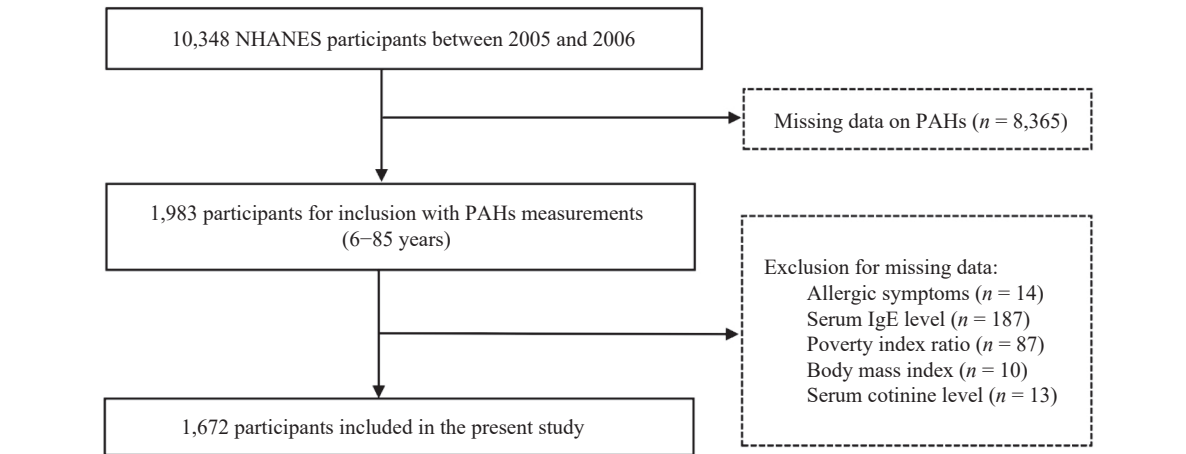
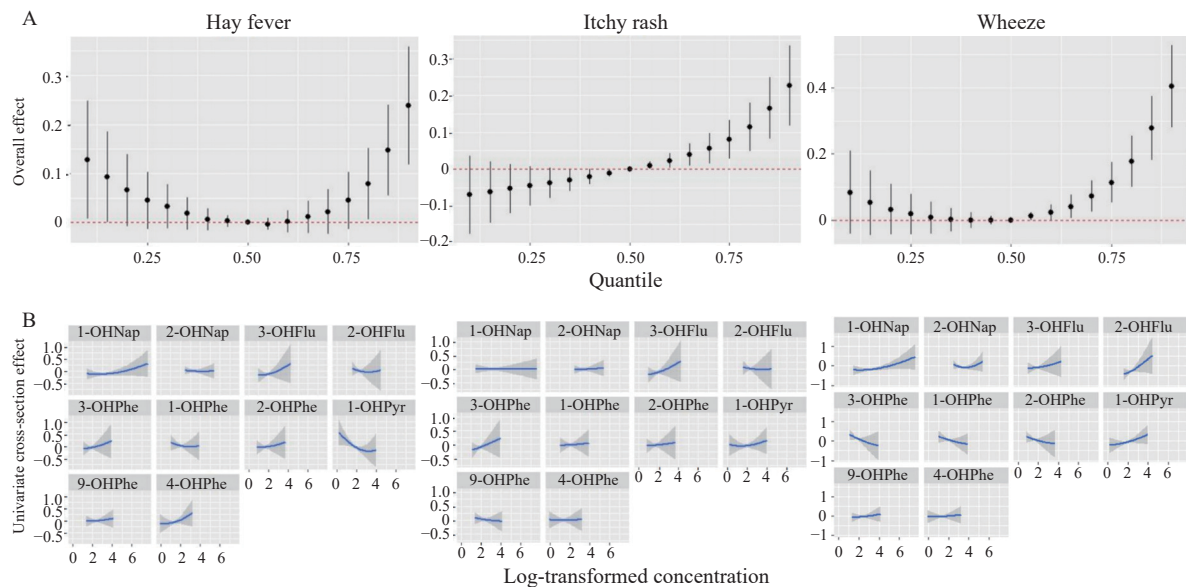




Supplementary Figure S1. Flow diagram of the study population.



Supplementary Figure S2. Overall effect of the urinary PAHs mixture on risks of allergic outcomes (A) and univariate exposure-response function between PAH metabolites and allergic outcomes (B) in the overall study population, estimated using BKMR models. Models were adjusted for age, race/ethnicity, sex, BMI, PIR, and serum cotinine level. The concentrations of urinary PAHs were log-transformed in the models.

