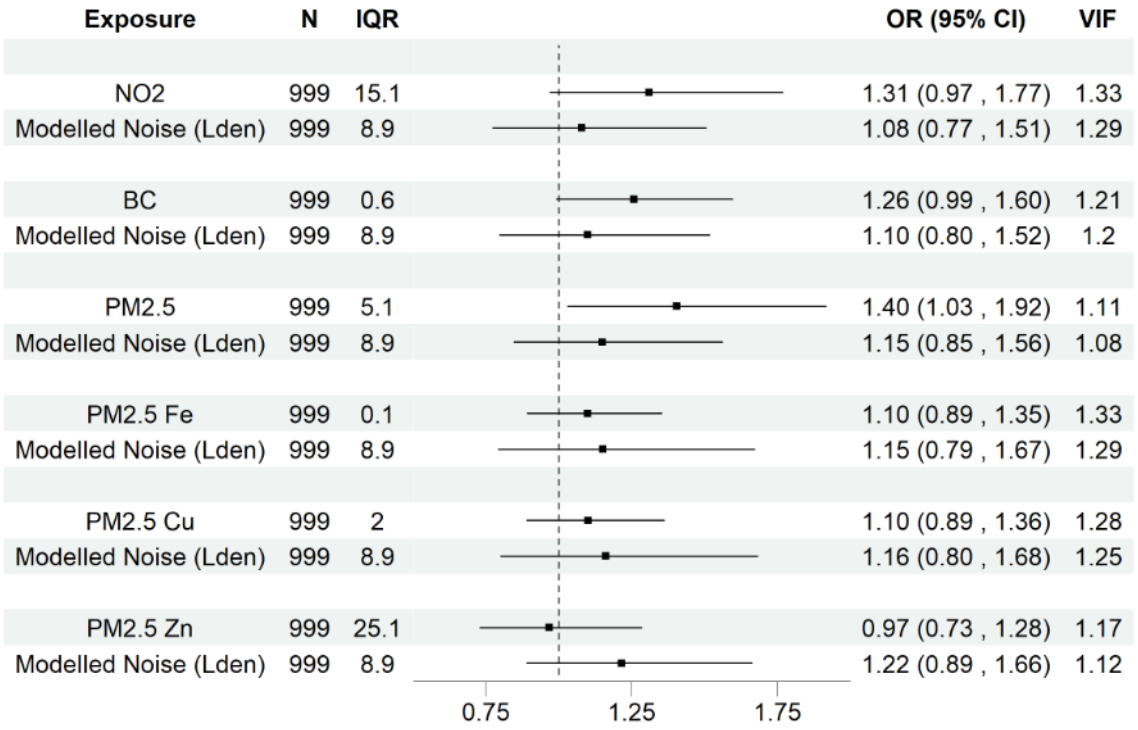
**Appendix 40.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) limiting the analyses to those participants who had modelled noise data for at least 75% of their pregnancy periods.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

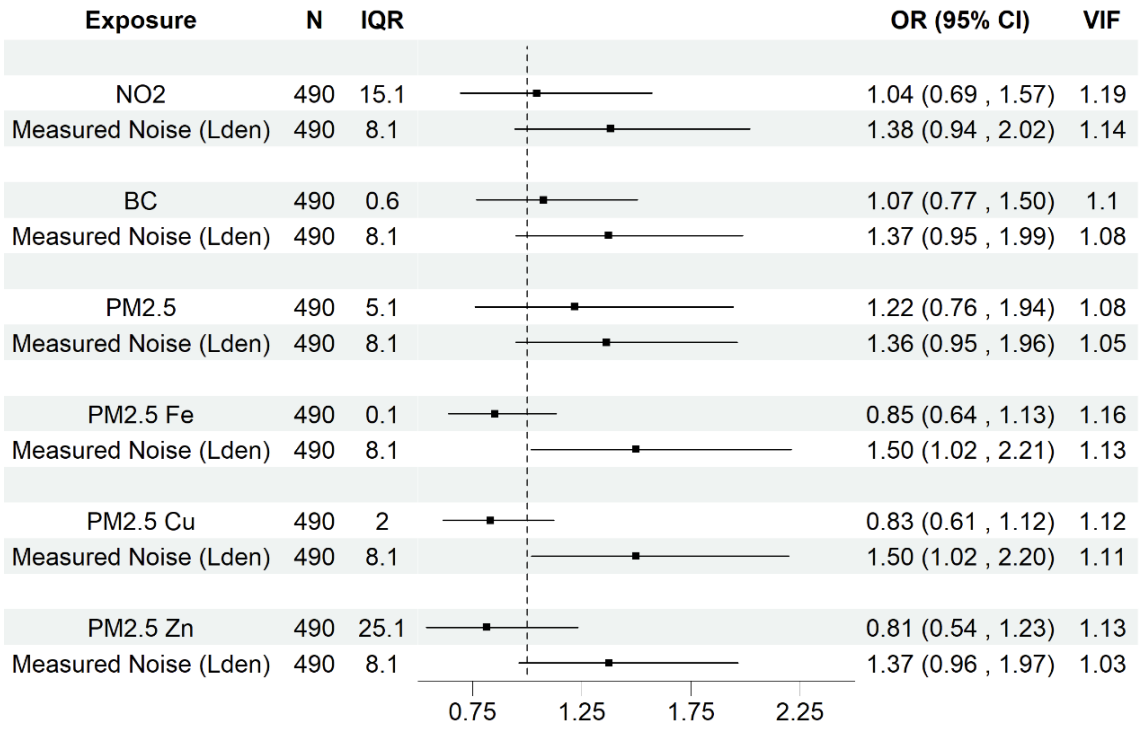
**Appendix 41.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including modelled air pollution and modelled noise levels (both at all microenvironments combined) limiting the analyses to those participants who had modelled noise data for at least 75% of their pregnancy periods.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

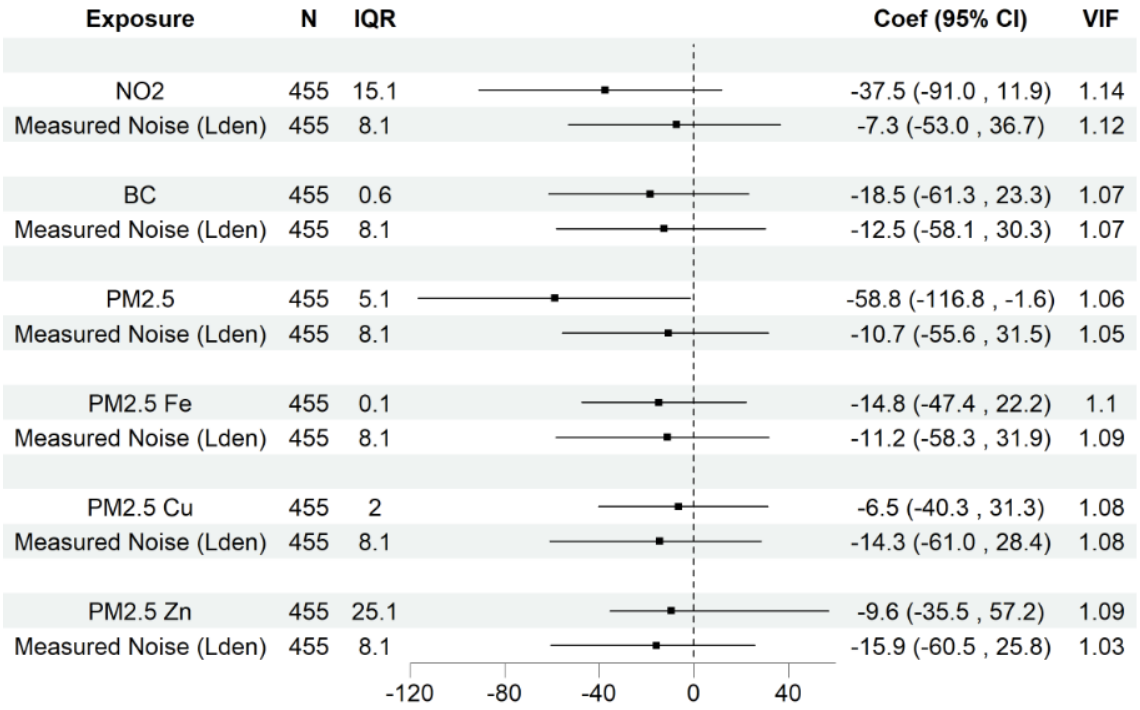
**Appendix 42.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor).




