Online Data Supplement

Association of blood trihalomethane concentrations with asthma in U.S. adolescents: nationally representative cross-sectional study

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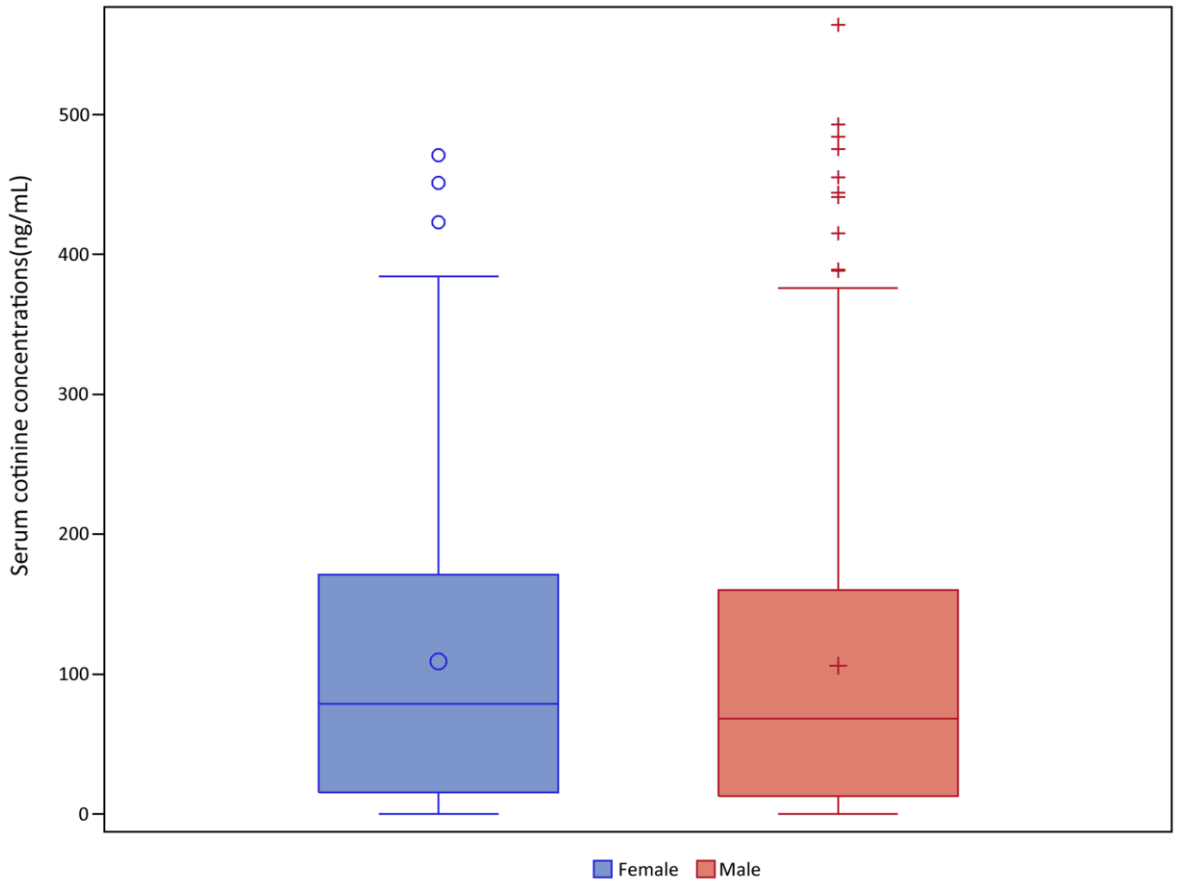

Figure S1. Distribution of serum cotinine concentrations (ng/mL) according to sex among participants with tobacco smoke exposure (NHANES, 2005-2012). The displayed values are the 10th (bottom whisker), 25th percentile (bottom of the box), median (line in box), 75th percentile (top of the box), and 90th (top whisker) of the concentrations. *P* for the Wilcoxon Rank-Sum Test > 0.05.