Supplementary Table S1. Demographic characteristics of the study population by allergic outcome status in NHANES 2005–2006 ($n = 1,672$)

Characteristics	Asthma <i>N</i> (%) ^a		Hay fever <i>N</i> (%) ^a		Itchy rash <i>N</i> (%) ^a		Sneeze <i>N</i> (%) ^a		Eczema <i>N</i> (%) ^a		Wheeze <i>N</i> (%) ^a		Allergic sensitization <i>N</i> (%) ^a	
	Yes (<i>n</i> = 232)	No (<i>n</i> = 1,440)	Yes (<i>n</i> = 131)	No (<i>n</i> = 1,541)	Yes (<i>n</i> = 142)	No (<i>n</i> = 1,530)	Yes (<i>n</i> = 500)	No (<i>n</i> = 1,172)	Yes (<i>n</i> = 134)	No (<i>n</i> = 1,538)	Yes (<i>n</i> = 218)	No (<i>n</i> = 1,454)	Yes (<i>n</i> = 815)	No (<i>n</i> = 857)
Sex														
Male	116 (50.0)	723 (50.2)	61 (46.6)	778 (50.5)	71 (50.0)	768 (50.2)	229 (45.8)	610 (52.0)	62 (46.3)	777 (50.5)	107 (49.1)	732 (50.3)	446 (54.7)	393 (45.9)
Female	116 (50.0)	717 (49.8)	70 (53.4)	763 (49.5)	71 (50.0)	762 (49.8)	271 (54.2)	562 (48.0)	72 (53.7)	761 (49.5)	111 (50.9)	722 (49.7)	369 (45.3)	464 (54.1)
<i>P</i> -Value	0.953		0.389		0.964		0.019		0.345		0.728		0.000	
Age														
Children (6–19 years)	107 (46.1)	553 (38.4)	30 (22.9)	630 (40.9)	43 (30.3)	617 (40.3)	178 (35.6)	482 (41.1)	59 (44.0)	601 (39.1)	72 (33.0)	588 (40.4)	352 (43.2)	308 (35.9)
Adults (≥ 20 years)	125 (53.9)	887 (61.6)	101 (77.1)	911 (59.1)	99 (69.7)	913 (59.7)	322 (64.4)	690 (58.9)	75 (56.0)	937 (60.9)	146 (67.0)	866 (59.6)	463 (56.8)	549 (64.1)
<i>P</i> -Value	0.026		0.000		0.019		0.034		0.261		0.037		0.002	
Race/ethnicity														
Non-Hispanic White	87 (37.5)	639 (44.4)	77 (58.8)	649 (42.1)	59 (41.5)	667 (43.6)	256 (51.2)	470 (40.1)	65 (48.5)	661 (43.0)	101 (46.3)	625 (43.0)	304 (37.3)	422 (49.2)
Non-Hispanic Black	81 (34.9)	382 (26.5)	26 (19.8)	437 (28.4)	45 (31.7)	418 (27.3)	128 (25.6)	335 (28.6)	49 (36.6)	414 (26.9)	64 (29.4)	399 (27.4)	272 (33.4)	191 (22.3)
Mexican American	45 (19.4)	310 (21.5)	19 (14.5)	336 (21.8)	27 (19.0)	328 (21.4)	77 (15.4)	278 (23.7)	9 (6.7)	346 (22.5)	31 (14.2)	324 (22.3)	173 (21.2)	182 (21.2)
