

Table S1. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for air pollution exposure and the risk of GDM in co-pollutant models, 2018-2021.

	Adjusting for	Pre-pregnancy		First trimester		Second trimester	
		OR	95% (CI)	OR	95% (CI)	OR	95% (CI)
NO₂	+O ₃	0.92	(0.86~0.99)	0.97	(0.89~1.04)	1.04	(0.96~1.13)
	+PM ₁₀	0.95	(0.89~1.02)	0.96	(0.89~1.02)	0.98	(0.91~1.05)
	+PM _{2.5}	0.95	(0.89~1.01)	0.97	(0.91~1.03)	0.97	(0.91~1.03)
	+CO	0.94	(0.88~1.01)	0.99	(0.92~1.05)	0.97	(0.91~1.03)
	+SO ₂	0.96	(0.90~1.02)	1.01	(0.94~1.07)	0.97	(0.91~1.03)
O₃	+NO ₂	0.82	(0.70~0.96)	0.80	(0.65~0.98)	1.58	(1.16~2.14) **
	+PM ₁₀	0.85	(0.72~1.00)	0.99	(0.81~1.20)	1.41	(1.11~1.78) **
	+PM _{2.5}	0.88	(0.74~1.05)	1.04	(0.85~1.26)	1.43	(1.14~1.78) **
	+CO	0.92	(0.78~1.09)	0.90	(0.75~1.06)	1.44	(1.15~1.80) **
	+SO ₂	0.87	(0.76~1.01)	0.86	(0.73~1.01)	1.39	(1.11~1.74) **
PM₁₀	+NO ₂	1.05	(0.91~1.20)	1.24	(1.10~1.39) **	0.94	(0.79~1.11)
	+O ₃	0.95	(0.81~1.10)	1.20	(1.05~1.36) **	0.97	(0.83~1.13)
	+CO	0.95	(0.82~1.09)	1.17	(1.04~1.31)	0.90	(0.78~1.05)
	+SO ₂	1.04	(0.90~1.19)	1.24	(1.10~1.40) **	0.93	(0.80~1.08)
PM_{2.5}	+NO ₂	1.10	(0.96~1.27)	1.34	(1.17~1.55) ***	1.00	(0.78~1.26)

CO	+O ₃	1.02	(0.86~1.20)	1.34	(1.14~1.57) ***	0.99	(0.79~1.25)
	+SO ₂	1.11	(0.96~1.29)	1.38	(1.19~1.61) ***	0.98	(0.78~1.24)
SO₂	+NO ₂	1.10	(1.01~1.20)	1.11	(1.01~1.21)	1.00	(0.92~1.09)
	+O ₃	1.06	(0.97~1.17)	1.09	(0.99~1.20)	1.01	(0.93~1.10)
	+PM ₁₀	1.11	(1.01~1.22)	1.05	(0.95~1.16)	1.00	(0.92~1.08)
	+SO ₂	1.09	(1.01~1.19)	1.10	(1.01~1.20)	0.99	(0.91~1.07)
	+NO ₂	0.99	(0.93~1.05)	1.01	(0.95~1.07)	0.93	(0.87~0.99)
	+O ₃	0.99	(0.93~1.05)	1.00	(0.94~1.06)	0.94	(0.88~1.00)
	+PM ₁₀	0.98	(0.92~1.05)	0.95	(0.89~1.02)	0.93	(0.87~1.00)
	+PM _{2.5}	0.97	(0.91~1.04)	0.95	(0.89~1.01)	0.93	(0.87~0.99)
	+CO	0.98	(0.92~1.04)	1.00	(0.94~1.06)	0.92	(0.87~0.99)

Bonferroni corrections with significance ($p < 0.006$), ** $p < 0.006$, and *** $p < 0.001$.

Abbreviations: GDM, gestational diabetes mellitus; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide.

Model adjusted for maternal age, first-trimester BMI, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, the season of OGTT, temperature, and relative humidity.

Table S2. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for air pollution exposure and the risk of GDM-IFH in co-pollutant models, 2018-

2021.