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

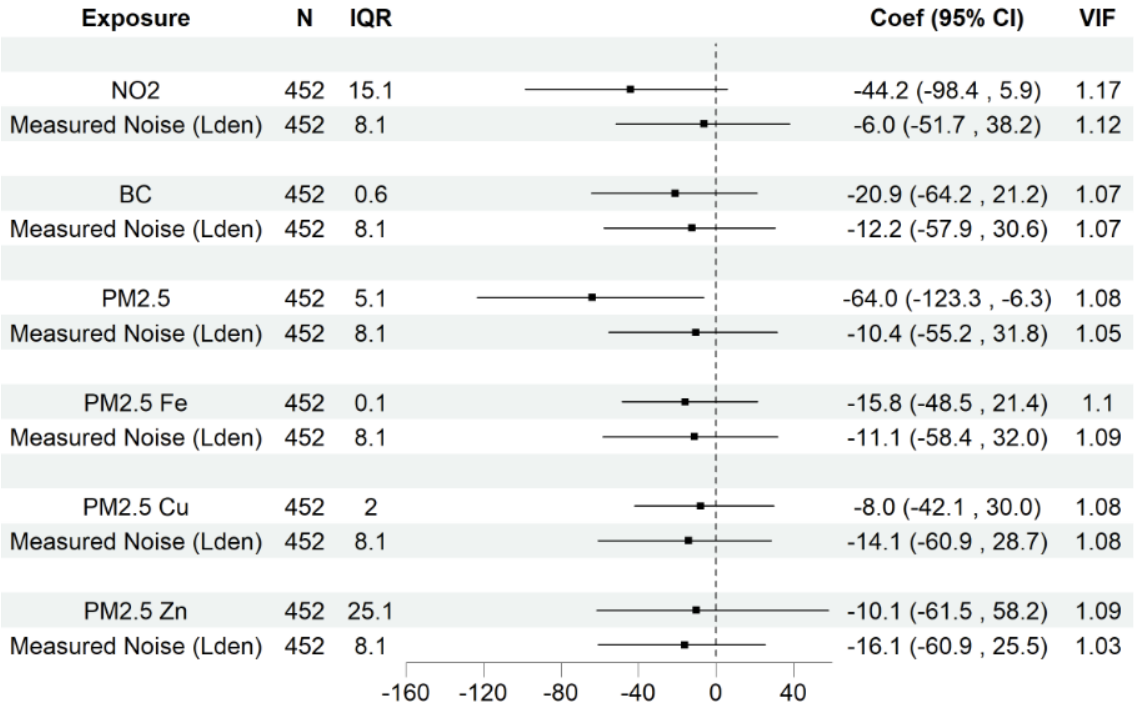
**Appendix 43.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for noise sensitivity.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

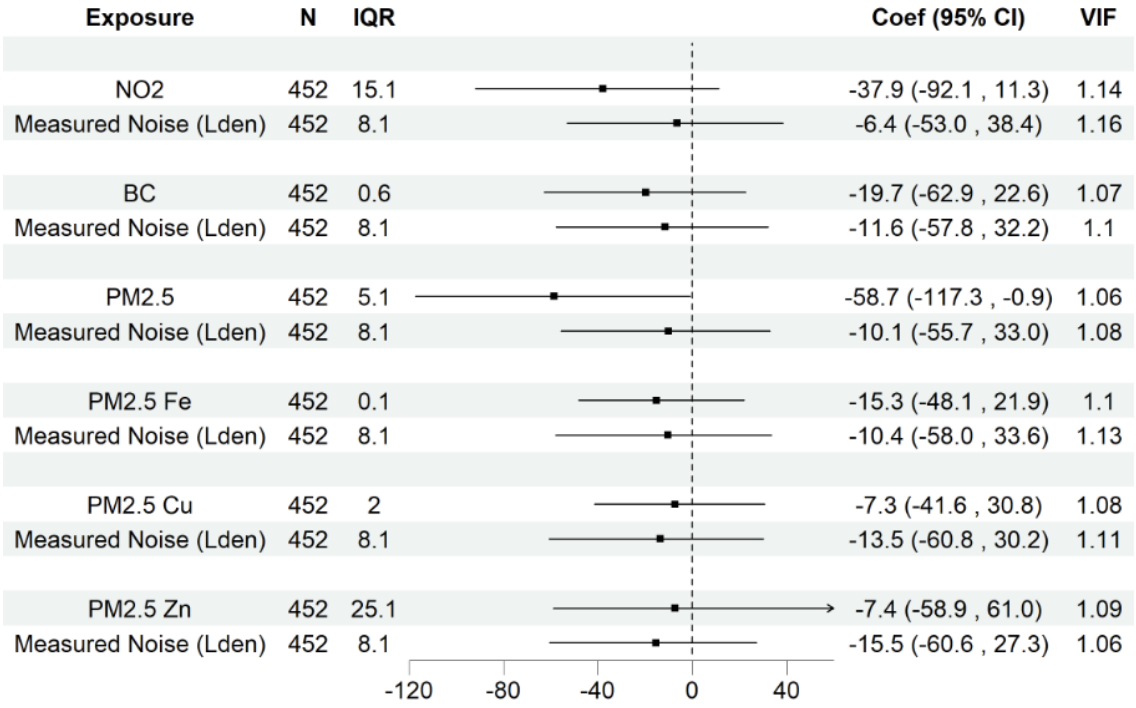
**Appendix 44.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for using earplugs.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