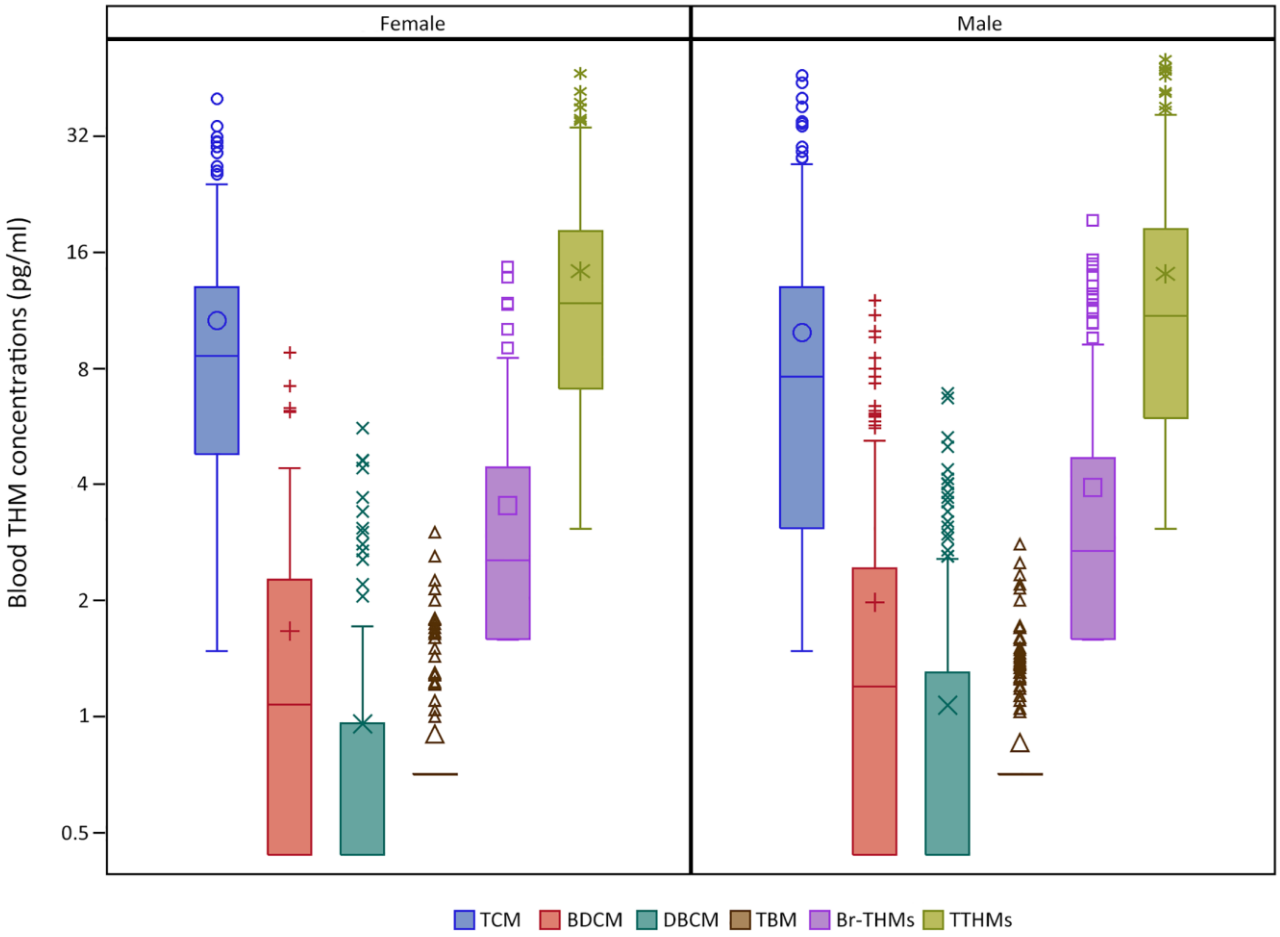

Figure S2. Distribution of blood THM concentrations (pg/ml) according to sex among participants with tobacco smoke exposure (NHANES, 2005-2012). The displayed values are the 10th (bottom whisker), 25th percentile (bottom of the box), median (line in box), 75th percentile (top of the box), and 90th (top whisker) of the concentrations. *P* for the Wilcoxon Rank-Sum Test all > 0.05. Abbreviations: THM, trihalomethane; TCM, chloroform; BDCM, bromodichloromethane; DBCM, dibromochloromethane; TBM, bromoform; Br-THMs, the sum of BDCM, DBCM, and TBM; TTHMs, the sum of TCM and Br-THMs.

Table S1. Characteristics of included adolescents and those excluded for study participants in NHANES 2005-2012 [mean (95% CI) or N (%)].[a]