	Adjusting for	Pre-pregnancy		First trimester		Second trimester	
		OR	95% (CI)	OR	95% (CI)	OR	95% (CI)
NO ₂							
	+O ₃	0.87	(0.70~1.07)	0.86	(0.70~1.07)	0.89	(0.71~1.12)
	+PM ₁₀	0.85	(0.70~1.04)	0.84	(0.70~1.02)	0.85	(0.70~1.03)
	+PM _{2.5}	0.87	(0.72~1.06)	0.86	(0.72~1.03)	0.88	(0.74~1.05)
	+CO	0.86	(0.71~1.05)	0.86	(0.71~1.04)	0.89	(0.74~1.06)
	+SO ₂	0.88	(0.73~1.07)	0.87	(0.73~1.04)	0.89	(0.75~1.06)
O ₃							
	+NO ₂	0.90	(0.56~1.44)	0.98	(0.55~1.74)	0.98	(0.41~2.35)
	+PM ₁₀	1.09	(0.69~1.71)	1.39	(0.76~2.55)	1.42	(0.71~2.84)
	+PM _{2.5}	1.11	(0.70~1.75)	1.38	(0.75~2.54)	1.35	(0.69~2.65)
	+CO	1.22	(0.76~1.93)	1.24	(0.72~2.15)	1.34	(0.68~2.66)
	+SO ₂	1.08	(0.71~1.65)	1.17	(0.71~1.93)	1.31	(0.67~2.55)
PM ₁₀							
	+NO ₂	1.09	(0.71~1.66)	1.14	(0.82~1.57)	1.38	(0.88~2.15)
	+O ₃	0.98	(0.63~1.51)	1.15	(0.79~1.66)	1.26	(0.82~1.93)
	+CO	0.87	(0.56~1.35)	1.04	(0.73~1.48)	1.19	(0.78~1.82)
	+SO ₂	1.07	(0.69~1.67)	1.13	(0.79~1.61)	1.20	(0.79~1.84)
PM _{2.5}							
	+NO ₂	1.05	(0.67~1.64)	1.08	(0.76~1.53)	1.26	(0.72~2.21)
	+O ₃	1.03	(0.64~1.67)	1.16	(0.75~1.78)	1.23	(0.70~2.16)

CO	+SO ₂	1.10	(0.68~1.77)	1.11	(0.75~1.64)	1.20	(0.67~2.12)
	+NO ₂	1.16	(0.90~1.51)	1.04	(0.79~1.36)	1.05	(0.82~1.33)
	+O ₃	1.16	(0.88~1.54)	1.03	(0.77~1.37)	1.04	(0.81~1.33)
	+PM ₁₀	1.15	(0.87~1.52)	0.96	(0.71~1.30)	1.00	(0.78~1.28)
	+SO ₂	1.15	(0.88~1.48)	1.00	(0.77~1.30)	1.01	(0.80~1.29)
SO₂	+NO ₂	0.89	(0.73~1.07)	0.94	(0.78~1.12)	0.99	(0.79~1.22)
	+O ₃	0.89	(0.73~1.07)	0.93	(0.78~1.12)	1.00	(0.80~1.23)
	+PM ₁₀	0.88	(0.71~1.08)	0.89	(0.72~1.09)	0.98	(0.77~1.21)
	+PM _{2.5}	0.88	(0.72~1.07)	0.90	(0.74~1.10)	0.98	(0.78~1.21)
	+CO	0.88	(0.72~1.06)	0.92	(0.77~1.11)	0.99	(0.79~1.22)

Bonferroni corrections with significance ($p < 0.006$), ** $p < 0.006$, and *** $p < 0.001$.

Abbreviations: GDM-IFH, GDM with isolated fasting hyperglycaemia; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide.

Model adjusted for maternal age, first-trimester BMI, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, the season of OGTT, temperature, and relative humidity.

Table S3. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for air pollution exposure and the risk of GDM-IPH in co-pollutant models, 2018-2021.

