

Ambient volatile organic compounds and racial/ethnic disparities in gestational diabetes mellitus: Are Asian/Pacific Islander women at greater risk?

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Supplemental Web Content

Web Table 1. Demographic Characteristics by Gestational Diabetes Mellitus and race/ethnicity in the Consortium on Safe Labor (n = 220,065)

Web Table 2. Spearman correlation coefficients for volatile organic compounds at 3 months prior to conception

Web Table 3. Spearman correlation coefficients for volatile organic compounds for first trimester of pregnancy

Web Table 4. Distribution of pregnancies in the Consortium on Safe Labor by VOC exposure level and race/ethnicity

Web Table 5. Associations between exposure to High VOC ($\geq 75^{\text{th}}$ percentile) and gestational diabetes in the Consortium on Safe Labor (2002-2008) – Pre-pregnancy BMI excluded from models

University Affiliated	1573 (1.4)	28116 (25.7)	1327 (2.7)	30708 (62.5)	1463 (3.8)	22047 (57.6)	329 (3.6)	3387 (37.3)	280 (1.9)	4153 (29.1)
Community: Teaching	2986 (2.7)	62524 (57.1)	816 (1.6)	16166 (32.9)	930 (2.4)	12872 (33.6)	541 (5.9)	4406 (48.5)	547 (3.8)	8501 (59.5)
Community: Non- teaching	418 (0.3)	13779 (12.6)	5 (0.0)	71 (0.1)	69 (0.1)	860 (2.2)	29 (0.3)	376 (4.1)	27 (0.1)	759 (5.3)

Web Table 2. Spearman correlation coefficients for volatile organic compounds at 3 months prior to conception (n= 220,065) ^a

	Benzene	Ethylbenzene	MTB Ether	N-hexane	EMK	m-xylene	o-xylene	p-xylene	propene	Sesquiterpene	Toluene	Styrene	1,3 butadiene	Cyclohexane
Benzene	1.00	0.96	0.61	0.97	0.87	0.95	0.92	0.95	0.53	0.67	0.90	0.25	0.27	0.84
Ethylbenzene		1.00	0.63	0.94	0.92	0.98	0.93	0.99	0.57	0.72	0.92	0.32	0.34	0.84
MTB Ether			1.00	0.66	0.81	0.54	0.40	0.65	0.92	0.76	0.35	0.81	0.81	0.30
N-hexane				1.00	0.86	0.94	0.90	0.93	0.54	0.72	0.89	0.28	0.29	0.85
EMK					1.00	0.85	0.77	0.93	0.77	0.72	0.74	0.59	0.61	0.65
m-xylene						1.00	0.97	0.97	0.45	0.67	0.96	0.20	0.21	0.91
o-xylene							1.00	0.92	0.31	0.57	0.99	0.05	0.07	0.95
p-xylene								1.00	0.59	0.73	0.90	0.36	0.37	0.82
propene									1.00	0.70	0.26	0.84	0.86	0.17
Sesquiterpene										1.00	0.55	0.57	0.56	0.50
Toluene											1.00	0.01	0.03	0.95
Styrene												1.00	0.98	-0.04
1,3 butadiene													1.00	-0.04

a. All correlations significant at $p < .0001$

Web Table 3. Spearman correlation coefficients for volatile organic compounds for first trimester of pregnancy^a (n= 220,065)

	Benzene	Ethylbenzene	MTB Ether	N-hexane	EMK	m-xylene	o-xylene	p-xylene	propene	Sesquiterpene	Toluene	Styrene	1,3 butadiene	Cyclohexane
Benzene	1.00	0.96	0.64	0.97	0.88	0.95	0.92	0.95	0.57	0.68	0.90	0.25	0.27	0.83
Ethylbenzene		1.00	0.65	0.94	0.93	0.98	0.94	0.99	0.60	0.71	0.92	0.32	0.34	0.84
MTB Ether			1.00	0.69	0.81	0.57	0.44	0.67	0.91	0.77	0.41	0.77	0.76	0.35
N-hexane				1.00	0.86	0.93	0.90	0.93	0.58	0.74	0.89	0.28	0.28	0.85
EMK					1.00	0.87	0.79	0.93	0.78	0.71	0.76	0.56	0.58	0.67
m-xylene						1.00	0.98	0.97	0.49	0.67	0.96	0.21	0.23	0.91