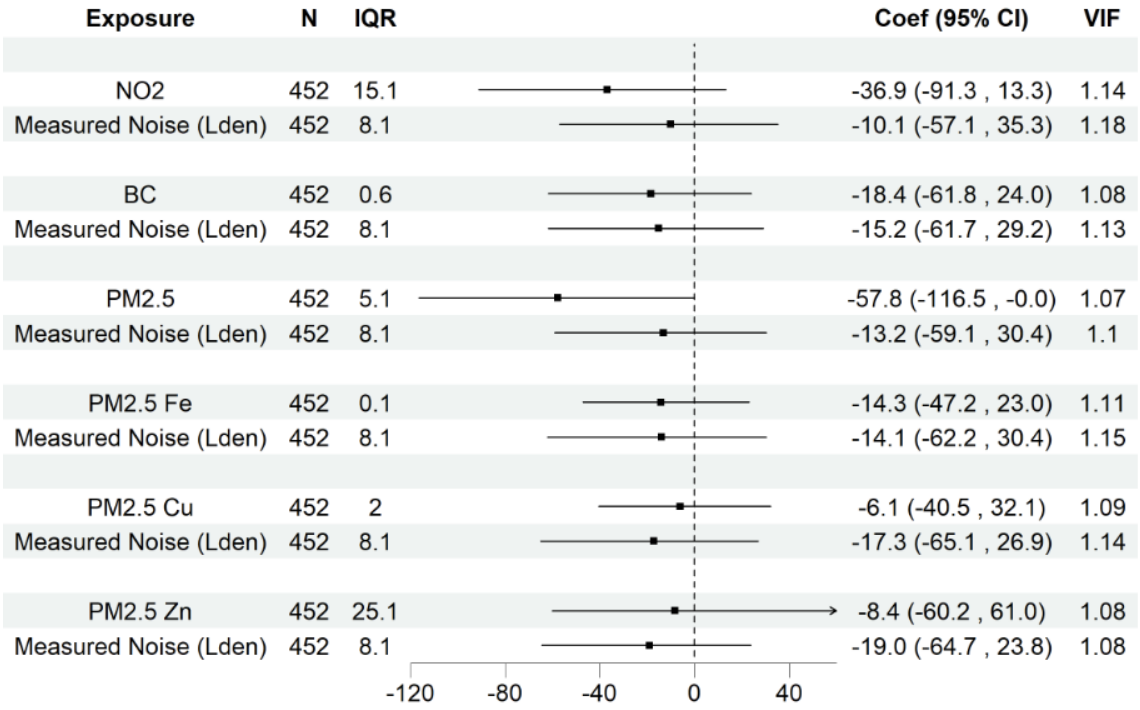
**Appendix 45.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for closing windows blinds.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

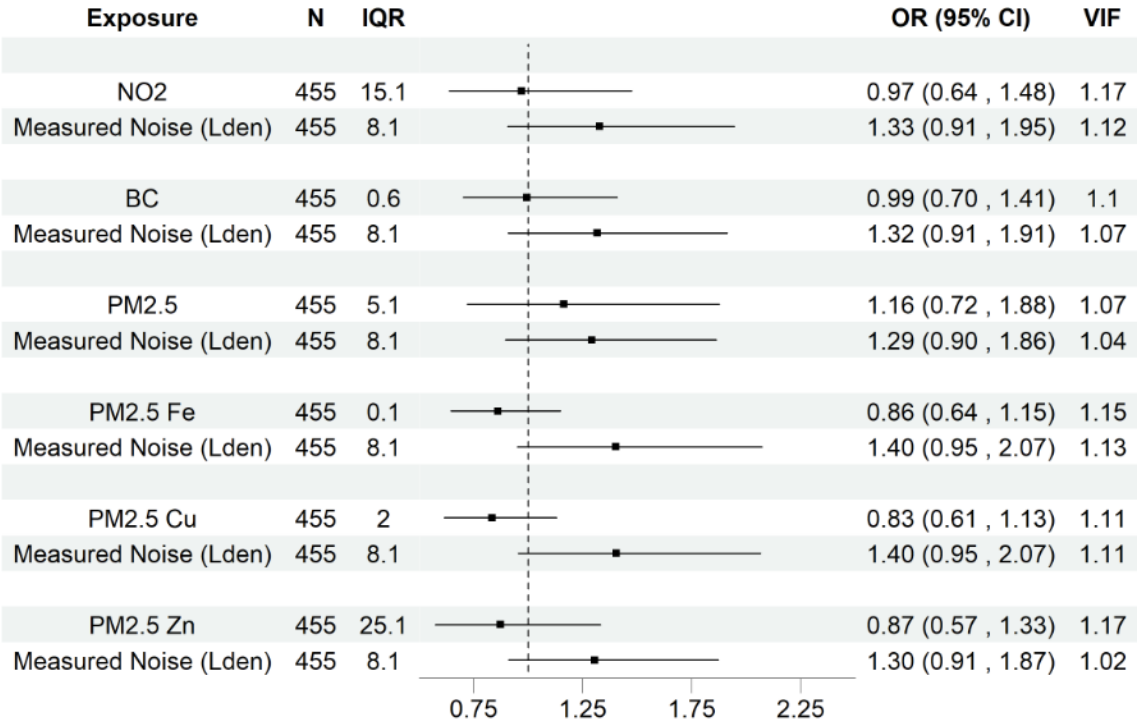
**Appendix 46.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ (μg/m$^3$), black carbon (μg/m$^3$), $PM_{2.5}$ (μg/m$^3$), $PM_{2.5}$ Cu content (ng/m$^3$), $PM_{2.5}$ Fe content (μg/m$^3$), and $PM_{2.5}$ Zn content (ng/m$^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for closing windows.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, kg/m$^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

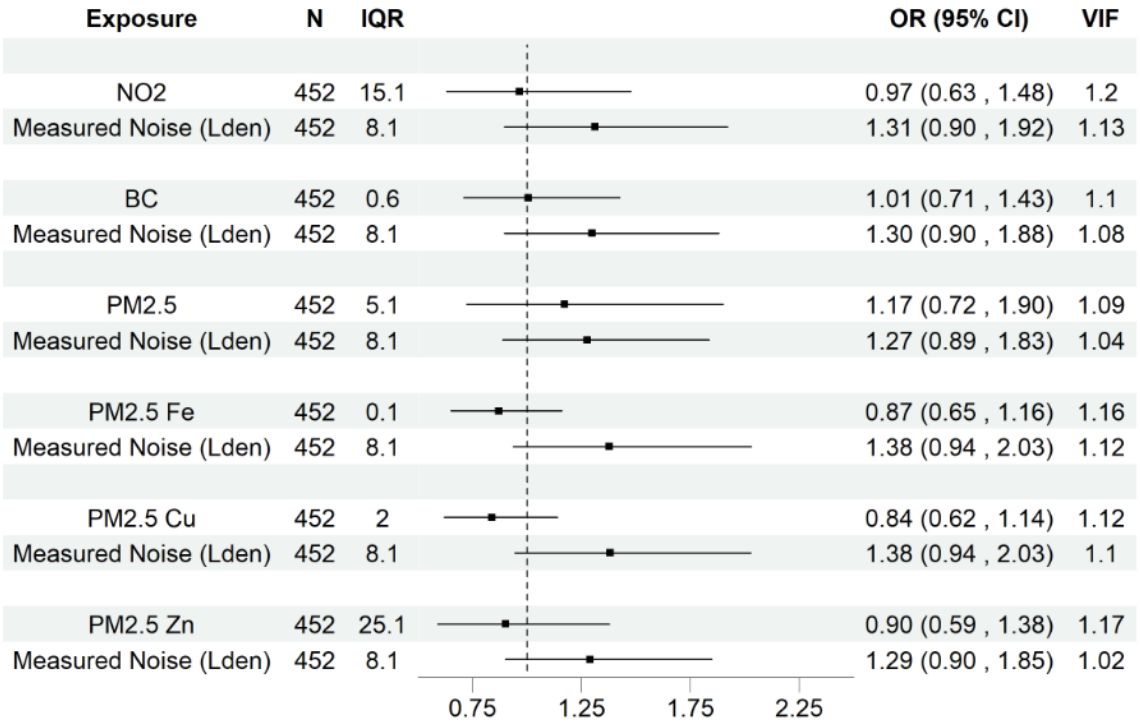
**Appendix 47.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for noise sensitivity.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