	Pre-pregnancy	First trimester	Second trimester
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	Adjusting for	OR	95% (CI)	OR	95% (CI)	OR	95% (CI)
NO₂	+O ₃	0.98	(0.90~1.06)	1.02	(0.93~1.11)	1.17	(1.07~1.29) **
	+PM ₁₀	1.02	(0.94~1.11)	1.03	(0.95~1.12)	1.08	(0.99~1.17)
	+PM _{2.5}	1.02	(0.95~1.10)	1.04	(0.96~1.12)	1.04	(0.97~1.12)
	+CO	1.02	(0.94~1.10)	1.06	(0.98~1.14)	1.03	(0.96~1.11)
	+SO ₂	1.04	(0.96~1.12)	1.08	(1.00~1.16)	1.03	(0.96~1.11)
O₃	+NO ₂	0.75	(0.62~0.90) **	0.76	(0.61~0.95)	2.05	(1.44~2.91) ***
	+PM ₁₀	0.74	(0.61~0.89) **	0.85	(0.67~1.09)	1.35	(1.03~1.77)
	+PM _{2.5}	0.76	(0.62~0.93)	0.89	(0.69~1.13)	1.38	(1.06~1.79)
	+CO	0.79	(0.65~0.95)	0.77	(0.63~0.96)	1.41	(1.08~1.83)
	+SO ₂	0.76	(0.64~0.90) **	0.73	(0.60~0.89) **	1.32	(1.02~1.72)
PM₁₀	+NO ₂	1.07	(0.91~1.24)	1.21	(1.05~1.38)	0.82	(0.67~1.01)
	+O ₃	0.95	(0.80~1.12)	1.16	(1.00~1.35)	0.96	(0.80~1.15)
	+CO	1.00	(0.85~1.18)	1.19	(1.04~1.37)	0.89	(0.75~1.07)
	+SO ₂	1.10	(0.93~1.29)	1.29	(1.12~1.49) **	0.95	(0.80~1.13)
PM_{2.5}	+NO ₂	1.15	(0.99~1.35)	1.35	(1.15~1.59) ***	0.84	(0.67~1.06)
	+O ₃	1.01	(0.84~1.22)	1.31	(1.09~1.57) **	0.89	(0.71~1.11)
	+SO ₂	1.18	(1.00~1.40)	1.46	(1.22~1.74) ***	0.90	(0.72~1.13)

CO							
	+NO ₂	1.11	(1.00~1.22)	1.11	(1.00~1.24)	1.02	(0.92~1.12)
	+O ₃	1.04	(0.93~1.16)	1.09	(0.97~1.21)	1.04	(0.95~1.15)
	+PM ₁₀	1.11	(1.00~1.24)	1.07	(0.95~1.20)	1.03	(0.94~1.14)
	+SO ₂	1.12	(1.01~1.23)	1.13	(1.02~1.26)	1.01	(0.92~1.11)
SO₂							
	+NO ₂	1.01	(0.94~1.08)	1.01	(0.95~1.09)	0.87	(0.81~0.94) **
	+O ₃	1.00	(0.93~1.07)	1.00	(0.94~1.08)	0.88	(0.81~0.95) **
	+PM ₁₀	0.99	(0.91~1.07)	0.95	(0.88~1.03)	0.88	(0.81~0.95) **
	+PM _{2.5}	0.98	(0.91~1.06)	0.95	(0.88~1.03)	0.87	(0.81~0.94) **
	+CO	0.99	(0.93~1.07)	1.01	(0.94~1.08)	0.87	(0.81~0.94) **

Bonferroni corrections with significance ($p < 0.006$), ** $p < 0.006$, and *** $p < 0.001$.

Abbreviations: GDM-IPH, GDM with isolated post-load hyperglycemia; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide.

Model adjusted for maternal age, first-trimester BMI, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, the season of OGTT, temperature, and relative humidity.

Table S4. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for air pollution exposure and the risk of GDM-CH in co-pollutant models, 2018-

2021.