o-xylene	1.00	0.93	0.37	0.59	0.99	0.08	0.10	0.95
p-xylene		1.00	0.62	0.73	0.91	0.35	0.37	0.83
propene			1.00	0.69	0.33	0.78	0.80	0.22
Sesquiterpene				1.00	0.57	0.55	0.53	0.52
Toluene					1.00	0.04	0.06	0.95
Styrene						1.00	0.98	-0.01
1,3 butadiene							1.00	-0.01
Cyclohexane								1.00

a. All correlations significant at $p < .0001$

Web Table 4. Distribution of pregnancies in the Consortium on Safe Labor by VOC exposure level and race/ethnicity (n= 220,065)

White (N: 109,396)	Black (N: 49,093)	Hispanic (N: 38,241)	Asian/Pacific Islander (N: 9,068)
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	n (% White)		n (% Black)		n (% Hispanic)		n (% Asian/Pacific Islander)	
	Low (< 75 th %)	High (≥ 75 th %)	Low (< 75 th %)	High (≥ 75 th %)	Low (< 75 th %)	High (≥ 75 th %)	Low (< 75 th %)	High (≥ 75 th %)
Preconception VOCs								
<i>Benzene</i>	82,430 (75.35)	26,966 (24.65)	37,300 (75.98)	11,793 (24.02)	28,916 (75.62)	9325 (24.38)	4356 (48.04)	4712 (51.96)
<i>1,3 Butadiene</i>	87765 (80.23)	21631 (19.77)	33234 (67.70)	15859 (32.30)	25786 (67.43)	12455 (32.57)	6928 (76.40)	2140 (23.60)
<i>Ethylbenzene</i>	82,094 (75.04)	27302 (24.96)	37816 (77.03)	11277 (22.97)	28980 (75.78)	9261 (24.22)	4160 (45.88)	4908 (54.12)
<i>Cyclohexane</i>	83897 (76.69)	25499 (23.31)	36689 (74.73)	12404 (25.27)	28423 (74.33)	9818 (25.67)	4768 (52.58)	4300 (47.42)
<i>MTB Ether</i>	87053 (79.58)	22343 (20.42)	35432 (72.17)	13661 (27.83)	25552 (66.82)	12689 (33.18)	5315 (58.61)	3753 (41.39)
<i>N-Hexane</i>	82146 (75.09)	27250 (24.91)	37188 (75.75)	11905 (24.25)	29265 (76.53)	8976 (23.47)	4368 (48.17)	4700 (51.83)
<i>Ethyl Methyl Ketone</i>	85074 (77.77)	24322 (22.23)	34886 (71.06)	14207 (28.94)	28023 (73.28)	10218 (26.72)	5565 (61.37)	3503 (38.63)
<i>m-xylene</i>	82158 (75.10)	27238 (24.90)	37851 (77.10)	11242 (22.90)	28911 (75.60)	9330 (24.40)	4153 (45.80)	4915 (54.20)
<i>o-xylene</i>	82098 (75.05)	27298 (24.95)	37841 (77.08)	11252 (22.92)	28997 (75.83)	9244 (24.17)	4200 (46.32)	4868 (53.68)
<i>p-xylene</i>	82460 (75.38)	26936 (24.62)	37504 (76.39)	11589 (23.61)	28865 (75.48)	9376 (24.52)	4305 (47.47)	4763 (52.53)
<i>Propene</i>	93422 (76.26)	25974 (23.74)	35088 (71.47)	14005 (28.53)	29119 (76.15)	9122 (23.85)	5554 (61.25)	3514 (38.75)
<i>Sesquiterpene</i>	84134 (76.91)	25262 (23.09)	37354 (76.09)	11739 (23.91)	27344 (71.50)	10897 (28.50)	4570 (50.40)	4498 (49.60)
<i>Styrene</i>	89621 (81.92)	19775 (18.08)	31976 (65.13)	17117 (34.87)	25127 (65.71)	13114 (34.29)	7003 (77.23)	2065 (22.77)
<i>Toluene</i>	82015 (74.97)	27381 (25.03)	37862 (77.12)	11231 (22.88)	29042 (75.94)	9199 (24.06)	4224 (46.58)	4844 (53.42)
First Trimester VOCs								
<i>Benzene</i>	82245 (75.18)	27151 (24.82)	37394 (79.17)	11699 (23.83)	28914 (75.61)	9327 (24.39)	4423 (48.78)	4645 (51.22)
<i>1,3 Butadiene</i>	87628 (80.10)	21768 (19.90)	33834 (68.92)	15259 (31.08)	25236 (65.99)	13005 (34.01)	6949 (76.63)	2119 (23.37)
<i>Ethylbenzene</i>	82021 (74.98)	27375 (25.02)	37801 (77.00)	11292 (23.00)	29048 (75.96)	9193 (24.04)	4187 (46.17)	4881 (53.83)
<i>Cyclohexane</i>	84737 (77.46)	24659 (22.54)	36510 (74.37)	12583 (25.63)	28013 (73.25)	10228 (26.75)	4809 (53.03)	4259 (46.97)