Other ^b	19 (8.2)	109 (7.6)	9 (6.9)	119 (7.7)	11 (7.7)	117 (7.6)	39 (7.8)	89 (7.6)	11 (8.2)	117 (7.6)	22 (10.1)	106 (7.3)	66 (8.1)	62 (7.3)
<i>P</i> -Value	0.015		0.004		0.847		0.000		0.001		0.026		0.000	
BMI ^c														
Underweight	2 (0.9)	30 (2.1)	2 (1.5)	30 (1.9)	2 (1.4)	30 (2.0)	9 (1.8)	23 (2.0)	0 (0.0)	32 (2.1)	4 (1.8)	28 (1.9)	15 (1.8)	17 (2.0)
Normal weight	89 (38.4)	582 (40.4)	50 (38.2)	621 (40.3)	46 (32.4)	625 (40.8)	192 (38.4)	479 (40.9)	56 (41.8)	615 (40.0)	63 (28.9)	608 (41.8)	331 (40.6)	340 (39.7)
Overweight	51 (22.0)	399 (27.7)	36 (27.5)	414 (26.9)	37 (26.1)	413 (27.0)	134 (26.8)	316 (27.0)	32 (23.9)	418 (27.2)	56 (25.7)	394 (27.1)	212 (26.0)	238 (27.8)
Obese	90 (38.8)	429 (29.8)	43 (32.8)	476 (30.9)	57 (40.1)	462 (30.2)	165 (33.0)	354 (30.2)	46 (34.3)	473 (30.8)	95 (43.6)	424 (29.2)	257 (31.5)	262 (30.6)
<i>P</i> -Value	> 0.05		> 0.05		> 0.05		> 0.05		> 0.05		0.008 ^d		> 0.05	
PIR														
Below poverty level (< 1.85)	97 (41.8)	610 (42.4)	36 (27.5)	671 (43.5)	63 (44.4)	644 (42.1)	182 (36.4)	525 (44.8)	50 (37.3)	657 (42.7)	96 (44.0)	611 (42.0)	354 (43.4)	353 (41.2)
Above poverty level (1.85–5)	135 (58.2)	830 (57.6)	95 (72.5)	870 (56.5)	79 (55.6)	886 (57.9)	318 (63.6)	647 (55.2)	84 (62.7)	881 (57.3)	122 (56.0)	843 (58.0)	461 (56.6)	504 (58.8)
<i>P</i> -Value	0.875		0.000		0.600		0.001		0.225		0.574		0.353	
Serum cotinine level														
Below LOD ^e	45 (19.4)	271 (18.8)	22 (16.8)	294 (19.1)	29 (20.4)	287 (18.8)	101 (20.2)	215 (18.3)	26 (19.4)	290 (18.9)	31 (14.2)	285 (19.6)	159 (19.5)	157 (18.3)
< 1 ng/mL	124 (53.4)	780 (54.2)	77 (58.8)	827 (53.7)	83 (58.5)	821 (53.7)	253 (50.6)	651 (55.5)	81 (60.4)	823 (53.5)	97 (44.5)	807 (55.5)	436 (53.5)	468 (54.6)
≥ 1 ng/mL	63 (27.2)	389 (27.0)	32 (24.4)	420 (27.3)	30 (21.1)	422 (27.6)	146 (29.2)	306 (26.1)	27 (20.1)	425 (27.6)	90 (41.3)	362 (24.9)	220 (27.0)	232 (27.1)
<i>P</i> -Value	0.973		0.529		0.254		0.177		0.160		0.000		0.815	