	Adjusting for	Pre-pregnancy		First trimester		Second trimester	
		OR	95% (CI)	OR	95% (CI)	OR	95% (CI)
NO ₂							
	+O ₃	0.97	(0.80~1.17)	1.00	(0.83~1.21)	0.86	(0.70~1.05)
	+PM ₁₀	1.00	(0.83~1.20)	1.00	(0.84~1.20)	0.93	(0.78~1.10)
	+PM _{2.5}	0.97	(0.82~1.15)	0.98	(0.83~1.16)	0.91	(0.78~1.07)
	+CO	0.97	(0.82~1.14)	0.97	(0.82~1.15)	0.94	(0.80~1.09)
	+SO ₂	0.96	(0.81~1.13)	0.97	(0.82~1.14)	0.92	(0.79~1.07)
O ₃							
	+NO ₂	1.06	(0.71~1.60)	1.22	(0.76~1.94)	0.67	(0.31~1.45)
	+PM ₁₀	0.98	(0.66~1.47)	1.06	(0.64~1.76)	0.90	(0.48~1.69)
	+PM _{2.5}	1.02	(0.68~1.52)	1.11	(0.67~1.83)	0.98	(0.54~1.80)
	+CO	1.05	(0.70~1.58)	1.19	(0.77~1.85)	0.90	(0.49~1.63)
	+SO ₂	1.09	(0.76~1.56)	1.18	(0.79~1.77)	1.04	(0.57~1.89)
PM ₁₀							
	+NO ₂	0.79	(0.55~1.15)	0.85	(0.64~1.13)	0.95	(0.63~1.42)
	+O ₃	0.78	(0.53~1.15)	0.87	(0.63~1.21)	0.86	(0.59~1.25)
	+CO	0.79	(0.53~1.17)	0.84	(0.62~1.14)	0.93	(0.65~1.35)
	+SO ₂	0.80	(0.55~1.17)	0.86	(0.64~1.16)	0.82	(0.57~1.19)
PM _{2.5}							
	+NO ₂	0.84	(0.57~1.22)	0.86	(0.64~1.17)	1.12	(0.68~1.83)

CO	+O ₃	0.83	(0.55~1.26)	0.90	(0.62~1.30)	1.06	(0.65~1.75)
	+SO ₂	0.85	(0.57~1.27)	0.88	(0.63~1.22)	1.02	(0.62~1.68)
	+NO ₂	0.94	(0.74~1.18)	0.95	(0.75~1.20)	0.87	(0.70~1.08)
	+O ₃	0.94	(0.73~1.22)	0.98	(0.76~1.26)	0.85	(0.68~1.05)
SO₂	+PM ₁₀	1.00	(0.78~1.29)	1.02	(0.78~1.33)	0.86	(0.69~1.07)
	+SO ₂	0.94	(0.75~1.18)	0.95	(0.75~1.20)	0.86	(0.69~1.07)
	+NO ₂	0.94	(0.80~1.11)	0.95	(0.81~1.11)	1.13	(0.95~1.34)
	+O ₃	0.94	(0.80~1.11)	0.96	(0.82~1.12)	1.13	(0.95~1.35)
	+PM ₁₀	0.99	(0.82~1.18)	0.99	(0.83~1.19)	1.15	(0.96~1.37)
	+PM _{2.5}	0.97	(0.81~1.15)	0.97	(0.82~1.16)	1.13	(0.94~1.34)
	+CO	0.95	(0.80~1.12)	0.95	(0.81~1.11)	1.12	(0.94~1.33)

Bonferroni corrections with significance ($p < 0.006$), ** $p < 0.006$, and *** $p < 0.001$.

Abbreviations: GDM-CH, GDM with combined hyperglycemia; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide.

Model adjusted for maternal age, first-trimester BMI, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, the season of OGTT, temperature, and relative humidity.