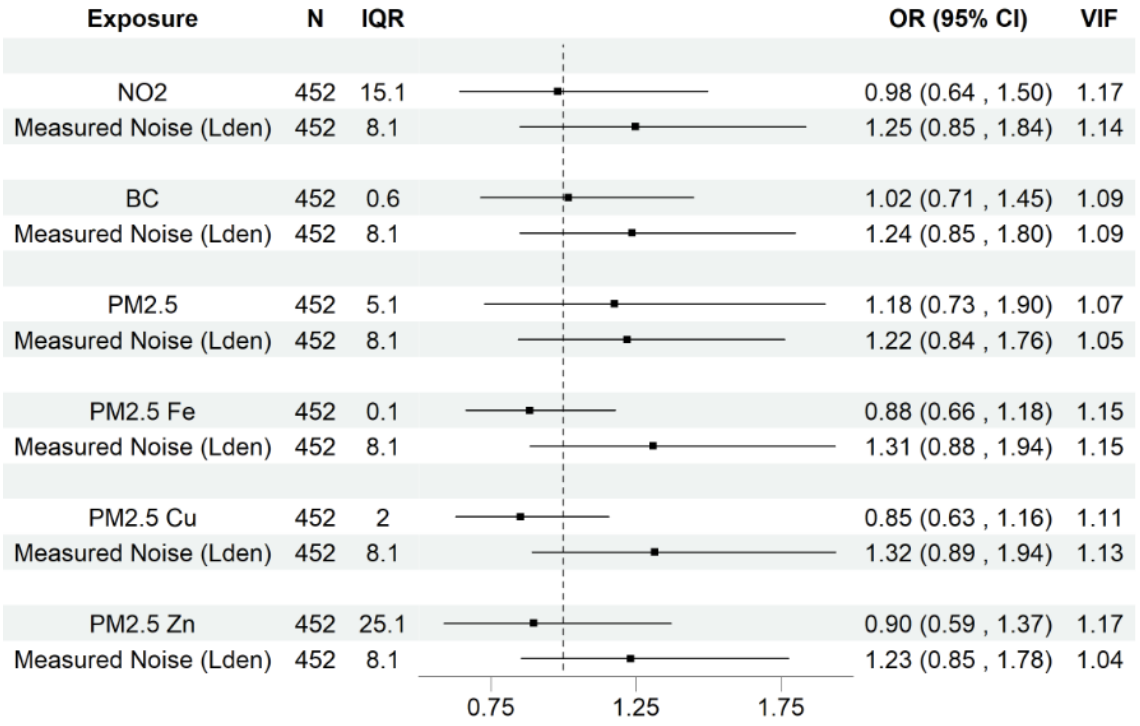
**Appendix 48.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for using earplug.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

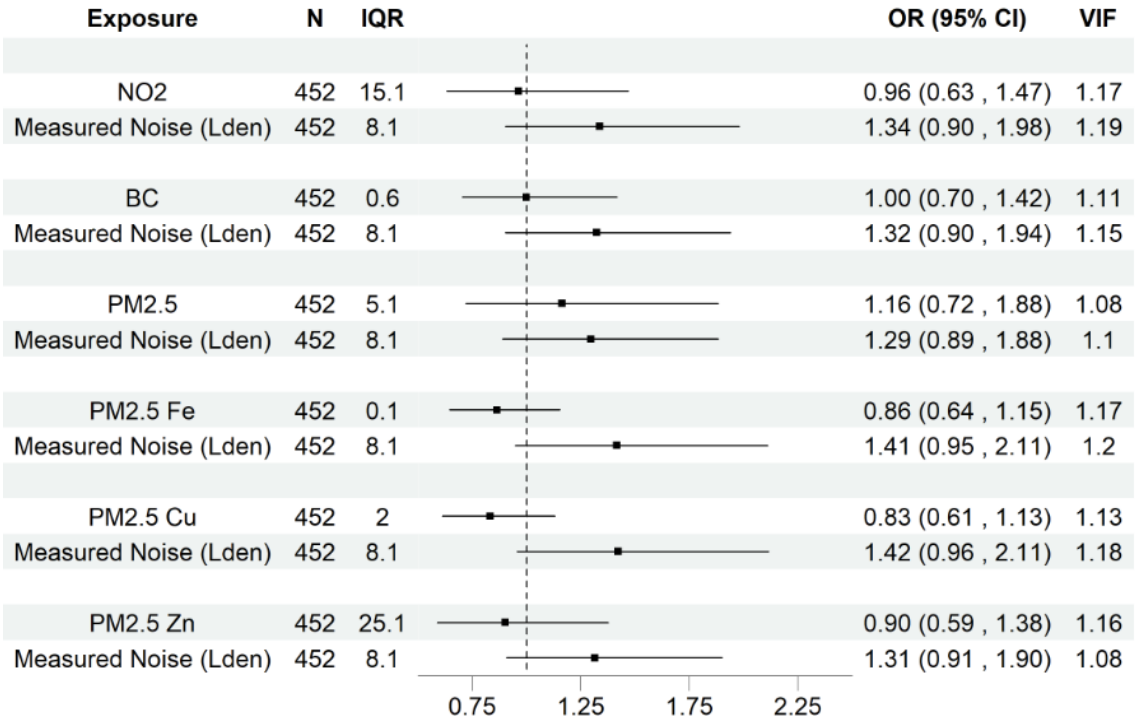
**Appendix 49.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for closing windows blinds.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

**Appendix 50.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise ($L_{den}$) in the two-pollutant models including air pollution and measured noise levels (both at home-outdoor) further adjusted for closing windows.