Note. NHANES: National Health and Nutrition Examination Survey; BMI: body mass index; PIR: poverty income ratio; LOD: limit of detection; Bold: Statistically significant ($P < 0.05$). ^aSelf-reported current symptoms in past 12 months; Symptoms of asthma, hay fever, and eczema were assessed only among those who reported a doctor's diagnosis. ^bAny serum IgE positive ≥ 0.35 kU/L. ^cOther race/ethnicity includes other Hispanic and non-Hispanic multiracial ethnicity. ^dNHANES classified children as underweight (BMI < 5th percentile), normal weight (BMI 5th to < 85th percentile), overweight (BMI 85th to < 95th percentile), or obese (BMI $\geq$ 95th percentile) according to the U.S. CDC gender-specific growth charts based on age and classified adults as underweight (BMI < 18.5 kg/m²), normal weight (18.5 $\leq$ BMI < 25 kg/m²), overweight (25 $\leq$ BMI < 30 kg/m²), or obese (BMI $\geq$ 30 kg/m²). ^eThe statistical value P between BMI and wheezing in adults was 0.008, in children was 0.124. ^fBelow 0.015 ng/mL.

Supplementary Table S2. Demographic characteristics of all participants aged ≥ 6 years ($n = 8,412$) and the study population ($n = 1,672$)

Characteristics	Study population ($N = 1672$)		Baseline population ($N = 8412$)		P-value
	N	(%)	N	(%)	
Sex					0.2234
Male	839	50.2	4084	48.5	
Female	833	49.8	4328	51.5	
Age					0.3092
Children (6–19 years)	660	39.5	3433	40.8	
Adults (≥ 20 years)	1012	60.5	4979	59.2	
Race/ethnicity					0.0032
Non-Hispanic White	726	43.4	3377	40.1	
Non-Hispanic Black	463	27.7	2247	26.7	
Mexican American	355	21.2	2133	25.4	
Other	128	7.7	655	7.8	
BMI					0.9196
Underweight	32	1.9	153	1.8	
Normal weight	671	40.1	3263	38.8	
Overweight	450	26.9	2146	25.5	
Obese	519	31.1	2412	28.7	
PIR					0.1451
Below poverty level (< 1.85)	707	42.3	3537	42.0	
Above poverty level (1.85–5)	965	57.7	4460	53.0	
Serum cotinine level					0.4565
Below LOD (0.015 ng/mL)	316	18.9	1319	15.7	
< 1 ng/mL	904	54.1	4099	48.7	
≥ 1 ng/mL	452	27.0	1944	23.1	

Note. BMI: body mass index; PIR: poverty income ratio; LOD: limit of detection. All analyses were performed by chi-square test. Numbers vary slightly in BMI, PIR, and serum cotinine level among baseline population due to missing data.

Supplementary Table S3. Distribution of urinary PAH metabolites (creatinine unadjusted and adjusted) among participants in NHANES 2005–2006 ($n = 1,672$)

Characteristics		Not adjusted for creatinine (ng/L)					Creatinine adjusted (ng/g Cr)				
		Percentile of distribution					Percentile of distribution				
		GM	25th	50th	75th	95th	GM	25th	50th	75th	95th
Metabolites	Detection rate (%)										
1-OHNap	99.8	2463.7	788.0	1885.0	7055.2	43959.4	2184.5	702.8	1597.2	5528.5	34056.7
2-OHNap	100.0	3806.6	1709.4	3631.9	8107.5	28044.9	3375.2	1686.5	2984.3	6215.1	20745.2
3-OHFlu	99.8	117.7	49.2	101.3	253.9	1323.9	104.3	47.4	78.1	177.8	1055.2
2-OHFlu	100	301.8	143.3	275.9	585.4	2547.7	267.6	138.2	207.7	413.4	1879.3
3-OHPhe	99.8	103.2	54.5	101.2	197.7	544.6	91.5	53.1	83.0	140.2	391.7
1-OHPhe	100	148.5	81.2	147.9	267.9	664.8	131.7	80.4	125.7	201.4	474.8
2-OHPhe	99.6	63.4	34.5	63.1	115.2	296.7	56.2	33.5	51.1	86.4	227.2
1-OHPyr	99.8	100.9	48.5	95.8	205.8	678.8	89.4	48.0	82.7	150.9	462.5
9-OHFlu	100	308.7	159.1	301.3	585.8	1720.6	273.7	151.3	244.9	443.4	1339.6
4-OHPhe	96.5	29.8	16.0	29.3	55.4	152.4	26.4	15.3	24.8	42.6	106.6

Note. GM: Geometric Mean.

Supplementary Table S4. Adjusted *ORs* (95% *CI*s) for the association between urinary PAHs and allergic outcomes in the overall study population in NHANES 2005–2006 ($n = 1,672$)