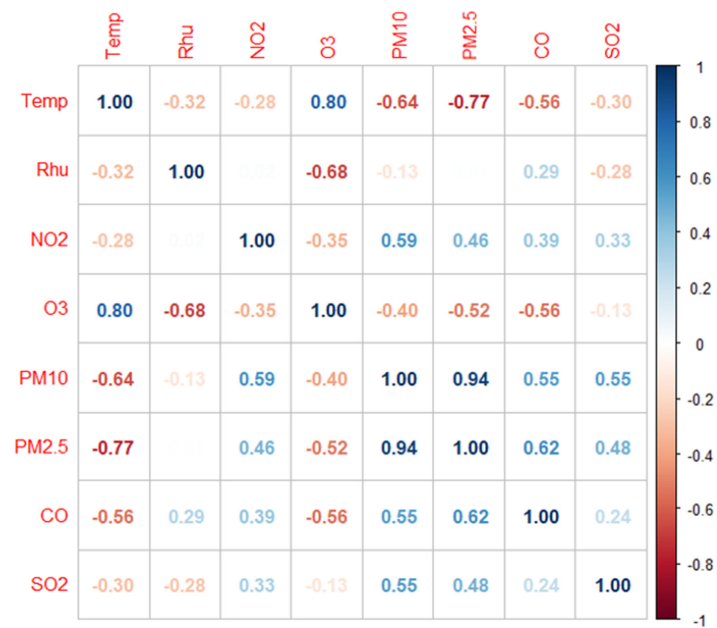


Figure S1. Spearman's correlation analysis of specific gestational pollutants and meteorological factors.