<i>MTB Ether</i>	85573 (78.22)	23823 (21.83)	36141 (73.62)	12952 (26.38)	26301 (68.78)	11940 (31.22)	5032 (55.49)	4036 (44.51)
<i>N-Hexane</i>	82127 (75.07)	27269 (24.93)	37321 (76.02)	11772 (23.98)	29094 (76.08)	9147 (23.92)	4393 (48.45)	4675 (51.55)
<i>Ethyl Methyl Ketone</i>	83262 (76.11)	26134 (23.89)	39525 (73.18)	13168 (26.82)	28687 (75.02)	9554 (24.98)	5241 (57.80)	3827 (42.20)
<i>m-xylene</i>	82011 (74.97)	27385 (25.03)	37858 (77.11)	11235 (22.89)	29028 (75.91)	9213 (24.09)	4170 (45.99)	4898 (54.01)
<i>o-xylene</i>	82119 (75.07)	27277 (24.93)	37889 (77.18)	11204 (22.82)	28998 (75.83)	9243 (24.17)	4184 (46.11)	4887 (53.89)
<i>p-xylene</i>	81974 (74.93)	27422 (25.07)	37744 (76.88)	11349 (23.12)	29131 (76.18)	9110 (23.82)	4237 (46.72)	4831 (53.28)
<i>Propene</i>	82187 (75.13)	27209 (24.87)	35566 (72.45)	13527 (27.55)	29813 (77.96)	8428 (22.04)	5416 (59.73)	3652 (40.27)
<i>Sesquiterpene</i>	83771 (76.58)	25625 (23.42)	37625 (76.64)	11468 (23.36)	27164 (71.03)	11077 (28.97)	4582 (50.53)	4486 (49.47)
<i>Styrene</i>	89618 (81.92)	19778 (18.08)	32709 (66.63)	16384 (33.37)	24414 (63.84)	2184 (24.08)	6884 (75.92)	2184 (24.08)
<i>Toluene</i>	82117 (75.06)	27279 (24.94)	37956 (77.31)	11137 (22.69)	28986 (75.80)	9255 (24.20)	4178 (46.07)	4890 (53.93)

Other race/ethnicity not reported due to heterogeneity of the group.

Web Table 5. Associations between exposure to High VOC ($\geq 75^{\text{th}}$ percentile) and gestational diabetes in the Consortium on Safe Labor (2002-2008) – Pre-pregnancy BMI excluded from models