Characteristic	Included participants (n=2,359)	Excluded participants (n=3,779)	P-value[b]
Survey cycle			
2005-2006	882 (24.7)	1,406 (25.1)	
2007-2008	457 (24.3)	781 (25.5)	0.89
2009-2010	526 (25.2)	813 (24.4)	
2011-2012	494 (25.7)	779 (25.0)	
Age, years	15.5 (15.4, 15.6)	15.4 (15.3, 15.5)	0.21
BMI Z - score	0.62 (0.57, 0.67)	0.51 (0.44, 0.57)	0.002
Sex			
Male	1,202 (49.9)	1,940 (51.6)	0.29
Female	1,157 (50.1)	1,839 (48.4)	
Race/ethnicity			
Non-Hispanic White	641 (58.6)	1,053 (59.5)	
Non-Hispanic Black	684 (14.9)	1,107 (15.0)	0.44
Mexican American	646 (13.5)	969 (12.1)	
Other	388 (13.0)	650 (13.4)	
Family income-poverty ratio			
0-1.0	734 (23.4)	1,051 (21.6)	0.13
1.1-3.0	859 (35.6)	1,461 (39.3)	
>3.0	612 (41.0)	930 (39.1)	
Leisure-time physical activity (hours per week)			
< 3	1,032 (39.6)	1,477 (39.8)	0.80
3-7	539 (25.3)	817 (24.2)	
>7	778 (35.0)	1,185 (36.0)	
Current allergic conditions			
Yes	630 (27.0)	952 (25.0)	0.31
No	1,729 (73.0)	2,827 (75.0)	
Examination session			
Morning	1,174 (50.4)	1,695 (47.6)	0.71
Afternoon	777 (31.7)	1,203 (32.2)	
Evening	408 (17.9)	700 (20.2)	
Sampling season			
November through April	1,222 (42.9)	1,819 (44.2)	0.50
May through October	1,137 (50.1)	1,779 (55.8)	
Family history of asthma			
Yes	455 (21.9)	710 (22.1)	0.89
No	1,904 (78.1)	3,069 (77.9)	
Ever (lifetime) asthma			
Yes	441 (20.3)	722 (19.6)	0.69
Never	1,918 (79.7)	3,057 (80.4)	
Current asthma			
Yes	196 (9.1)	272 (7.7)	0.20
No	2,163 (90.9)	3,507 (92.3)	

Mean (95% CI) and N (%) were accounted for complex, multistage sampling survey designs (e.g., sampling weights, stratification, and clusters) to ensure nationally representative estimation.

[a] A total of 31, 491, and 310 participants had missing information on BMI Z - score, family income-poverty ratio, and levels of leisure-time physical activity, respectively; data on water-use activities was only collected among participants who were measured for blood volatile organic compounds.

[b] P-value was calculated by Rao-Scott chi-square test and t-test for categorical and continuous variables.

Table S2. Characteristics of study participants in NHANES 2005-2012 according to quartiles of blood TTHM concentrations [mean (95% CI) or N (%)].

Characteristic[a]	**Blood TTHM**				
	Quartile 1 (n=540)	Quartile 2 (n=540)	Quartile 3 (n=541)	Quartile4 (n=540)	P[b]
Survey cycle					
2005-2006	138 (17.4)	202 (23.3)	234 (31.3)	219 (27.7)	
2007-2008	133 (28.0)	99 (21.1)	91 (22.7)	90 (23.5)	< 0.001
2009-2010	117 (17.5)	123 (23.9)	121 (25.9)	147 (32.1)	
2011-2012	152 (37.1)	116 (31.7)	95 (20.1)	84 (16.7)	
Age, years	15.5 (15.3, 15.8)	15.4 (15.2, 15.7)	15.5 (15.2, 15.8)	15.4 (15.2, 15.7)	0.94
BMI Z - score	0.55 (0.44, 0.67)	0.66 (0.51, 0.81)	0.64 (0.52, 0.77)	0.62 (0.50, 0.75)	0.61
Sex					
Male	290 (50.5)	262 (49.2)	264 (48.7)	273 (55.4)	0.42
Female	250 (49.5)	278 (50.8)	277 (51.3)	267 (44.6)	
Race/ethnicity					
Non-Hispanic White	205 (68.3)	138 (57.6)	126 (52.0)	123 (50.5)	
Non-Hispanic Black	112 (9.5)	171 (16.3)	177 (18.8)	186 (20.2)	< 0.001
Mexican American	138 (11.8)	136 (12.6)	151 (14.7)	143 (14.2)	
Other	85 (10.4)	95 (13.5)	87 (14.5)	88 (15.1)	
Family income-poverty ratio					
0-1.0	146 (19.5)	177 (25.2)	173 (24.8)	187 (27.8)	0.15
1.1-3.0	199 (34.5)	198 (36.0)	191 (33.2)	187 (37.0)	
>3.0	163 (46.0)	132 (38.8)	138 (42.0)	125 (35.2)	
Leisure-time physical activity level (hours per week)					
< 3	242 (40.9)	241 (38.7)	230 (36.0)	254 (43.4)	0.79
3-7	132 (24.6)	115 (24.7)	126 (27.6)	121 (23.9)	
>7	164 (34.4)	182 (36.6)	183 (36.3)	172 (32.7)	
Current allergic conditions					
Yes	140 (29.3)	141 (23.3)	156 (27.6)	137 (27.4)	0.46
No	400 (70.7)	399 (76.7)	385 (72.4)	403 (72.6)	
Examination session					0.33