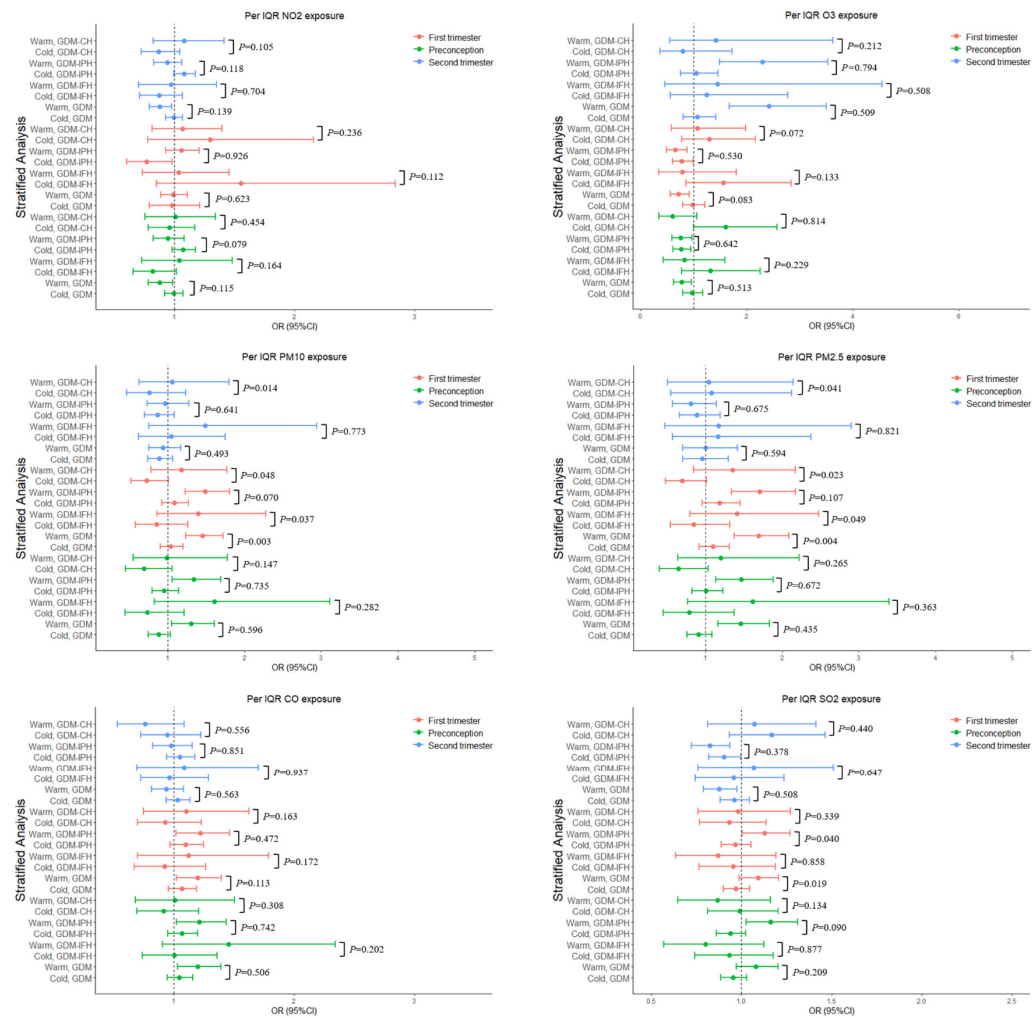


Figure S2. Modification for the potential effects of air pollution exposure in association with GDM subgroups according to cold and warm seasons. *P*-value is

shown for interaction. Abbreviations: GDM, gestational diabetes mellitus; GDM-IFH, GDM with isolated fasting hyperglycemia; GDM-IPH, GDM with isolated post-load hyperglycemia; GDM-CH, GDM with combined hyperglycemia; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide; IQR, interquartile range.

Model adjusted for maternal age, first-trimester BMI, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, temperature, and relative humidity.



Figure S3. Modification for the potential effects of air pollution exposure in association with GDM subgroups according to maternal age. *P*-value is shown for interaction. Abbreviations: GDM, gestational diabetes mellitus; GDM-IFH, GDM with isolated fasting hyperglycemia; GDM-IPH, GDM with isolated post-load hyperglycemia; GDM-CH, GDM with combined hyperglycemia; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide; IQR, interquartile range.

Model adjusted for first-trimester BMI, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, the season of OGTT, temperature, and relative humidity.

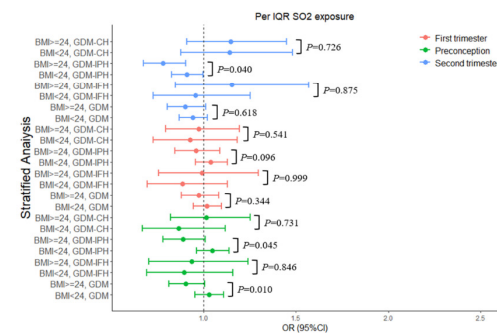
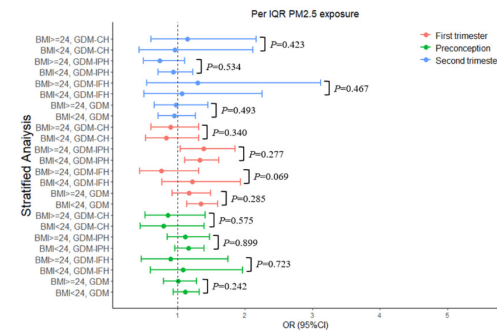
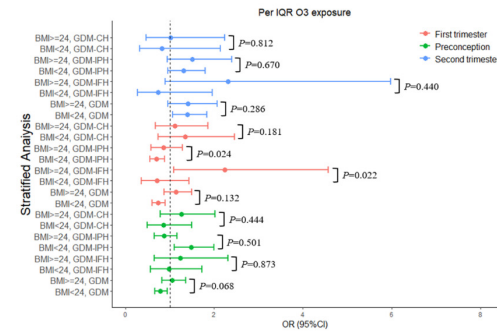


Figure S4. Modification for the potential effects of air pollution exposure in association with GDM subgroups according to BMI in the first trimester. *P* value for interaction.

Abbreviations: GDM, gestational diabetes mellitus; GDM-IFH, GDM with isolated fasting hyperglycemia; GDM-IPH, GDM with isolated post-load hyperglycemia; GDM-CH, GDM with combined hyperglycemia; NO₂, nitrogen dioxide; O₃, ozone; PM₁₀, inhalable particulate matter; PM_{2.5}, fine particulate matter; CO, carbon monoxide; SO₂, sulfur dioxide; IQR, interquartile range.

Model adjusted for maternal age, gravidity, parity, tobacco, alcohol, folic acid, assisted reproduction, macrosomia, multiple pregnancies, the season of OGTT, temperature, and relative humidity.