

## Supplementary Tables and Figures

**Supplementary Table 1. Associations of maternal overweight or obesity and smoking on child's SGA/LGA risks.**

Maternal OWO status	Smoking status	N (total = 2351)	Number of SGA children (%)	OR(95%CI)	Number of LGA children (%)	OR(95%CI)
Individual associations						
nonOWO		1109(0.47)	180(0.16)	Referent	78(0.07)	Referent
OWO		1242(0.53)	114(0.09)	0.60(0.46-0.77)	150(0.121)	1.52(1.13-2.05)
	non-smoking	1930(0.82)	213(0.11)	Referent	198(0.10)	Referent
	quit-smoking	188(0.08)	18(0.10)	0.79(0.47-1.33)	16(0.085)	0.82(0.48-1.42)
	continuous-smoking	233(0.10)	63(0.27)	3.39(2.35-4.90)	14(0.060)	0.68(0.37-1.23)
	BMI/IQR	2351(1.00)	294(0.13)	0.75(0.63-0.89)	228(0.097)	1.36(1.18-1.57)
Joint associations						
nonOWO	non-smoking	927(0.39)	129(0.14)	Referent	68(0.07)	Referent
nonOWO	quit-smoking	75(0.03)	12(0.16)	1.10(0.56-2.13)	5(0.067)	0.95(0.36-2.48)
nonOWO	continuous-smoking	107(0.05)	39(0.36)	4.30(2.62-7.04)	5(0.047)	0.86(0.32-2.28)
OWO	non-smoking	1003(0.43)	84(0.08)	0.67(0.50-0.91)	130(0.130)	1.61(1.17-2.22)
OWO	quit-smoking	113(0.05)	6(0.05)	0.38(0.16-0.89)	11(0.097)	1.17(0.59-2.31)
OWO	continuous-smoking	126(0.05)	24(0.19)	1.84(1.10-3.08)	9(0.071)	0.95(0.45-2.01)
p for interaction (OWO*smoking)			0.224		0.647	

Notes: All samples are considered. SGA and LGA samples are compared to AGA. Models were adjusted for maternal age at delivery, race, education, parity, perceived stress during pregnancy, child age, breastfeeding, gestational or preexisting diabetes.

**Supplementary Table 2. Maternal overweight or obesity and smoking associations on child's overweight or obesity, stratified by sex.**

Maternal OWO status	Smoking status	Number of female children (total =1174)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		553(0.47)	86(0.16)	Referent	90(0.16)	Referent
OWO		621(0.53)	109(0.18)	1.68(1.20-2.35)	238(0.383)	3.52(2.61-4.75)
	non-smoking	969(0.83)	167(0.17)	Referent	261(0.27)	Referent
	quit-smoking	94(0.08)	14(0.15)	0.95(0.50-1.78)	31(0.330)	1.27(0.78-2.06)
	continuous-smoking	111(0.09)	14(0.13)	0.71(0.37-1.36)	36(0.324)	1.16(0.72-1.87)
	BMI/IQR	1174(1.00)	195(0.17)	1.45(1.17-1.79)	328(0.279)	2.20(1.85-2.62)
Joint associations						
nonOWO	non-smoking	474(0.40)	74(0.16)	Referent	76(0.16)	Referent
nonOWO	quit-smoking	33(0.03)	3(0.09)	0.53(0.15-1.84)	7(0.212)	1.15(0.47-2.82)
nonOWO	continuous-smoking	46(0.04)	9(0.20)	1.25(0.54-2.88)	7(0.152)	1.00(0.41-2.44)
OWO	non-smoking	495(0.42)	93(0.19)	1.77(1.23-2.56)	185(0.374)	3.50(2.52-4.87)
OWO	quit-smoking	61(0.05)	11(0.18)	1.89(0.88-4.05)	24(0.393)	3.84(2.06-7.15)
OWO	continuous-smoking	65(0.06)	5(0.08)	0.67(0.25-1.84)	29(0.446)	3.75(2.05-6.85)
p for interaction (OWO*smoking)			0.347		0.935	