PAHs	Asthma	Hay fever	Itchy rash	Sneeze	Eczema	Wheeze	Allergic sensitization
1-OHNap	0.99 (0.79–1.25)	1.32 (1.02–1.72) *	1.13 (0.87–1.46)	1.08 (0.91–1.28)	1.03 (0.78–1.37)	1.32 (1.06–1.64) *	0.95 (0.81–1.11)
2-OHNap	1.01 (0.69–1.50)	1.47 (0.90–2.40)	1.40 (0.87–2.24)	0.90 (0.67–1.20)	1.35 (0.83–2.21)	1.41 (0.96–2.09)	0.90 (0.69–1.18)
3-OHFlu	0.98 (0.67–1.42)	1.75 (1.09–2.82) *	2.05 (1.30–3.23) **	1.11 (0.84–1.47)	1.09 (0.67–1.77)	1.47 (1.03–2.12) *	0.91 (0.70–1.19)
2-OHFlu	0.86 (0.55–1.32)	1.64 (0.96–2.80)	1.99 (1.20–3.32) **	1.16 (0.84–1.60)	1.14 (0.66–1.98)	1.60 (1.06–2.41) *	0.88 (0.65–1.18)
3-OHPhe	0.81 (0.51–1.29)	1.68 (0.97–2.89)	2.14 (1.28–3.58) **	1.00 (0.71–1.42)	1.46 (0.84–2.52)	1.07 (0.68–1.69)	0.94 (0.68–1.29)
1-OHPhe	0.79 (0.49–1.27)	1.22 (0.68–2.20)	1.87 (1.09–3.20) *	0.88 (0.62–1.26)	1.41 (0.80–2.50)	0.99 (0.61–1.61)	0.95 (0.69–1.32)
2-OHPhe	0.71 (0.43–1.16)	1.54 (0.88–2.71)	1.88 (1.10–3.20) *	0.98 (0.69–1.39)	1.46 (0.83–2.57)	1.03 (0.64–1.66)	0.97 (0.70–1.34)
1-OHPyr	0.91 (0.62–1.34)	1.06 (0.65–1.73)	1.79 (1.15–2.80) *	0.83 (0.62–1.11)	1.43 (0.90–2.28)	1.33 (0.91–1.94)	1.02 (0.78–1.32)
9-OHFlu	0.68 (0.43–1.07)	1.63 (0.96–2.76)	1.44 (0.86–2.42)	1.05 (0.76–1.46)	0.87 (0.50–1.52)	1.18 (0.76–1.84)	1.05 (0.78–1.43)
4-OHPhe	0.92 (0.60–1.43)	1.65 (0.96–2.82)	1.61 (0.96–2.72)	0.84 (0.61–1.16)	1.12 (0.65–1.93)	1.18 (0.76–1.84)	0.97 (0.72–1.31)

Note. All models adjusted for age, race/ethnicity, sex, BMI, PIR, and serum cotinine level; * $P < 0.05$; ** $P < 0.01$. Urine PAHs concentrations were adjusted for creatinine then log10-transformed.

Supplementary Table S5. Adjusted *ORs* (95% *CI*s) for the association between urinary PAHs and allergic outcomes in adults in NHANES 2005–2006 (*n* = 1,012)

PAHs	Asthma	Hay fever	Itchy rash	Sneeze	Eczema	Wheeze	Allergic sensitization
1-OHNap	0.88 (0.65–1.18)	1.29 (0.97–1.73)	0.98 (0.71–1.35)	0.94 (0.76–1.15)	0.99 (0.70–1.41)	1.35 (1.04–1.74)*	1.01 (0.83–1.23)
2-OHNap	1.24 (0.74–2.08)	1.64 (0.94–2.84)	1.14 (0.64–2.01)	0.90 (0.62–1.30)	1.33 (0.70–2.51)	1.77 (1.09–2.87)*	0.97 (0.68–1.37)
3-OHFlu	1.02 (0.61–1.71)	1.96 (1.14–3.36)*	1.83 (1.06–3.16)*	1.16 (0.81–1.66)	1.10 (0.59–2.06)	1.71 (1.08–2.70)*	0.90 (0.64–1.26)
2-OHFlu	0.96 (0.54–1.73)	1.72 (0.94–3.13)	1.98 (1.09–3.58)*	1.22 (0.82–1.82)	1.16 (0.58–2.32)	2.03 (1.23–3.36)**	0.84 (0.57–1.22)
3-OHPhe	0.86 (0.46–1.61)	1.63 (0.87–3.03)	1.90 (1.03–3.48)*	1.04 (0.68–1.60)	1.25 (0.61–2.55)	1.21 (0.70–2.10)	0.80 (0.53–1.21)
1-OHPhe	0.72 (0.38–1.38)	1.21 (0.62–2.38)	1.67 (0.88–3.18)	0.83 (0.53–1.30)	1.15 (0.54–2.43)	1.07 (0.60–1.94)	0.87 (0.57–1.33)
2-OHPhe	0.83 (0.44–1.56)	1.41 (0.74–2.66)	1.75 (0.95–3.24)	0.93 (0.60–1.43)	1.44 (0.71–2.89)	1.23 (0.70–2.15)	0.84 (0.56–1.27)
1-OHPyr	0.94 (0.56–1.59)	1.23 (0.70–2.15)	2.02 (1.19–3.42)**	0.88 (0.61–1.27)	1.52 (0.83–2.80)	1.55 (0.97–2.49)	0.80 (0.56–1.13)
9-OHFlu	0.80 (0.43–1.46)	1.60 (0.86–2.96)	1.53 (0.83–2.81)	0.86 (0.57–1.30)	0.89 (0.43–1.83)	1.28 (0.75–2.19)	1.08 (0.73–1.60)
4-OHPhe	0.89 (0.50–1.58)	1.47 (0.79–2.72)	1.16 (0.62–2.16)	0.72 (0.48–1.09)	0.90 (0.45–1.81)	1.15 (0.67–1.95)	0.80 (0.55–1.18)