Morning	256 (50.1)	248 (47.4)	258 (49.7)	319 (58.2)	
Afternoon	181 (31.8)	185 (34.1)	187 (32.8)	155 (28.7)	
Evening	103 (18.1)	107 (18.5)	96 (17.5)	66 (13.1)	
Time interval since last shower or bath (hour)					
≤ 2	51 (11.7)	45 (12.2)	89 (17.7)	111 (20.0)	< 0.001
3-6	90 (17.0)	128 (22.5)	127 (23.0)	189 (36.1)	
7-14	153 (30.6)	144 (24.7)	137 (23.6)	102 (17.5)	
> 14	246 (40.7)	223 (40.6)	188 (35.7)	138 (26.4)	
Sampling season					
November 1 through April 30	251 (36.1)	245 (55.7)	267 (40.4)	291 (47.1)	0.15
May 1 through October 31	289 (63.9)	295 (44.3)	274 (59.6)	249 (52.9)	
Swimming pool/hot tub/ steam room use within 72h					
Yes	18 (5.6)	32 (10.7)	25 (8.7)	43 (12.8)	0.04
No	522 (94.4)	508 (89.3)	516 (91.3)	497 (87.2)	

Abbreviations: TCM, chloroform; BDCM, bromodichloromethane; DBCM, dibromochloromethane; TBM, bromoform; Br-THMs, the sum of BDCM, DBCM, and TBM; TTHMs, the sum of TCM and Br-THMs.

All estimates were accounted for complex survey designs.

[a] A total of 30, 150, and 9 participants had missing information on BMI Z - score, family income-poverty ratio, and Leisure-time physical activity level, respectively.

[b] P-value was calculated by Rao-Scott chi-square test and t-test for categorical and continuous variables, respectively.

Table S3. Adjusted ORs (95% CIs) of **ever** asthma and **current** asthma in relation to blood THM concentrations among U.S. adolescents with tobacco smoke exposure (n = 378), stratified by sex (NHANES, 2005-2012).[a]

Blood THMs (pg/ml)	Ever asthma			Current asthma[c]		
	Male (n = 240)	Female (n = 138)	*P* for interaction	Male (n = 212)	Female (n = 118)	*P* for interaction
TCM						
Q1 (1.48-4.11)	Ref.	Ref.		Ref.	Ref.	
Q2 (4.12-8.34)	0.73 (0.27, 1.93)	0.43 (0.11, 1.78)	0.11	1.90 (0.20, 18.07)	0.47 (0.04, 6.12)	0.01
Q3 (8.35-16.90)	0.62 (0.20, 1.93)	0.12 (0.02, 0.80)		3.52 (0.43, 28.65)	0.05 (0.001, 1.93)	
Q4 (> 16.90)	1.89 (0.74, 4.84)	0.37 (0.11, 1.32)		6.23 (1.25, 31.09)	0.13 (0.006, 2.66)	
P for trend[b]	0.15	0.27		0.002	0.19	
BDCM						
T1 (0.44-0.75)	Ref.	Ref.		Ref.	Ref.	
T2 (0.76-2.50)	0.83 (0.23, 3.02)	1.04 (0.47, 2.32)	0.55	1.18 (0.19, 7.49)	4.12 (1.46, 11.65)	0.08
T3 (> 2.50)	1.82 (0.75, 4.47)	0.86 (0.25, 2.98)		4.75 (1.29, 17.49)	1.52 (0.18, 12.88)	
P for trend[b]	0.10	0.80		0.008	0.98	
DBCM						
< 50th (0.44-0.65)	Ref.	Ref.		Ref.	Ref.	
50-75th (0.66-1.87)	1.34 (0.52, 3.45)	1.62 (0.54, 4.85)	0.10	1.93 (0.59, 6.28)	5.93 (1.61, 21.85)	0.11
> 75th (>1.87)	5.96 (2.79, 12.73)	1.90 (0.53, 6.81)		7.57 (2.21, 25.89)	2.11 (0.22, 20.19)	
P for trend[b]	< 0.001	0.39		0.001	0.74	
TBM						
< 75th (0.71-1.13)	Ref.	Ref.		Ref.	Ref.	
75-87.5th (1.14-2.10)	2.65 (1.05, 6.68)	1.06 (0.20, 5.66)	0.87	0.60 (0.15, 2.46)	1.25 (0.12, 12.67)	0.83
> 87.5th (> 2.10)	1.12 (0.23, 5.55)	2.28 (0.53, 9.79)		1.29 (0.28, 5.93)	1.36 (0.12, 15.43)	
P for trend[b]	0.82	0.29		0.76	0.78	
Br-THMs						
Q1 (1.58-1.78)	Ref.	Ref.		Ref.	Ref.	
Q2 (1.79-3.15)	1.22 (0.39, 3.79)	1.15 (0.30, 4.37)	0.22	2.42 (0.55, 10.92)	0.96 (0.27, 3.48)	0.11
Q3 (3.16-6.69)	0.84 (0.21, 3.30)	0.91 (0.21, 3.60)		1.33 (0.54, 3.28)	1.75 (0.39, 7.74)	
Q4 (> 6.69)	4.25 (1.69, 10.72)	1.72 (0.39, 7.56)		9.63 (4.00, 23.23)	2.16 (0.28, 16.88)	
P for trend[b]	< 0.001	0.43		0.002	0.48	
TTHMs						
Q1 (3.07-6.99)	Ref.	Ref.		Ref.	Ref.	
Q2 (7.00-12.97)	0.46 (0.17, 1.23)	0.40 (0.16, 1.00)	0.10	0.86 (0.15, 4.85)	0.55 (0.11, 2.75)	0.02
Q3 (12.98-25.63)	0.45 (0.16, 1.27)	0.21 (0.03, 1.32)		3.31 (1.23, 8.92)	0.36 (0.03, 5.09)	
Q4 (> 25.63)	2.53 (1.20, 5.34)	0.45 (0.12, 1.66)		6.72 (3.52, 12.80)	0.27 (0.04, 2.10)	
P for trend[b]	0.005	0.38		<0.001	0.27	