Maternal OWO status	Smoking status	Number of male children (total = 1177)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		556(0.47)	90(0.16)	Referent	111(0.20)	Referent
OWO		621(0.53)	115(0.19)	1.54(1.11-2.14)	223(0.359)	2.65(1.98-3.54)
	non-smoking	961(0.82)	164(0.17)	Referent	266(0.28)	Referent
	quit-smoking	94(0.08)	13(0.14)	0.82(0.42-1.59)	30(0.319)	1.17(0.72-1.91)
	continuous-smoking	122(0.10)	28(0.23)	1.87(1.10-3.18)	38(0.311)	1.40(0.87-2.26)
	BMI/IQR	1177(1.00)	205(0.17)	1.49(1.19-1.86)	334(0.284)	2.27(1.88-2.74)
Joint associations						

nonOWO	non-smoking	453(0.38)	70(0.15)	Referent	89(0.20)	Referent
nonOWO	quit-smoking	42(0.04)	5(0.12)	0.84(0.31-2.29)	8(0.190)	0.89(0.39-2.05)
nonOWO	continuous-smoking	61(0.05)	15(0.25)	2.44(1.18-5.03)	14(0.230)	1.50(0.73-3.08)
OWO	non-smoking	508(0.43)	94(0.19)	1.66(1.15-2.39)	177(0.348)	2.59(1.88-3.57)
OWO	quit-smoking	52(0.04)	8(0.15)	1.38(0.57-3.37)	22(0.423)	3.48(1.80-6.73)
OWO	continuous-smoking	61(0.05)	13(0.21)	2.51(1.19-5.32)	24(0.393)	3.61(1.90-6.86)
p for interaction (OWO*smoking)			0.993		0.44	

Notes: Models were adjusted for maternal age at delivery, race, education, parity, perceived stress during pregnancy, child age, breastfeeding, gestational or preexisting diabetes.

**Supplementary Table 3. Maternal overweight or obesity and smoking associations on child's overweight or obesity, stratified by term/preterm.**

Maternal OWO status	Smoking status	Number of term-birth children (total = 1708)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		825(0.48)	134(0.16)	Referent	150(0.18)	Referent
OWO		883(0.52)	172(0.19)	1.72(1.31-2.26)	330(0.374)	3.11(2.44-3.96)
	non-smoking	1445(0.85)	261(0.18)	Referent	393(0.27)	Referent
	quit-smoking	115(0.07)	15(0.13)	0.86(0.47-1.57)	44(0.383)	1.57(1.03-2.41)
	continuous-smoking	148(0.09)	30(0.20)	1.24(0.77-2.00)	43(0.291)	1.12(0.74-1.71)
Joint associations						
nonOWO	non-smoking	718(0.42)	114(0.16)	Referent	129(0.18)	Referent
nonOWO	quit-smoking	40(0.02)	4(0.10)	0.69(0.23-2.05)	10(0.250)	1.34(0.62-2.90)
nonOWO	continuous-smoking	67(0.04)	16(0.24)	1.67(0.87-3.20)	11(0.164)	1.00(0.48-2.06)
OWO	non-smoking	727(0.43)	147(0.20)	1.82(1.36-2.44)	264(0.363)	3.04(2.34-3.96)
OWO	quit-smoking	75(0.04)	11(0.15)	1.52(0.73-3.15)	34(0.453)	4.10(2.39-7.02)
OWO	continuous-smoking	81(0.05)	14(0.17)	1.71(0.86-3.36)	32(0.395)	3.37(1.96-5.81)
p for interaction (OWO*smoking)		0.782		0.994		

Maternal OWO status	Smoking status	Number of preterm-birth children (total=643)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		284(0.44)	42(0.15)	Referent	51(0.18)	Referent
OWO		359(0.56)	52(0.14)	1.28(0.80-2.07)	131(0.365)	2.83(1.89-4.24)
	non-smoking	485(0.75)	70(0.14)	Referent	134(0.28)	Referent
	quit-smoking	73(0.11)	12(0.16)	1.06(0.53-2.16)	17(0.233)	0.82(0.45-1.52)
	continuous-smoking	85(0.13)	12(0.14)	1.32(0.62-2.82)	31(0.365)	1.72(0.97-3.06)
Joint associations						
nonOWO	non-smoking	209(0.33)	30(0.14)	Referent	36(0.17)	Referent
nonOWO	quit-smoking	35(0.05)	4(0.11)	0.75(0.24-2.35)	5(0.143)	0.82(0.29-2.32)
nonOWO	continuous-smoking	40(0.06)	8(0.20)	2.24(0.83-6.03)	10(0.250)	2.27(0.91-5.61)
OWO	non-smoking	276(0.43)	40(0.14)	1.38(0.79-2.40)	98(0.355)	2.98(1.86-4.79)
OWO	quit-smoking	38(0.06)	8(0.21)	2.00(0.77-5.17)	12(0.316)	2.77(1.19-6.44)
OWO	continuous-smoking	45(0.07)	4(0.09)	1.01(0.31-3.28)	21(0.467)	4.43(2.06-9.54)
p for interaction (OWO*smoking)		0.378		0.845		

Notes: Models were adjusted for maternal age at delivery, race, education, parity, perceived stress during pregnancy, child age, breastfeeding, gestational or preexisting diabetes.