Note. All models adjusted for age, race/ethnicity, sex, BMI, PIR, and serum cotinine level; **P* < 0.05; ***P* < 0.01. Urine PAHs concentrations were adjusted for creatinine then log10-transformed.

Supplementary Table S6. Adjusted *ORs* (95% *CI*s) for the association between the quartiles of urinary PAHs and allergic outcomes in children in NHANES 2005–2006 (*n* = 660)

PAHs	Asthma	Hay fever	Itchy rash	Sneeze	Eczema	Wheeze	Allergic sensitization
1-OHNap							
Q1 (≤ 579.12)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (579.13–1101.93)	0.82 (0.43–1.56)	1.06 (0.37–3.05)	1.23 (0.45–3.34)	0.76 (0.45–1.29)	1.28 (0.57–2.87)	1.37 (0.67–2.82)	1.10 (0.71–1.71)
Q3 (1101.94–2870.60)	1.37 (0.76–2.48)	1.41 (0.50–4.02)	2.16 (0.87–5.36)	1.39 (0.84–2.30)	1.18 (0.52–2.68)	1.11 (0.53–2.33)	0.88 (0.56–1.38)
Q4 (≥ 2870.61)	1.15 (0.62–2.13)	1.02 (0.32–3.26)	1.45 (0.54–3.90)	1.47 (0.88–2.45)	1.42 (0.63–3.23)	1.12 (0.53–2.37)	1.08 (0.68–1.71)
<i>P</i> for trend ^a	0.573	0.921	0.710	0.051	0.491	0.923	0.758
2-OHNap							
Q1 (≤ 1605.16)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (1605.17–2560.92)	0.90 (0.49–1.65)	0.82 (0.32–2.15)	1.07 (0.38–2.98)	0.81 (0.50–1.34)	1.08 (0.50–2.33)	0.39 (0.18–0.83)	0.65 (0.42–1.03)
Q3 (2560.93–4503.30)	0.80 (0.43–1.50)	0.30 (0.08–1.18)	2.32 (0.90–5.94)	0.72 (0.43–1.22)	1.04 (0.45–2.38)	0.66 (0.33–1.29)	0.68 (0.43–1.08)
Q4 (≥ 4503.31)	1.04 (0.57–1.90)	0.80 (0.29–2.24)	2.05 (0.76–5.52)	0.90 (0.54–1.50)	1.40 (0.62–3.17)	0.51 (0.25–1.04)	0.71 (0.44–1.13)
<i>P</i> for trend	0.723	0.788	0.142	0.970	0.396	0.271	0.426
3-OHFlu							
Q1 (≤ 49.23)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (49.24–77.73)	1.18 (0.65–2.17)	0.32 (0.11–0.94)	0.85 (0.34–2.15)	1.00 (0.61–1.65)	0.82 (0.36–1.84)	0.98 (0.48–2.03)	0.61 (0.39–0.96)
Q3 (77.74–125.23)	1.04 (0.55–1.98)	0.20 (0.06–0.69)	1.48 (0.60–3.64)	0.90 (0.53–1.52)	1.01 (0.45–2.26)	1.19 (0.58–2.44)	0.76 (0.47–1.23)
Q4 (≥ 125.24)	1.13 (0.59–2.17)	0.39 (0.13–1.15)	1.58 (0.60–4.14)	0.91 (0.53–1.57)	1.13 (0.49–2.59)	0.81 (0.37–1.78)	0.88 (0.54–1.43)
<i>P</i> for trend	0.830	0.419	0.276	0.741	0.581	0.496	0.633
2-OHFlu							
Q1 (≤ 132.06)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (132.07–191.96)	0.72 (0.39–1.33)	0.30 (0.09–0.98)	0.45 (0.17–1.15)	0.70 (0.42–1.16)	0.58 (0.24–1.39)	0.87 (0.43–1.78)	0.94 (0.60–1.49)