[a] All models adjusted for age, race/ethnicity, BMI *Z*-score, family income-poverty ratio, family history of asthma, swimming pool/hot tub/ steam room use within 72h, and survey cycle.

[b] Tests for linear trend were conducted by modeling categories of THM concentrations as ordinal variables using the median values within each category.

[c] Participants who ever received a diagnosis of asthma but no wheezing or whistling in the past year were excluded in the model for current asthma (n = 48).

Table S4. Sensitivity analyses of the associations between **ever** asthma and blood THM concentrations among U.S. adolescents according to tobacco smoke exposure, excluding participants with missing data on BMI z-scores or family income-poverty ratio (NHANES, 2005-2012).[a,b]

Blood THMs (pg/ml)	All[d] (N=2,176)	Tobacco smoke exposure (n = 351)	No tobacco smoke exposure (n = 1,825)	*P* for interaction
TCM				
Q1 (1.48-4.11)	Ref.	Ref.	Ref.	
Q2 (4.12-8.34)	0.76 (0.55, 1.03)	0.90 (0.41, 1.98)	0.71 (0.50, 1.02)	0.32
Q3 (8.35-16.90)	0.77 (0.50, 1.20)	0.59 (0.23, 1.49)	0.82 (0.49, 1.36)	
Q4 (> 16.90)	0.80 (0.53, 1.19)	1.36 (0.51, 3.63)	0.71 (0.47, 1.07)	
P for trend[c]	0.47	0.43	0.25	
BDCM				
T1 (0.44-0.75)	Ref.	Ref.	Ref.	
T2 (0.76-2.50)	0.79 (0.54, 1.17)	1.13 (0.47, 2.71)	0.72 (0.46, 1.12)	0.03
T3 (> 2.50)	0.93 (0.67, 1.27)	1.89 (0.85, 4.19)	0.79 (0.57, 1.09)	
P for trend[c]	0.90	0.10	0.27	
DBCM				
< 50th (0.44-0.65)	Ref.	Ref.	Ref.	
50-75th (0.66-1.87)	1.03 (0.67, 1.57)	1.67 (0.76, 3.66)	0.93 (0.56, 1.56)	0.03
> 75th (> 1.87)	1.54 (1.08, 2.18)	4.31 (2.00, 9.29)	1.27 (0.85, 1.90)	
P for trend[c]	0.01	< 0.001	0.18	
TBM				
< 75th (0.71-1.13)	Ref.	Ref.	Ref.	
75-87.5th (1.14-2.10)	1.45 (0.93, 2.26)	1.58 (0.64, 3.90)	1.49 (0.88, 2.52)	0.98
> 87.5th (> 2.10)	1.12 (0.61, 2.03)	1.38 (0.46, 4.11)	1.13 (0.63, 2.04)	
P for trend[c]	0.59	0.40	0.59	
Br-THMs				
Q1 (1.58-1.78)	Ref.	Ref.	Ref.	
Q2 (1.79-3.15)	1.01 (0.65, 1.54)	1.44 (0.57, 3.65)	0.87 (0.51, 1.49)	0.02
Q3 (3.16-6.69)	0.86 (0.58, 1.28)	1.27 (0.40, 3.99)	0.80 (0.51, 1.27)	
Q4 (> 6.69)	1.39 (0.94, 2.07)	3.57 (1.52, 8.41)	1.10 (0.71, 1.70)	
P for trend[c]	0.07	0.003	0.41	
TTHMs				
Q1 (3.07-6.99)	Ref.	Ref.	Ref.	
Q2 (7.00-12.97)	0.56 (0.37, 0.85)	0.58 (0.27, 2.52)	0.54 (0.34, 0.86)	0.14
Q3 (12.98-25.63)	0.72 (0.46, 1.13)	0.56 (0.22, 1.38)	0.80 (0.49, 1.31)	
Q4 (> 25.63)	0.89 (0.57, 1.39)	1.58 (0.72, 3.48)	0.79 (0.50, 1.23)	
P for trend[c]	0.89	0.09	0.70	