**Supplementary Table 4. Maternal overweight or obesity and smoking associations on child's overweight or obesity<sup>a</sup>.**

Maternal OWO status	Smoking status	Number of children (total = 2351)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		1109(0.47)	176(0.16)	Referent	201(0.18)	Referent
OWO		1242(0.53)	224(0.18)	1.59(1.26-2.01)	461(0.371)	2.87(2.33-3.54)
	non-smoking	1930(0.82)	331(0.17)	Referent	527(0.27)	Referent

	quit-smoking	188(0.08)	27(0.14)	0.90(0.57-1.41)	61(0.324)	1.25(0.88-1.77)
	continuous-smoking	233(0.10)	42(0.18)	1.26(0.84-1.89)	74(0.318)	1.54(1.09-2.17)
Joint associations						
nonOWO	non-smoking	927(0.39)	144(0.16)	Referent	165(0.18)	Referent
nonOWO	quit-smoking	75(0.03)	8(0.11)	0.69(0.32-1.49)	15(0.200)	1.05(0.57-1.94)
nonOWO	continuous-smoking	107(0.05)	24(0.22)	1.81(1.04-3.12)	21(0.196)	1.57(0.89-2.75)
OWO	non-smoking	1003(0.43)	187(0.19)	1.68(1.30-2.17)	362(0.361)	2.85(2.26-3.59)
OWO	quit-smoking	113(0.05)	19(0.17)	1.66(0.94-2.95)	46(0.407)	3.50(2.22-5.50)
OWO	continuous-smoking	126(0.05)	18(0.14)	1.47(0.82-2.64)	53(0.421)	4.01(2.58-6.25)
p for interaction (OWO*smoking)			0.448		0.688	

<sup>a</sup> These results are obtained from models that were further adjusted for fetal growth restriction.

Notes: IQR, interquartile range. Models were adjusted for maternal age at delivery, race, education, parity, perceived stress during pregnancy, child age, breastfeeding, gestational or preexisting diabetes, fetal growth restriction.

**Supplementary Table 5. Associations of maternal overweight or obesity and plasma cotinine levels on child's overweight or obesity.**

Maternal OWO status	Cotinine	Number of male children (total = 660)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		307(0.47)	40(0.13)	Referent	64(0.21)	Referent
OWO		353(0.53)	54(0.15)	1.58(0.98-2.54)	129(0.365)	2.43(1.65-3.56)
	Q1	164(0.25)	25(0.15)	Referent	41(0.25)	Referent
	Q2	160(0.24)	19(0.12)	0.75(0.38-1.50)	44(0.275)	0.98(0.58-1.68)
	Q3	161(0.24)	18(0.11)	0.74(0.37-1.48)	49(0.304)	1.21(0.72-2.04)
	Q4	175(0.27)	32(0.18)	1.89(0.98-3.66)	59(0.337)	1.78(1.03-3.06)
	continuous cotinine	660(1.00)	94(0.14)	1.35(1.05-1.75)	193(0.292)	1.26(1.04-1.54)
Joint associations						
nonOWO	Q1-3	227(0.34)	24(0.11)	Referent	47(0.21)	Referent
nonOWO	Q4	80(0.12)	16(0.20)	2.87(1.34-6.15)	17(0.212)	1.24(0.63-2.45)
OWO	Q1-3	258(0.39)	38(0.15)	1.81(1.01-3.25)	87(0.337)	2.13(1.36-3.32)
OWO	Q4	95(0.14)	16(0.17)	3.44(1.59-7.43)	42(0.442)	4.12(2.29-7.42)