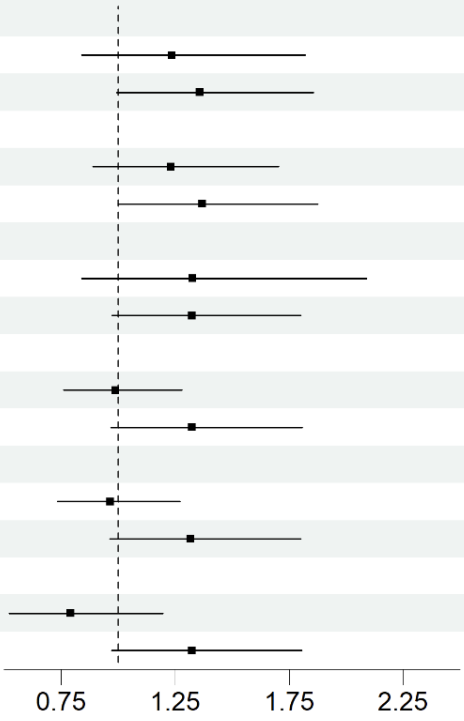



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

**Appendix 51.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$),[b] $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor).

| Exposure | N | IQR | OR (95% CI) | VIF |
|---|---|---|---|---|
| NO2 | 507 | 15.1 | 1.24 (0.84 , 1.82) | 1.09 |
| Intermittency Ratio | 507 | 13.9 | 1.36 (0.99 , 1.86) | 1.04 |
| BC | 507 | 0.6 | 1.23 (0.89 , 1.70) | 1.07 |
| Intermittency Ratio | 507 | 13.9 | 1.37 (1.00 , 1.87) | 1.05 |
| PM2.5 | 507 | 5.1 | 1.33 (0.84 , 2.09) | 1.05 |
| Intermittency Ratio | 507 | 13.9 | 1.32 (0.97 , 1.80) | 1.02 |
| PM2.5 Fe | 507 | 0.1 | 0.99 (0.76 , 1.28) | 1.06 |
| Intermittency Ratio | 507 | 13.9 | 1.32 (0.97 , 1.81) | 1.04 |
| PM2.5 Cu | 507 | 2 | 0.97 (0.73 , 1.27) | 1.05 |
| Intermittency Ratio | 507 | 13.9 | 1.32 (0.96 , 1.80) | 1.04 |
| PM2.5 Zn | 507 | 25.1 | 0.79 (0.52 , 1.20) | 1.11 |
| Intermittency Ratio | 507 | 13.9 | 1.32 (0.97 , 1.81) | 1.01 |

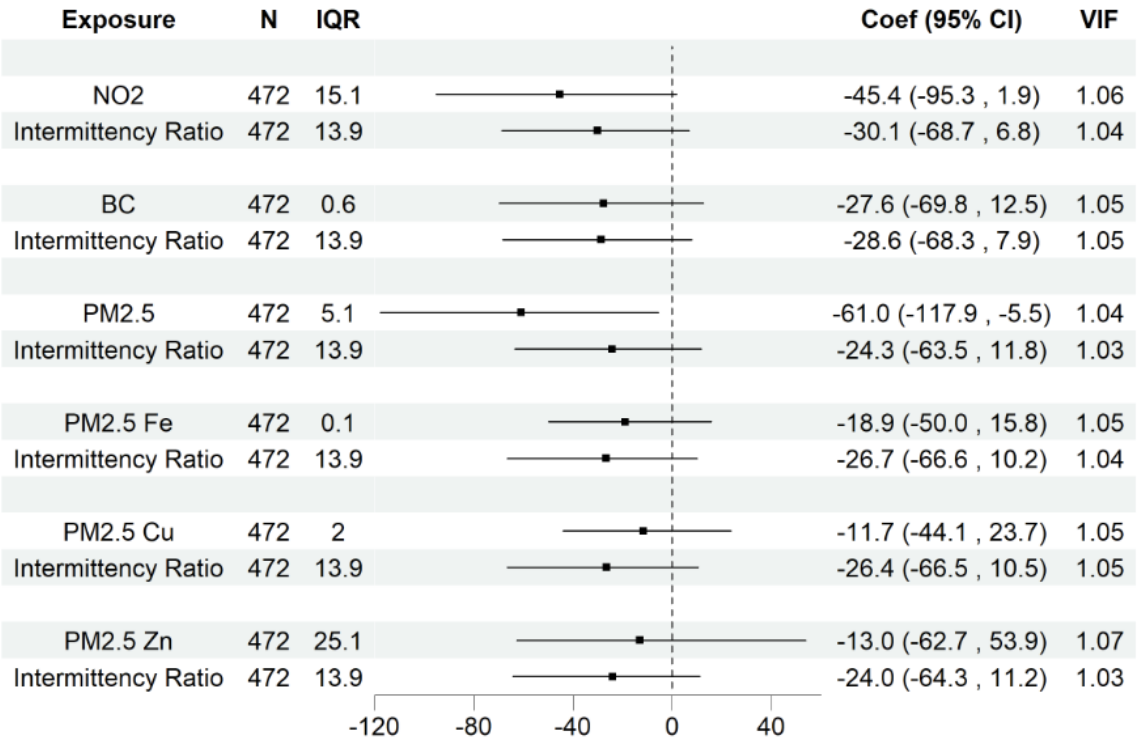



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

[b]For model with BC, intermittency ratio lower CI $> 1$ at 3 decimals.

**Abbreviation:** VIF: Variance inflation factor.

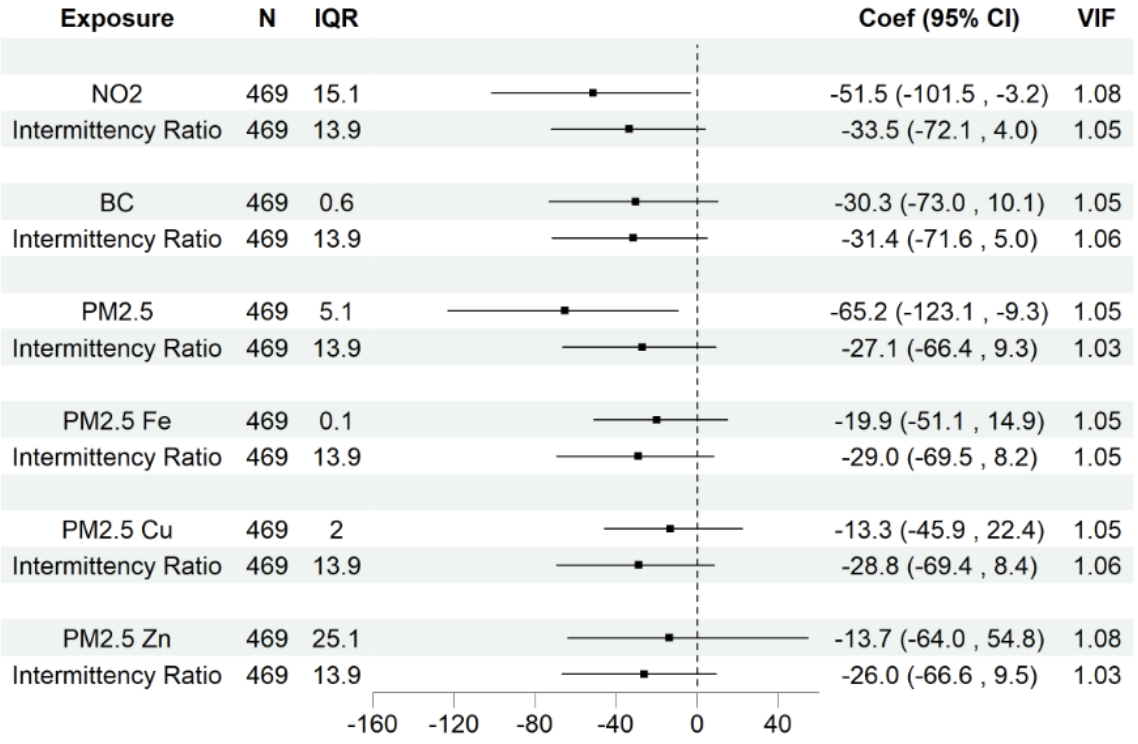
**Appendix 52.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for noise sensitivity.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