[a] All models adjusted for age, sex, race/ethnicity, BMI *Z*-score, family income-poverty ratio, family history of asthma, swimming pool/hot tub/ steam room use within 72h, and survey cycle.
[b] Participants with missing data on BMI z-scores or family income-poverty ratio (n =185) were excluded.
[c] Tests for linear trend were conducted by modeling categories of THM concentrations as ordinal variables using the median values within each category.
[d] Models were additionally adjusted for tobacco smoke exposure.

Table S5. Sensitivity analyses of the associations between **ever** asthma and blood THM concentrations among U.S. adolescents according to tobacco smoke exposure with additional adjustment for specific covariates related to THM exposures (NHANES, 2005-2012).[a]

Blood THMs (pg/ml)	All[c] (N=2,359)	Tobacco smoke exposure (n = 378)	No tobacco smoke exposure (n = 1,981)	*P* for interaction
TCM				
Q1 (1.48-4.11)	Ref.	Ref.	Ref.	
Q2 (4.12-8.34)	0.74 (0.55, 1.01)	0.80 (0.37, 1.70)	0.71 (0.49, 1.02)	0.29
Q3 (8.35-16.90)	0.79 (0.51, 1.22)	0.52 (0.22, 1.25)	0.86 (0.53, 1.41)	
Q4 (> 16.90)	0.77 (0.51, 1.22)	1.16 (0.48, 2.81)	0.70 (0.46, 1.07)	
P for trend[b]	0.40	0.58	0.24	
BDCM				
T1 (0.44-0.75)	Ref.	Ref.	Ref.	
T2 (0.76-2.50)	0.80 (0.56, 1.16)	0.84 (0.38, 1.89)	0.74 (0.49, 1.13)	0.05
T3 (> 2.50)	0.89 (0.64, 1.23)	1.54 (0.68, 3.49)	0.77 (0.54, 1.09)	
P for trend[b]	0.65	0.23	0.23	
DBCM				
< 50th (0.44-0.65)	Ref.	Ref.	Ref.	
50-75th (0.66-1.87)	0.96 (0.61, 1.51)	1.61 (0.73, 3.56)	0.85 (0.51, 1.42)	0.03
> 75th (> 1.87)	1.47 (1.02, 2.12)	3.86 (1.75, 8.49)	1.20 (0.78, 1.84)	
P for trend[b]	0.02	0.001	0.29	
TBM				
< 75th (0.71-1.13)	Ref.	Ref.	Ref.	
75-87.5th (1.14-2.10)	1.38 (0.87, 2.19)	1.49 (0.63, 3.53)	1.37 (0.79, 2.37)	0.99
> 87.5th (> 2.10)	1.16 (0.66, 2.04)	1.26 (0.43, 3.69)	1.18 (0.68, 2.05)	
P for trend[b]	0.53	0.51	0.51	
Br-THMs				
Q1 (1.58-1.78)	Ref.	Ref.	Ref.	
Q2 (1.79-3.15)	1.02 (0.67, 1.56)	1.19 (0.48, 2.96)	0.90 (0.54, 1.50)	0.02
Q3 (3.16-6.69)	0.87 (0.58, 1.31)	0.98 (0.36, 2.65)	0.81 (0.51, 1.29)	
Q4 (> 6.69)	1.37 (0.91, 2.08)	3.10 (1.30, 2.65)	1.10 (0.69, 1.75)	
P for trend[b]	0.08	0.008	0.24	
TTHMs				
Q1 (3.07-6.99)	Ref.	Ref.	Ref.	
Q2 (7.00-12.97)	0.57 (0.38, 0.86)	0.46 (0.21, 1.03)	0.56 (0.36, 0.87)	0.19
Q3 (12.98-25.63)	0.74 (0.48, 1.15)	0.46 (0.19, 1.13)	0.85 (0.53, 1.36)	
Q4 (> 25.63)	0.85 (0.54, 1.35)	1.13 (0.51, 2.50)	0.78 (0.49, 1.23)	
P for trend[b]	0.97	0.32	0.68	