Maternal OWO status	Cotinine	Number of female children (total = 655)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		302(0.46)	51(0.17)	Referent	53(0.18)	Referent
OWO		353(0.54)	63(0.18)	1.51(0.96-2.35)	135(0.382)	3.09(2.07-4.60)
	Q1	167(0.25)	32(0.19)	Referent	44(0.26)	Referent
	Q2	168(0.26)	25(0.15)	0.70(0.38-1.29)	49(0.292)	0.99(0.59-1.66)
	Q3	166(0.25)	28(0.17)	0.83(0.45-1.51)	46(0.277)	0.96(0.57-1.61)
	Q4	154(0.24)	29(0.19)	1.04(0.55-1.95)	49(0.318)	1.21(0.70-2.10)
	continuous cotinine	655(1.00)	114(0.17)	0.94(0.74-1.19)	188(0.287)	1.03(0.85-1.26)
Joint associations						
nonOWO	Q1-3	241(0.37)	41(0.17)	Referent	40(0.17)	Referent
nonOWO	Q4	61(0.09)	10(0.16)	0.96(0.43-2.17)	13(0.213)	1.31(0.62-2.78)
OWO	Q1-3	260(0.40)	44(0.17)	1.36(0.82-2.27)	99(0.381)	3.18(2.02-5.02)
OWO	Q4	93(0.14)	19(0.20)	1.92(0.96-3.86)	36(0.387)	3.59(1.94-6.65)

Notes: Models were adjusted for maternal age at delivery, race, education, parity, perceived stress during pregnancy, child age, breastfeeding, gestational or preexisting diabetes.

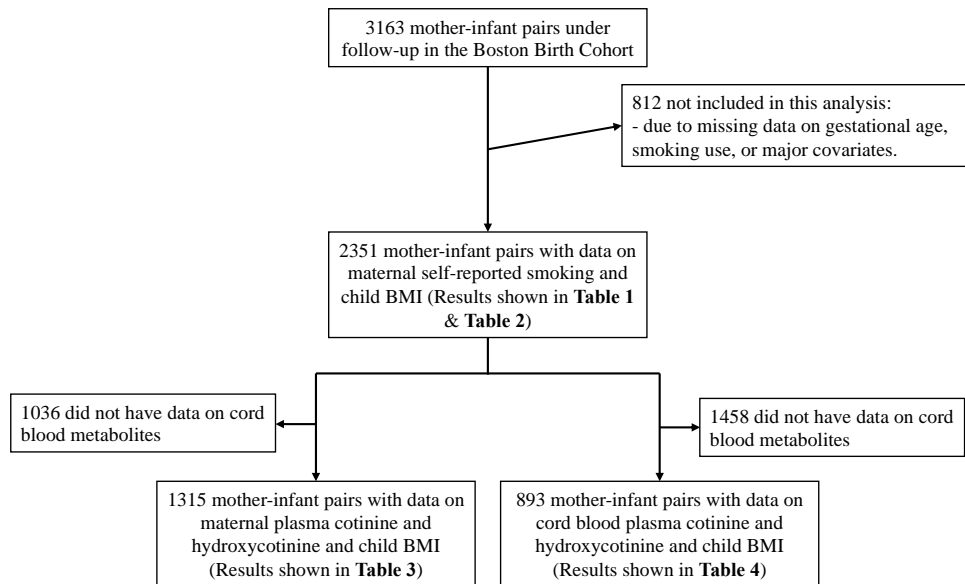
**Supplementary Table 6. Maternal overweight or obesity and cord blood cotinine levels associations on child's overweight or obesity.**

Maternal OWO status	Cotinine	Number of male children (total = 484)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		225(0.46)	34(0.15)	Referent	50(0.22)	Referent
OWO		259(0.54)	44(0.17)	1.47(0.86-2.52)	91(0.351)	2.13(1.35-3.35)

