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Supplemental Material

A Prospective Analysis of Per- and Polyfluoroalkyl Substances from Early Pregnancy to Delivery in the Atlanta African American Maternal–Child Cohort

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Table S8. Adjusted percent change between natural log transformed newborn dried blood PFASs (ng/ml) samples and maternal serum PFASs (ng/ml) samples in early and late pregnancy, respectively, Atlanta African American Maternal-Child Cohort, 2014-2020 (N=199).

Figure S1. Directed acyclic graph (DAG)(*https://www.dagitty.net/)* for hypothesized relationships between repeated maternal serum per- and polyfluoroalkyl substances (PFAS) and newborn DBS PFAS.

Figure S2. The Spearman correlation matrix of natural log-transformed PFAS among paired maternal samples (N=301) (left) and maternal-newborn pairs (N=199) (right). The summary data can be found in Table S5.

Figure S3. Violin plots of PFAS transfer ratio among maternal-newborn pairs in the Atlanta African American Maternal-Child Cohort, 2014 – 2020 (N=73).

Figure S4. The adjusted percent change and 95% confidence interval (CI) for PFAS concentrations among maternal-newborn pairs (N=199) using inverse probability weights (IPW). A. The density plots of estimated propensity scores among N=199 subsets and remaining subsets from overall N=533 populations; B. The frequency plots of estimated propensity scores among N=199 subsets and remaining subsets from overall N=533 populations; C. The adjusted percent change and 95% confidence interval (CI) for PFAS concentrations using linear mixed effect model after applying IPW.

Table S1. Experimental details on the PFAS measurements. Atlanta African American Maternal-Child Cohort, 2014-2020.

Name	Abbreviation	Molecular formula	CAS Registry Number	Carbon Chain Length	Limit of Detection (ng/mL)		
					ME	ML	DBS
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorohexanoic acid	PFHxA	$C_6HF_{11}O_2$	307-24-4	C6	NY: 0.018; WA: 0.050	NY:0.018	-
Perfluoroheptanoic acid	PFHpA	$C_7HF_{13}O_2$	375-85-9	C7	NY: 0.022; WA: 0.050	NY:0.022	-
Perfluorooctanoic acid	PFOA	$C_8HF_{15}O_2$	335-67-1	C8	NY: 0.020; WA: 0.035; EM:0.200	NY:0.020	NY:0.028
Perfluorononanoic acid	PFNA	$C_9HF_{17}O_2$	375-95-1	C9	NY: 0.027; WA:0.02; EM: 0.100	NY:0.027	NY:0.018
Perfluorodecanoic acid	PFDA	$C_{10}HF_{19}O_2$	335-76-2	C10	NY: 0.020; WA: 0.035	NY:0.020	-
Perfluoroundecanoic acid	PFUnDA	$C_{11}HF_{21}O_2$	2058-94-8	C11	NY: 0.017; WA: 0.020	NY:0.017	-
Perfluorododecanoic acid	PFDoDA	$C_{12}HF_{23}O_2$	307-55-1	C12	NY: 0.020; WA: 0.035	NY:0.020	-
Perfluoroalkane sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid	PFBS	$C_4HF_9O_3S$	375-73-5	C4	NY: 0.028; WA: 0.020	NY:0.028	-
Perfluorohexane sulfonate	PFHxS	$C_6HF_{13}O_3S$	355-46-4	C6	NY/WA: 0.020; EM: 0.200	NY:0.020	NY:0.022
Perfluorooctane sulfonate	PFOS	$C_8HF_{17}O_3S$	1763-23-1	C8	NY: 0.019/WA:0.020; EM: 0.050	NY:0.019	NY:0.019
Perfluoroalkane sulfonamides (FASAs)							
Perfluorooctanesulfonamide	PFOSA	$C_8H_2F_{17}NO_2S$	754-91-6	C8	NY: 0.016; WA:0.020	NY:0.016	-
N-methyl Perfluorooctane sulfonamido acetic acid	NMFOSAA	$C_{11}H_6F_{17}NO_4S$	2355-31-9	C11	NY: 0.017; WA:0.020	NY:0.017	-

Abbreviations: ME: maternal samples in early pregnancy including both NY and EM sources; ML: maternal samples in late pregnancy; DBS: newborn dried blood samples; NY: Wadsworth Lab Hub; WA: Wadsworth Center at New York State Department of Health; EM: Laboratory of Exposure Assessment and Development for Environmental Health Research at Emory University. PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFHpA = perfluoroheptanoic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; PFDoDA = perfluorododecanoic acid; PFOSA = perfluorooctanesulfonamide; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid; PFHxA = perfluorohexanoic acid.

Table S2. Overlapped maternal serum PFAS concentrations (ng/ml) in early pregnancy from Wadsworth Center at New York State Department of Health and New York University Laboratory Hub^. Atlanta African American Maternal-Child Cohort, 2014-2020.