[a] All models adjusted for age, sex, race/ethnicity, BMI *Z*-score, family income-poverty ratio, family history of asthma, examination session, sampling season, and the time interval since last shower or bath, swimming pool/hot tub/ steam room use within 72h, and survey cycle.

[b] Tests for linear trend were conducted by modeling categories of THM concentrations as ordinal variables using the median values within each category.

[c] Models were additionally adjusted for tobacco smoke exposure.

Table S6. Sensitivity analyses of the associations between **ever** asthma and blood THM concentrations among U.S. adolescents according to tobacco smoke exposure with additional adjustment for levels of leisure-time physical activity and allergic symptoms (NHANES, 2005-2012).[a]

Blood THMs (pg/ml)	All[c] (N=2,359)	Tobacco smoke exposure (n = 378)	No tobacco smoke exposure (n = 1,981)	*P* for interaction
TCM				
Q1 (1.48-4.11)	Ref.	Ref.	Ref.	
Q2 (4.12-8.34)	0.84 (0.62, 1.13)	0.95 (0.44, 2.06)	0.78 (0.55, 1.12)	0.17
Q3 (8.35-16.90)	0.80 (0.49, 1.30)	0.54 (0.23, 1.25)	0.86 (0.48, 1.53)	
Q4 (> 16.90)	0.86 (0.57, 1.31)	1.48 (0.63, 3.49)	0.75 (0.48, 1.17)	
P for trend[b]	0.63	0.30	0.34	
BDCM				
T1 (0.44-0.75)	Ref.	Ref.	Ref.	
T2 (0.76-2.50)	0.93 (0.62, 1.38)	1.05 (0.41, 2.70)	0.87 (0.56, 1.37)	0.06
T3 (> 2.50)	1.03 (0.72, 1.47)	1.82 (0.77, 4.31)	0.89 (0.59, 1.33)	
P for trend[b]	0.77	0.12	0.63	
DBCM				
< 50th (0.44-0.65)	Ref.	Ref.	Ref.	
50-75th (0.66-1.87)	1.00 (0.65, 1.53)	1.57 (0.75, 3.31)	0.90 (0.55, 1.47)	0.04
> 75th (> 1.87)	1.74 (1.18, 2.56)	4.92 (1.98, 12.17)	1.41 (0.90, 2.20)	
P for trend[b]	0.004	0.001	0.09	
TBM				
< 75th (0.71-1.13)	Ref.	Ref.	Ref.	
75-87.5th (1.14-2.10)	1.50 (0.88, 2.55)	1.65 (0.68, 4.02)	1.49 (0.81, 2.72)	0.64
> 87.5th (> 2.10)	1.27 (0.76, 2.14)	1.61 (0.55, 4.75)	1.24 (0.74, 2.09)	
P for trend[b]	0.27	0.25	0.35	
Br-THMs				
Q1 (1.58-1.78)	Ref.	Ref.	Ref.	
Q2 (1.79-3.15)	1.07 (0.67, 1.69)	1.43 (0.59, 3.46)	0.95 (0.54, 1.66)	0.03
Q3 (3.16-6.69)	1.01 (0.68, 1.49)	1.30 (0.40, 4.19)	0.93 (0.61, 1.43)	
Q4 (> 6.69)	1.57 (1.03, 2.38)	3.57 (1.37, 9.32)	1.24 (0.77, 1.99)	
P for trend[b]	0.02	0.006	0.25	
TTHMs				
Q1 (3.07-6.99)	Ref.	Ref.	Ref.	
Q2 (7.00-12.97)	0.64 (0.43, 0.95)	0.62 (0.30, 1.27)	0.63 (0.42, 0.96)	0.12
Q3 (12.98-25.63)	0.78 (0.48, 1.28)	0.49 (0.20, 1.20)	0.91 (0.52, 1.59)	
Q4 (> 25.63)	0.96 (0.62, 1.47)	1.55 (0.67, 3.61)	0.83 (0.53, 1.30)	
P for trend[b]	0.72	0.14	0.77	

[a] All models adjusted for age, sex, race/ethnicity, BMI *Z*-score, family income-poverty ratio, family history of asthma, levels of leisure-time physical activity, current allergic symptoms, and survey cycle.
[b] Tests for linear trend were conducted by modeling categories of THM concentrations as ordinal variables using the median values within each category.
[c] Models were additionally adjusted for tobacco smoke exposure.