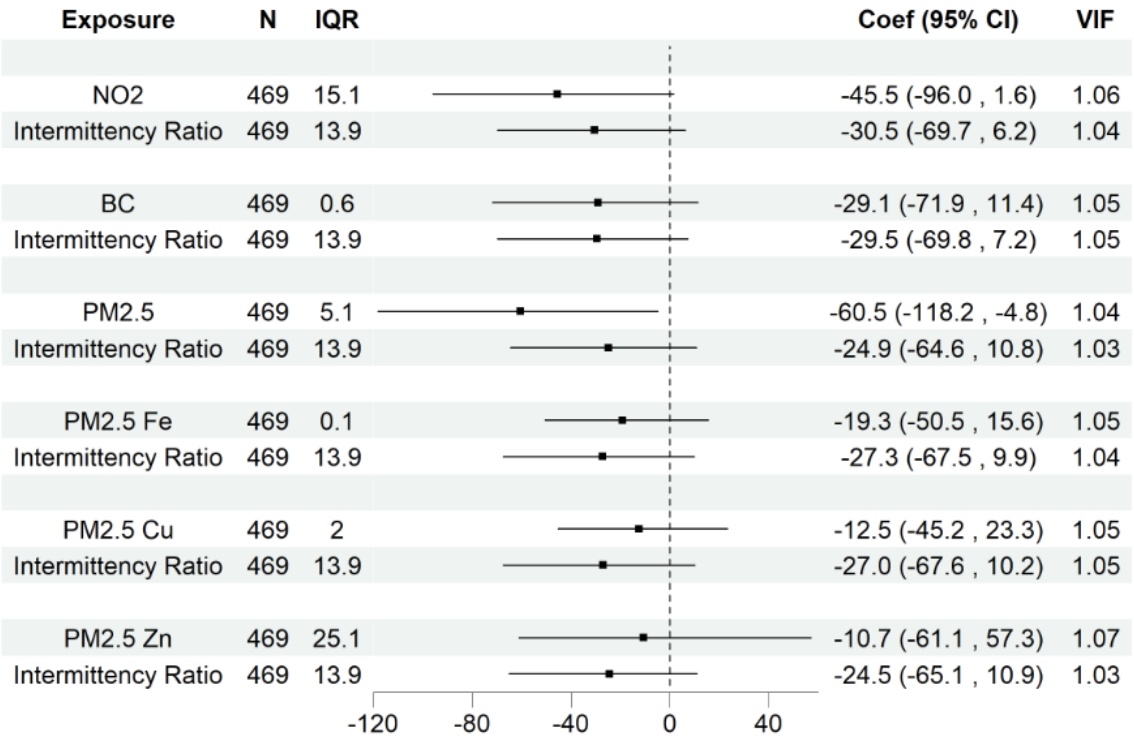
**Appendix 53.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for using earplugs.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

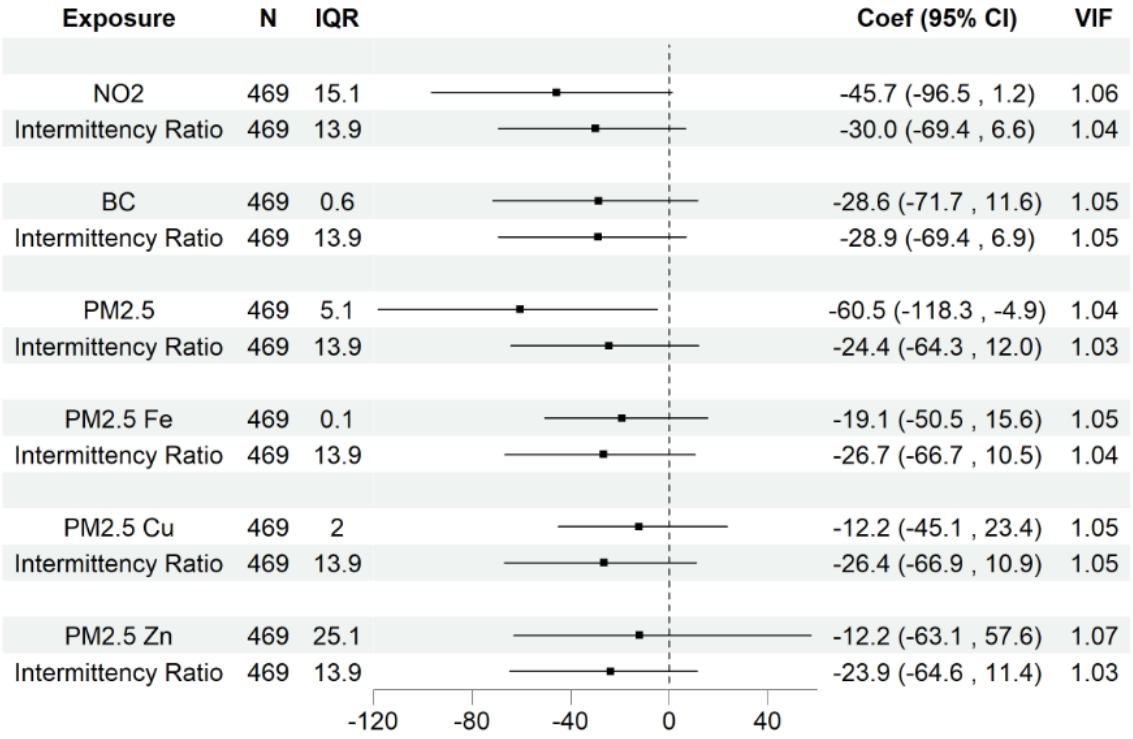
**Appendix 54.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for closing windows blinds.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

**Appendix 55.** Adjusted[a] change in birth weight (g) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for closing windows.

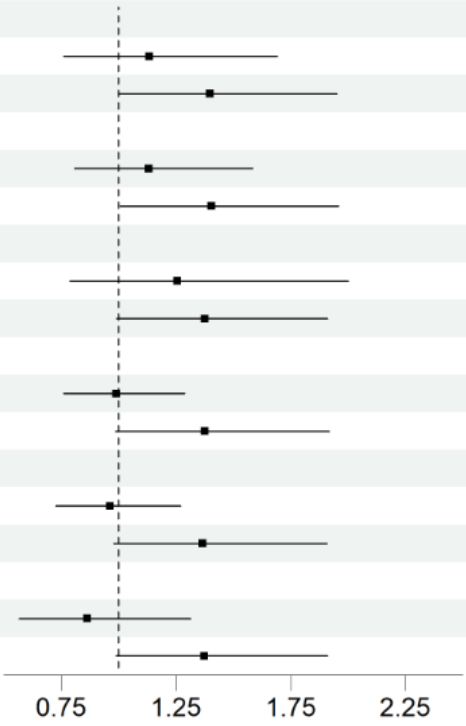



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), gestational age at delivery (continuous, day), history of low birth weight in previous pregnancies (categorical, yes/no), and sex of the neonate (girl vs. boy).