VOC	White N= 109,396		Black N=49,093		Hispanic N=38,241		Asian/Pacific Islander N=9,068		
	OR	99% CI	OR	99% CI	OR	99% CI	OR	99% CI	
<i>Preconception</i>									
Benzene	1.31	1.15, 1.50 ^b	1.18	0.99, 1.42	1.13	0.94, 1.37	1.45	1.16, 1.81 ^{b,c}	
1,3 Butadiene	1.02	0.94, 1.11	1.03	0.91, 1.17	0.92	0.81, 1.04 ^c	0.96	0.76, 1.20	
Ethylbenzene	1.43	1.22, 1.69 ^b	1.27	1.04, 1.55 ^b	1.30	1.05, 1.60 ^b	1.60	1.25, 2.04 ^{b,c}	
Cyclohexane	1.14	1.03, 1.25 ^b	1.02	0.87, 1.19	1.02	0.88, 1.17	1.30	1.06, 1.59 ^{b,c}	
MTB Ether	1.18	1.09, 1.28 ^b	1.12	0.99, 1.28	0.97	0.86, 1.09	1.27	1.06, 1.54 ^b	
N-Hexane	1.35	1.21, 1.51 ^b	1.20	1.02, 1.41 ^b	1.17	1.00, 1.39 ^b	1.50	1.22, 1.85 ^{b,c}	
Ethyl Methyl Ketone	1.21	1.11, 1.32 ^b	1.12	0.98, 1.29	1.04	0.91, 1.19	1.24	1.03, 1.51 ^b	
m-xylene	1.39	1.18, 1.63 ^b	1.25	1.03, 1.54 ^b	1.23	1.00, 1.52 ^b	1.52	1.19, 1.94 ^{b,c}	
o-xylene	1.24	1.07, 1.44 ^b	1.08	0.89, 1.31	1.12	0.92, 1.37	1.40	1.11, 1.77 ^{b,c}	
p-xylene	1.35	1.19, 1.54 ^b	1.21	1.01, 1.44 ^b	1.20	1.01, 1.42 ^b	1.48	1.19, 1.85 ^{b,c}	
Propene	1.14	1.06, 1.23 ^b	1.06	0.93, 1.20	0.91	0.79, 1.03	1.28	1.06, 1.55 ^{b,c}	
Sesquiterpene	1.19	1.10, 1.30 ^b	1.13	0.99, 1.29	0.98	0.86, 1.11	1.43	1.18, 1.74 ^{b,c}	
Styrene	1.02	0.93, 1.12	1.04	0.91, 1.18	0.94	0.82, 1.06	0.91	0.72, 1.15	
Toluene	1.20	1.04, 1.39 ^b	1.05	0.87, 1.28	1.08	0.89, 1.32	1.36	1.08, 1.71 ^{b,c}	
<i>First Trimester</i>									
Benzene	1.20	1.05, 1.36 ^b	1.08	0.90, 1.29	1.06	0.89, 1.27	1.34	1.08, 1.65 ^{b,c}	
1,3 Butadiene	0.98	0.89, 1.07	0.92	0.81, 1.05	0.87	0.77, 1.00 ^c	0.84	0.66, 1.06 ^c	
Ethylbenzene	1.22	1.03, 1.43 ^b	1.07	0.87, 1.31	1.09	0.88, 1.34	1.36	1.07, 1.74 ^{b,c}	
Cyclohexane	1.02	0.93, 1.12	0.98	0.84, 1.14	0.94	0.81, 1.08	1.13	0.92, 1.38 ^c	
MTB Ether	1.11	1.02, 1.20 ^b	1.03	0.90, 1.18	0.91	0.81, 1.03	1.29	1.07, 1.55 ^{b,c}	
N-Hexane	1.19	1.06, 1.33 ^b	1.05	0.89, 1.24	1.04	0.88, 1.23	1.38	1.13, 1.69 ^{b,c}	
Ethyl Methyl Ketone	1.16	1.06, 1.26 ^b	1.06	0.92, 1.23	0.97	0.84, 1.11	1.22	1.01, 1.48 ^b	
m-xylene	1.14	0.96, 1.35	1.00	0.81, 1.24	1.01	0.81, 1.26	1.28	0.99, 1.64 ^c	
o-xylene	1.09	0.92, 1.28	0.95	0.77, 1.18	0.97	0.78, 1.21	1.23	0.96, 1.58 ^c	
p-xylene	1.14	0.98, 1.33	1.02	0.84, 1.24	1.01	0.83, 1.23	1.29	1.02, 1.62 ^{b,c}	
Propene	1.11	1.03, 1.20 ^b	0.99	0.87, 1.12	0.96	0.84, 1.10	1.27	1.06, 1.53 ^{b,c}	
Sesquiterpene	1.14	1.04, 1.24 ^b	1.08	0.94, 1.24	0.92	0.81, 1.04	1.36	1.12, 1.65 ^{b,c}	
Styrene	1.01	0.91, 1.11	0.98	0.86, 1.12	0.90	0.79, 1.03 ^c	0.89	0.70, 1.12	
Toluene	1.11	0.94, 1.30	0.96	0.78, 1.19	0.98	0.79, 1.22	1.24	0.96, 1.58 ^c	

- a. Model adjusted for maternal race, maternal age, insurance status, marital status, parity, site, hospital type. Other race/ethnicity group included in analysis, but stratum specific results not reported here due to heterogeneity of the population.
- b. Statistically significant estimates.
- c. Significant interaction term at $p < 0.01$ for VOCs and race/ethnicity (reference: non-Hispanic white)