Table S7. Sensitivity analyses of the associations between **ever** asthma and blood THM concentrations among U.S. adolescents according to tobacco smoke exposure, excluding participants who spent any time at a swimming pool, a hot tub, or a steam room in the past 72 hours (NHANES, 2005-2012).[a]

Blood THMs (pg/ml)	All[c] (N=2,228)	Tobacco smoke exposure (n = 363)	No tobacco smoke exposure (n = 1,865)	*P* for interaction
TCM				
Q1 (1.48-4.11)	Ref.	Ref.	Ref.	
Q2 (4.12-8.34)	0.80 (0.57, 1.12)	0.87 (0.42, 1.80)	0.77 (0.51, 1.15)	0.44
Q3 (8.35-16.90)	0.81 (0.52, 1.26)	0.52 (0.21, 1.30)	0.88 (0.53, 1.45)	
Q4 (> 16.90)	0.73 (0.48, 1.11)	1.16 (0.44, 3.11)	0.66 (0.43, 1.02)	
P for trend[b]	0.22	0.67	0.13	
BDCM				
T1 (0.44-0.75)	Ref.	Ref.	Ref.	
T2 (0.76-2.50)	0.87 (0.59, 1.30)	0.94 (0.42, 2.11)	0.99 (0.61, 1.61)	0.11
T3 (> 2.50)	0.92 (0.66, 1.28)	1.44 (0.65, 3.21)	0.86 (0.57, 1.28)	
P for trend[b]	0.74	0.30	0.33	
DBCM				
< 50th (0.44-0.65)	Ref.	Ref.	Ref.	
50-75th (0.66-1.87)	1.02 (0.67, 1.55)	1.51 (0.72, 3.18)	0.94 (0.57, 1.55)	0.05
> 75th (> 1.87)	1.51 (1.05, 2.18)	3.76 (1.76, 8.05)	1.15 (0.76, 1.75)	
P for trend[b]	0.02	0.002	0.17	
TBM				
< 75th (0.71-1.13)	Ref.	Ref.	Ref.	
75-87.5th (1.14-2.10)	1.47 (0.93, 2.33)	1.74 (0.75, 4.05)	1.11 (0.70, 1.75)	0.50
> 87.5th (> 2.10)	1.35 (0.76, 2.40)	1.12 (0.31, 4.07)	1.65 (0.97, 2.79)	
P for trend[b]	0.23	0.60	0.15	
Br-THMs				
Q1 (1.58-1.78)	Ref.	Ref.	Ref.	
Q2 (1.79-3.15)	1.05 (0.70, 1.58)	1.47 (0.63, 3.43)	0.93 (0.56, 1.53)	0.14
Q3 (3.16-6.69)	0.93 (0.62, 1.37)	1.16 (0.42, 3.22)	0.88 (0.55, 1.40)	
Q4 (> 6.69)	1.39 (0.93, 2.09)	2.68 (1.12, 6.44)	1.20 (0.78, 1.86)	
P for trend[b]	0.09	0.03	0.25	
TTHMs				
Q1 (3.07-6.99)	Ref.	Ref.	Ref.	
Q2 (7.00-12.97)	0.58 (0.38, 0.87)	0.53 (0.27, 1.07)	0.58 (0.37, 0.90)	0.55
Q3 (12.98-25.63)	0.75 (0.48, 1.16)	0.47 (0.19, 1.19)	0.87 (0.54, 1.38)	
Q4 (> 25.63)	0.80 (0.51, 1.26)	1.11 (0.45, 2.68)	0.77 (0.49, 1.21)	
P for trend[b]	0.70	0.53	0.58	

[a] All models adjusted for age, sex, race/ethnicity, BMI *Z*-score, family income-poverty ratio, family history of asthma, and survey cycle.

[b] Tests for linear trend were conducted by modeling categories of THM concentrations as ordinal variables using the median values within each category.

[c] Models were additionally adjusted for tobacco smoke exposure.

Table S8. Water-use activities of study participants in NHANES 2005-2012 according to asthma history [N (%).

Swimming pool/hot tub/ steam room use within 72h	Current asthma (n = 196)	No asthma (n=1,918)	P-value[a]
Yes	10 (6.1)	109 (9.4)	0.29
No	186 (93.9)	1,809 (90.6)	

[a] P-value was calculated by the Rao-Scott chi-square test.