**Abbreviation:** VIF: Variance inflation factor.

**Appendix 56.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$),[b] black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for noise sensitivity.

| Exposure | N | IQR | OR (95% CI) | VIF |
|---|---|---|---|---|
| NO2 | 472 | 15.1 | 1.14 (0.76 , 1.69) | 1.09 |
| Intermittency Ratio | 472 | 13.9 | 1.40 (1.00 , 1.95) | 1.06 |
| BC | 472 | 0.6 | 1.13 (0.81 , 1.58) | 1.06 |
| Intermittency Ratio | 472 | 13.9 | 1.40 (1.01 , 1.96) | 1.06 |
| PM2.5 | 472 | 5.1 | 1.26 (0.79 , 2.00) | 1.05 |
| Intermittency Ratio | 472 | 13.9 | 1.38 (0.99 , 1.91) | 1.03 |
| PM2.5 Fe | 472 | 0.1 | 0.99 (0.76 , 1.29) | 1.06 |
| Intermittency Ratio | 472 | 13.9 | 1.38 (0.99 , 1.92) | 1.05 |
| PM2.5 Cu | 472 | 2 | 0.96 (0.73 , 1.27) | 1.05 |
| Intermittency Ratio | 472 | 13.9 | 1.37 (0.98 , 1.91) | 1.06 |
| PM2.5 Zn | 472 | 25.1 | 0.86 (0.57 , 1.31) | 1.15 |
| Intermittency Ratio | 472 | 13.9 | 1.37 (0.99 , 1.91) | 1.03 |

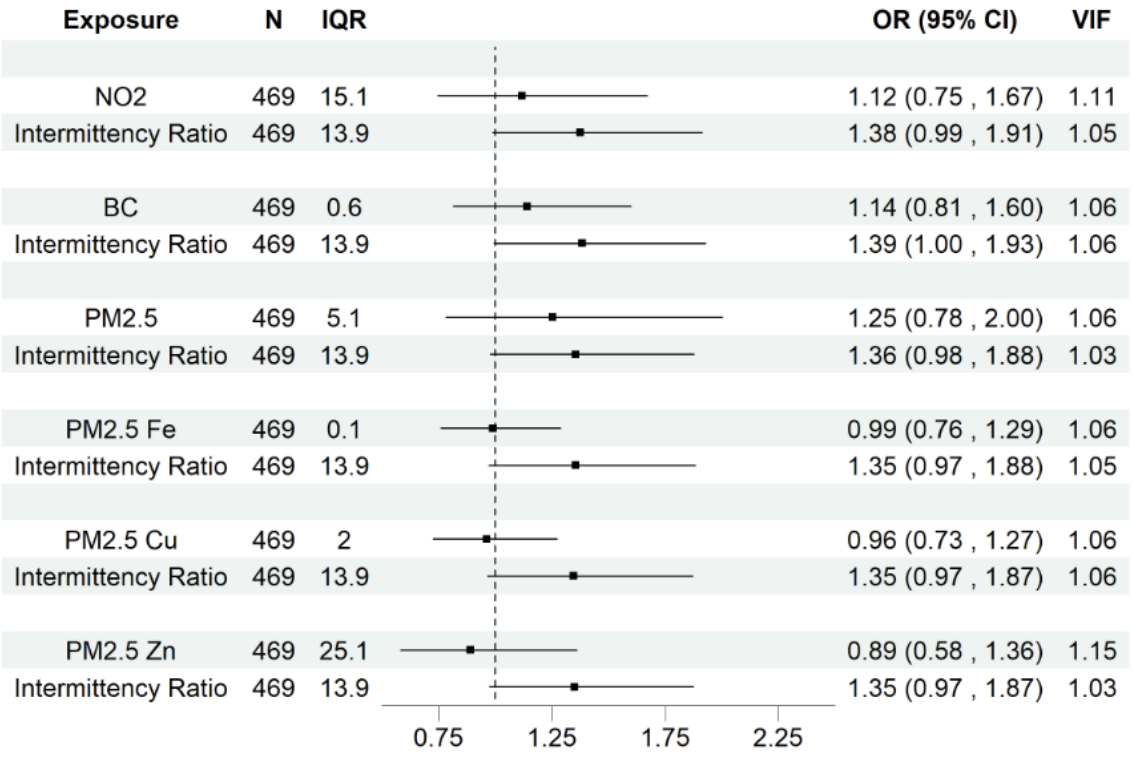



[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

[b]For model with $NO_2$, intermittency ratio lower CI > 1 at 3 decimals.

**Abbreviation:** VIF: Variance inflation factor.

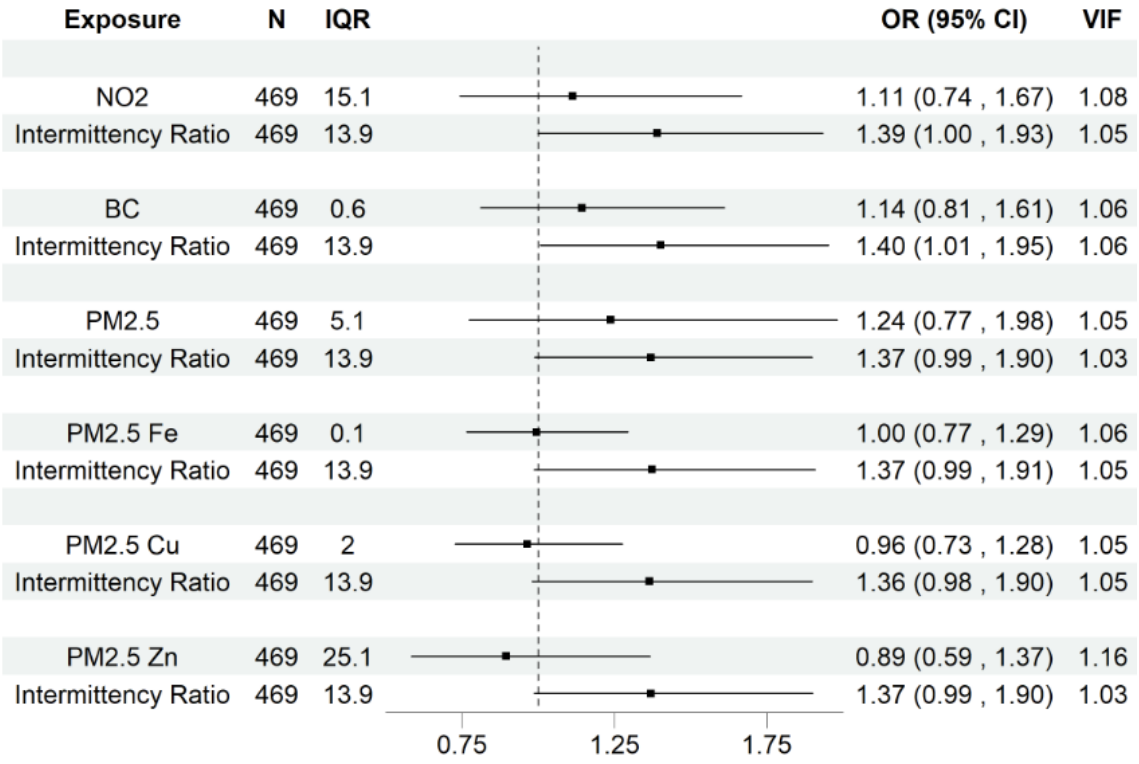
**Appendix 57.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for noise protection.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