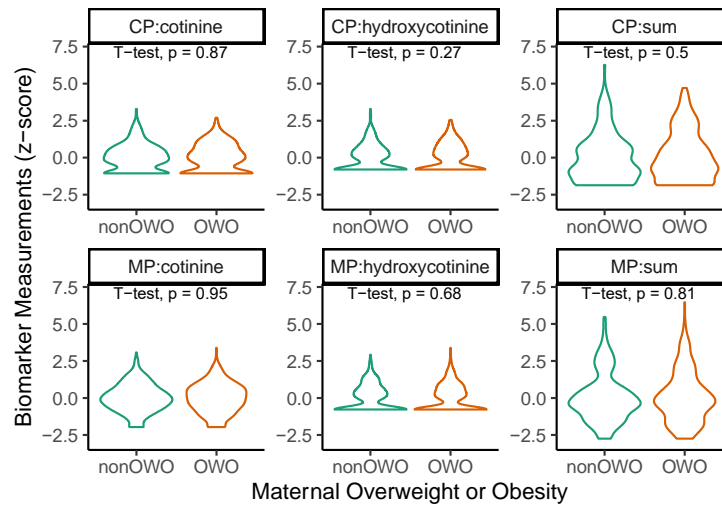
	Q1	133(0.27)	21(0.16)	Referent	39(0.29)	Referent
	Q2	104(0.21)	25(0.24)	1.57(0.78-3.15)	22(0.212)	0.80(0.42-1.53)
	Q3	118(0.24)	11(0.09)	0.60(0.26-1.38)	39(0.331)	1.09(0.60-1.96)
	Q4	129(0.27)	21(0.16)	1.34(0.63-2.84)	41(0.318)	1.27(0.69-2.31)
	continuous cotinine	484(1.00)	78(0.16)	1.06(0.78-1.43)	141(0.291)	1.10(0.86-1.40)
Joint associations						
nonOWO	Q1-3	161(0.33)	23(0.14)	Referent	34(0.21)	Referent
nonOWO	Q4	64(0.13)	11(0.17)	1.80(0.75-4.34)	16(0.250)	1.43(0.67-3.06)
OWO	Q1-3	194(0.40)	34(0.18)	1.73(0.92-3.23)	66(0.340)	2.24(1.32-3.79)
OWO	Q4	65(0.13)	10(0.15)	1.76(0.71-4.34)	25(0.385)	2.73(1.34-5.57)

Maternal OWO status	Cotinine	Number of female children (total = 409)	Number of overweight children (%)	OR(95%CI)	Number of obese children (%)	OR(95%CI)
Individual associations						
nonOWO		196(0.48)	33(0.17)	Referent	33(0.17)	Referent
OWO		213(0.52)	49(0.23)	2.48(1.43-4.29)	82(0.385)	3.90(2.34-6.50)
	Q1	106(0.26)	20(0.19)	Referent	31(0.29)	Referent
	Q2	104(0.25)	23(0.22)	1.07(0.52-2.22)	23(0.221)	0.66(0.34-1.30)
	Q3	105(0.26)	21(0.20)	0.94(0.45-1.95)	25(0.238)	0.72(0.37-1.39)
	Q4	94(0.23)	18(0.19)	1.22(0.53-2.78)	36(0.383)	1.25(0.62-2.49)
	continuous cotinine	409(1.00)	82(0.20)	1.12(0.81-1.54)	115(0.281)	1.03(0.78-1.36)
Joint associations						
nonOWO	Q1-3	164(0.40)	24(0.15)	Referent	25(0.15)	Referent
nonOWO	Q4	32(0.08)	9(0.28)	3.09(1.12-8.54)	8(0.250)	1.96(0.71-5.43)
OWO	Q1-3	151(0.37)	40(0.26)	3.53(1.90-6.59)	54(0.358)	4.35(2.41-7.83)
OWO	Q4	62(0.15)	9(0.15)	1.83(0.71-4.75)	28(0.452)	4.43(2.07-9.47)

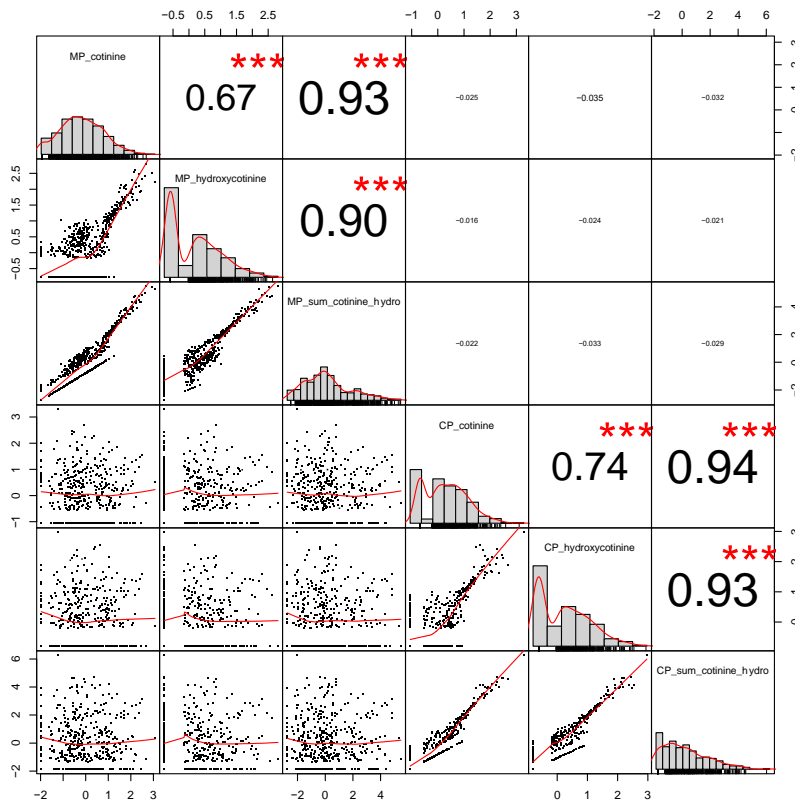
Notes: Models were adjusted for maternal age at delivery, race, education, parity, perceived stress during pregnancy, child age, breastfeeding, gestational or preexisting diabetes.