Continued

PAHs	Asthma	Hay fever	Itchy rash	Sneeze	Eczema	Wheeze	Allergic sensitization
Q3 (191.97–289.03)	1.09 (0.59–1.98)	0.47 (0.16–1.33)	0.93 (0.39–2.20)	0.89 (0.53–1.49)	1.82 (0.86–3.85)	1.06 (0.52–2.17)	1.24 (0.77–1.99)
Q4 ($\geq$ 289.04)	0.70 (0.36–1.34)	0.49 (0.17–1.44)	0.88 (0.35–2.23)	0.79 (0.46–1.34)	0.73 (0.30–1.77)	0.60 (0.27–1.33)	0.95 (0.59–1.53)
P for trend	0.384	0.518	0.840	0.660	0.649	0.189	0.795
3-OHPhe							
Q1 ($\leq$ 52.93)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (52.94–80.98)	0.79 (0.43–1.45)	0.71 (0.24–2.11)	1.34 (0.52–3.49)	0.79 (0.48–1.30)	0.71 (0.31–1.65)	0.81 (0.40–1.64)	0.88 (0.55–1.39)
Q3 (80.99–117.35)	0.86 (0.46–1.61)	0.38 (0.10–1.40)	1.78 (0.67–4.71)	0.64 (0.37–1.09)	1.05 (0.47–2.35)	1.01 (0.50–2.04)	1.02 (0.64–1.64)
Q4 ($\geq$ 117.36)	0.89 (0.47–1.66)	1.15 (0.40–3.30)	2.35 (0.87–6.36)	0.92 (0.54–1.55)	1.08 (0.47–2.52)	0.55 (0.25–1.21)	1.31 (0.81–2.13)
P for trend	0.902	0.449	0.085	0.972	0.559	0.149	0.128
1- OHPhe							
Q1 ($\leq$ 67.61)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (67.62–106.82)	0.57 (0.30–1.09)	0.40 (0.12–1.39)	1.28 (0.53–3.13)	0.71 (0.43–1.18)	0.91 (0.41–2.06)	0.66 (0.31–1.39)	0.85 (0.54–1.34)
Q3 (106.83–161.67)	1.18 (0.66–2.14)	0.80 (0.28–2.25)	1.12 (0.43–2.96)	0.72 (0.43–1.21)	1.12 (0.50–2.51)	1.17 (0.59–2.32)	1.00 (0.63–1.59)
Q4 ($\geq$ 161.68)	0.98 (0.52–1.82)	0.87 (0.31–2.47)	1.48 (0.57–3.84)	0.82 (0.49–1.38)	1.11 (0.48–2.57)	0.70 (0.32–1.50)	1.22 (0.76–1.97)
P for trend	0.554	0.770	0.489	0.697	0.707	0.565	0.214
2-OHPhe							
Q1 ($\leq$ 29.40)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (29.41–41.34)	1.13 (0.63–2.01)	0.46 (0.15–1.40)	1.19 (0.48–2.94)	0.74 (0.45–1.21)	1.28 (0.59–2.77)	1.56 (0.79–3.09)	0.94 (0.60–1.47)
Q3 (41.35–61.12)	0.77 (0.41–1.44)	0.25 (0.07–0.98)	1.41 (0.56–3.54)	0.61 (0.36–1.03)	0.96 (0.42–2.20)	0.77 (0.35–1.67)	0.95 (0.60–1.49)
Q4 ($\geq$ 61.13)	0.97 (0.52–1.81)	1.06 (0.41–2.71)	1.52 (0.59–3.93)	0.89 (0.54–1.48)	1.17 (0.51–2.66)	0.93 (0.43–1.99)	1.18 (0.74–1.89)
P for trend	0.804	0.399	0.396	0.968	0.852	0.456	0.359
1-OHPyr							
Q1 ($\leq$ 53.32)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (53.33–88.74)	0.94 (0.51–1.74)	0.69 (0.25–1.94)	0.99 (0.40–2.44)	0.98 (0.59–1.61)	0.82 (0.38–1.79)	1.16 (0.56–2.43)	0.95 (0.60–1.50)
Q3 (88.75–143.81)	1.05 (0.56–1.97)	0.43 (0.13–1.39)	1.20 (0.47–3.03)	0.99 (0.59–1.67)	0.72 (0.32–1.63)	1.42 (0.68–2.98)	1.05 (0.65–1.68)
Q4 ($\geq$ 143.82)	1.13 (0.60–2.13)	0.68 (0.23–1.97)	1.43 (0.54–3.79)	0.74 (0.43–1.27)	0.71 (0.30–1.65)	1.00 (0.45–2.19)	0.99 (0.61–1.60)
P for trend	0.611	0.628	0.414	0.220	0.483	0.818	0.979
9-OHFlu							
Q1 ($\leq$ 128.77)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (128.78–197.18)	0.75 (0.41–1.37)	0.73 (0.25–2.10)	1.71 (0.72–4.09)	0.85 (0.50–1.42)	1.13 (0.52–2.43)	0.73 (0.35–1.51)	0.92 (0.59–1.45)
Q3 (197.19–323.24)	0.81 (0.44–1.50)	0.37 (0.11–1.33)	1.37 (0.52–3.59)	0.89 (0.52–1.51)	0.88 (0.39–1.99)	0.95 (0.47–1.92)	0.91 (0.57–1.45)
Q4 ($\geq$ 323.25)	0.77 (0.41–1.45)	1.02 (0.37–2.81)	0.95 (0.32–2.77)	1.27 (0.76–2.15)	0.59 (0.24–1.48)	0.57 (0.26–1.25)	1.29 (0.80–2.08)
P for trend	0.584	0.710	0.593	0.178	0.163	0.203	0.176
4-OHPhe							
Q1 ($\leq$ 13.76)	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (13.77–20.65)	0.69 (0.36–1.32)	0.27 (0.07–1.02)	0.52 (0.17–1.64)	0.53 (0.31–0.88)	0.60 (0.26–1.39)	1.14 (0.54–2.39)	0.79 (0.50–1.24)