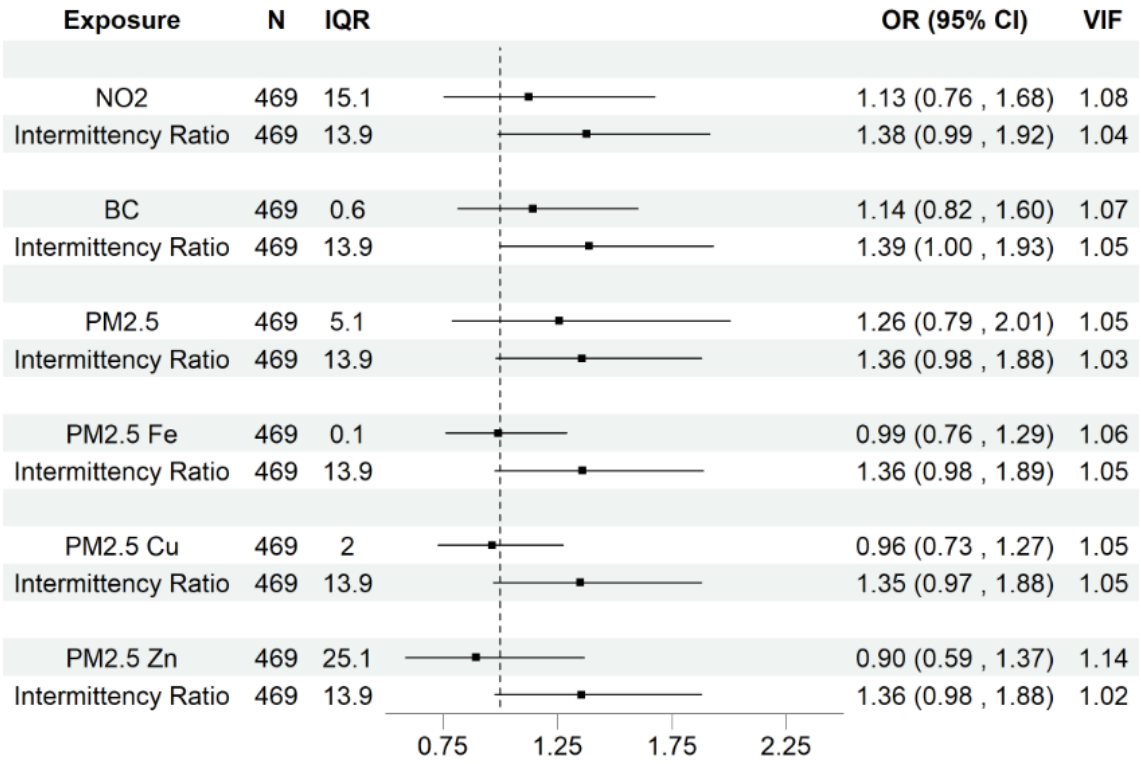
**Appendix 58.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for closing windows blinds.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

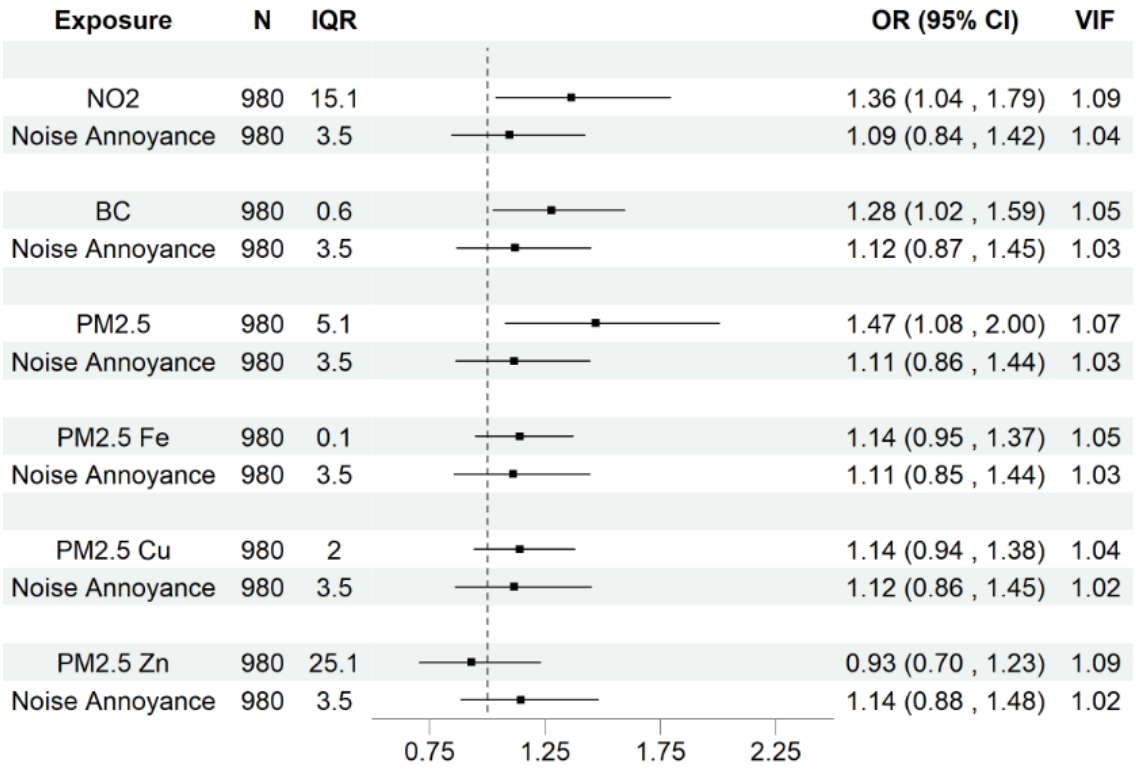
**Appendix 59.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise intermittency ratio in the two-pollutant models including air pollution and measured noise intermittency ratio (both at home-outdoor) further adjusted for closing windows.




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).

**Abbreviation:** VIF: Variance inflation factor.

**Appendix 60.** Adjusted[a] odds ratio (OR) of the small for gestational age (SGA) associated with one interquartile (IQR) increase exposure to $NO_2$ ($\mu g/m^3$), black carbon ($\mu g/m^3$), $PM_{2.5}$ ($\mu g/m^3$), $PM_{2.5}$ Cu content ($ng/m^3$), $PM_{2.5}$ Fe content ($\mu g/m^3$), and $PM_{2.5}$ Zn content ($ng/m^3$) and noise annoyance due to traffic in the two-pollutant models including air pollution and noise annoyance (both at home).




[a]Adjusted for maternal age (continuous, years), education level (categorical, university degree: yes/no), body mass index (BMI) at the first trimester (continuous, $kg/m^2$), parity (categorical, nulliparous: yes/no), active smoking during pregnancy (categorical, yes/no), exposure to environmental tobacco smoke (categorical, yes/no), alcohol consumption during pregnancy (categorical, yes/no), and history of low birth weight in previous pregnancies (categorical, yes/no).