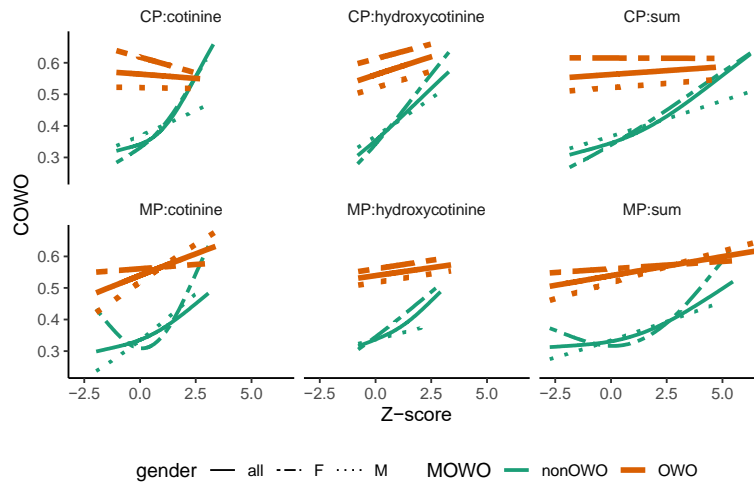
Supplementary Figure 1. Flowchart of the participant selection process for the analysis.



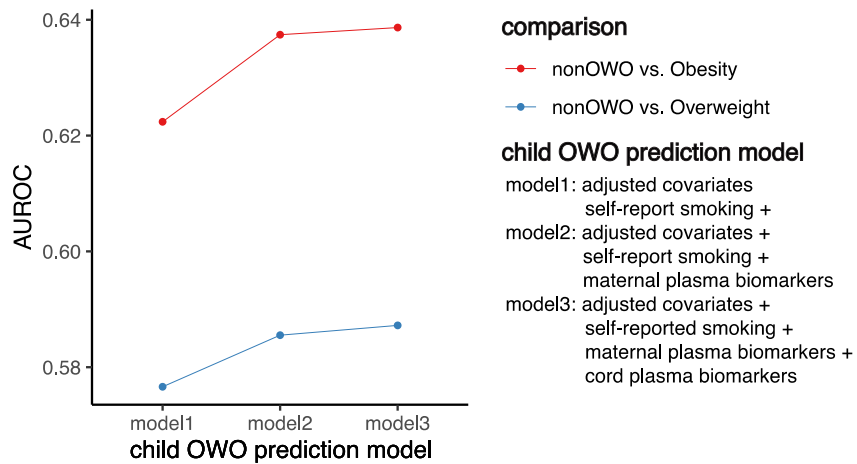
**Supplementary Figure 2. Distribution of cotinine, hydroxycotinine, and their sum in maternal plasma (MP) and cord plasma (CP).**



**Supplementary Figure 3. Maternal plasma vs cord plasma biomarkers (cotinine, hydroxycotinine, and sum) loess correlation plot.** Scatterplots show the bivariate z-scores with a red fitted curve. Absolute values of the correlations are starred by the cor.test. (MP: maternal plasma. CP: cord plasma. Sum\_cotinine\_hydro: the sum of cotinine and hydroxycotinine.)



**Supplementary Figure 4. Sex difference of the effects of smoking biomarkers on child’s overweight or obesity risk.** MP, maternal plasma; CP, cord plasma; sum, sum of cotinine and hydroxycotinine; all, all samples; F, female; M, male.



**Supplementary Figure 5. Child’s overweight or obesity prediction performance in three nested models.** All of model1, model2, and model3 are adjusted with pertinent covariates, except that model1 only include self-reported smoking, model2 is based on model1 but add maternal plasma biomarker measurements (cotinine, hydroxycotinine), and model3 is based on model2 but add cord plasma biomarker measurements (cotinine, hydroxycotinine). AUROC = Area Under Receiver Operating Characteristic.