Continued							
PAHs	Asthma	Hay fever	Itchy rash	Sneeze	Eczema	Wheeze	Allergic sensitization
Q3 (20.66–33.65)	1.43 (0.79–2.59)	0.47 (0.15–1.45)	1.64 (0.65–4.14)	0.77 (0.47–1.26)	0.90 (0.41–1.97)	1.60 (0.78–3.27)	1.04 (0.66–1.63)
Q4 (≥ 33.66)	1.25 (0.68–2.31)	1.14 (0.44–2.91)	2.07 (0.82–5.22)	0.77 (0.47–1.28)	0.89 (0.40–1.97)	0.94 (0.43–2.06)	1.10 (0.69–1.75)
<i>P</i> for trend	0.201	0.223	0.026	0.868	0.854	0.736	0.377

Note. All models adjusted for age, race/ethnicity, sex, BMI, PIR, and serum cotinine level. Q1: Quartile 1; Q2: Quartile 2; Q3: Quartile 3; Q4: Quartile 4; OR: odds ratio; CI: confidence interval. ^a *p* values for the medians of each quartile of PAHs levels included in the logistic regression models.

Supplementary Table S7. Posterior inclusion probabilities (PIPs) for urinary PAHs metabolites with allergic outcomes in the overall study population (*n* = 1,672) and adults (*n* = 1,012)

Population	PAHs	Hay fever	Itchy rash	Wheeze
Overall	1-OHNap	0.3358	0.0970	0.6004
	2-OHNap	0.3082	0.1904	0.6534
	3-OHFlu	0.5262	0.4132	0.5642
	2-OHFlu	0.5382	0.3378	0.7352
	3-OHPhe	0.4832	0.3984	0.5972
	1-OHPhe	0.4978	0.2178	0.5504
	2-OHPhe	0.4350	0.2640	0.5614
	1-OHPyr	0.6608	0.4000	0.4554
	9-OHFlu	0.3580	0.1992	0.4092
	4-OHPhe	0.5050	0.1948	0.4044
Adults	1-OHNap	0.3172	0.1390	0.5098
	2-OHNap	0.3254	0.1416	0.5390
	3-OHFlu	0.4852	0.2312	0.5262
	2-OHFlu	0.4160	0.2824	0.8858
	3-OHPhe	0.4412	0.2978	0.6590
	1-OHPhe	0.4376	0.2726	0.6220
	2-OHPhe	0.3934	0.2174	0.5770
	1-OHPyr	0.3658	0.4414	0.5014
	9-OHFlu	0.4158	0.2510	0.4380
	4-OHPhe	0.3780	0.2674	0.4120

Note. Bold: Statistically significant in the logistic regression model.