PFAS	PFBS			PFHXS			PFOS			PFOA			PFNA		
Subject ID	NY	WA	RPD%*	NY	WA	RPD%	NY	WA	RPD%	NY	WA	RPD%	NY	WA	RPD%
E0611	0.436	< LOD#	-	0.709	2.341	106.96	4.950	2.191	77.30	1.066	0.425	85.90	0.753	0.271	94.31
E0644	-	-	-	0.144	2.913	181.18	3.430	1.892	57.78	0.576	0.581	0.77	0.424	0.217	64.67
E0656	1.441	0.023	193.83	0.571	2.904	134.25	0.374	0.935	85.69	0.719	0.575	22.17	0.258	0.140	59.09

PFAS	PFHPA		PFDA		PFUNDA		PFDODA		PFOSA		NMFOSAA		PFHXA	
Subject ID	NY	WA	NY	WA	NY	WA	NY	WA	NY	WA	NY	WA	NY	WA
E0611^	0.437	< LOD	0.392	< LOD	0.070	0.026	0.129	< LOD	< LOD	< LOD	0.098	< LOD	0.389	< LOD
E0656^	< LOD	< LOD	0.096	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	0.061	< LOD	< LOD

*%RPD, Relative percent differences = (Lab 1 result – Lab 2 result)*100/(Lab 1 result + Lab 2 result)/2;

^Results used in the main analysis: 1. Both measured under LOD or above LOD: used the average value of the overlapped sample concentrations; ^ One above LOD and the other below LOD: used value above LOD;

#Values below LODs were replaced by LOD/$\sqrt{2}$;

Abbreviations: NY: New York University Laboratory Hub; WA: Wadsworth Center at New York State Department of Health; PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFHpA = perfluoroheptanoic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; PFDoDA = perfluorododecanoic acid; PFOSA = perfluorooctanesulfonamide; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid; PFHxA = perfluorohexanoic acid.

Table S3. Geometric means (GMs) of four most common PFAS (ng/ml) [^] in maternal serum in early and late pregnancy and newborn DBS among mother-newborn dyads by prenatal factors (N=199). Atlanta African American Maternal-Child Cohort, 2014-2020

Prenatal Characteristic		PFHxS				PFOS				PFOA				PFNA			
		ME	ML	DBS	P*	ME	ML	DBS	P*	ME	ML	DBS	P*	ME	ML	DBS	P*
Age (years)	≥18 and <25	1.048	3.907	0.577	0.03	2.043	2.967	0.375	0.42	0.613	0.548	0.042	0.45	0.232	0.414	0.015	0.32
	≥25 and <30	0.949	3.173	0.488	<0.01	1.994	2.506	0.355	<0.01	0.633	0.535	0.049	<0.01	0.254	0.431	0.015	<0.01
	≥30 and ≤40	0.892	3.561	0.609	0.67	1.976	2.791	0.499	0.79	0.628	0.404	0.045	0.54	0.267	0.407	0.021	0.50
Married or Cohabiting																	
	Yes	0.976	3.814	0.571	0.19	2.060	2.857	0.368	0.17	0.602	0.519	0.043	0.33	0.231	0.432	0.016	0.05
	No	1.024	3.541	0.552	<0.01	1.986	2.801	0.392	<0.01	0.637	0.515	0.046	<0.01	0.253	0.402	0.016	<0.01
					0.54				0.84				0.89				0. 39
Education level																	
	Less than high school	1.017	4.099	0.464	0.72	1.883	2.707	0.421	0.01	0.578	0.495	0.040	0.01	0.235	0.389	0.016	<0.01
	High school	0.942	3.709	0.606	<0.01	1.857	2.648	0.360	<0.01	0.607	0.464	0.043	<0.01	0.221	0.390	0.014	<0.01
	Some college	1.036	3.693	0.498	0.18	2.109	2.875	0.356	0.98	0.602	0.549	0.040	0.92	0.236	0.426	0.016	0.93
	College and above	1.062	3.246	0.655		2.455	3.296	0.465		0.737	0.608	0.063		0.328	0.488	0.022	
Income-to-poverty ratio (%)																	
	< 100	0.906	3.748	0.555	0.10	1.732	2.776	0.361	0.13	0.525	0.510	0.034	0.06	0.206	0.399	0.013	0.05
	≥100 and < 150	0.975	4.131	0.717	<0.01	2.216	2.793	0.482	<0.01	0.694	0.363	0.057	<0.01	0.271	0.401	0.023	<0.01
	≥150 and < 300	1.159	3.830	0.582	0.29	2.326	2.959	0.419	0.80	0.699	0.545	0.053	0.08	0.261	0.443	0.016	0.06
	≥ 300	0.952	2.853	0.410		2.113	2.550	0.406		0.710	0.505	0.062		0.319	0.403	0.024	
Pregnancy insurance																	
	Private	1.075	3.329	0.499	0.65	2.303	2.697	0.400	0.10	0.660	0.463	0.052	0.25	0.284	0.430	0.021	<0.01
	Medicaid	0.980	3.785	0.576	<0.01	1.949	2.870	0.377	<0.01	0.609	0.535	0.042	<0.01	0.231	0.412	0.015	<0.01
					0.17				0.40				0.27				0.27
Hospital Site																	
	Grady	0.968	3.708	0.662	0.53	1.922	2.823	0.352	0.07	0.640	0.550	0.047	0.19	0.227	0.407	0.015	<0.01
	Emory Midtown	1.047	3.624	0.437	<0.01	2.171	2.836	0.430	<0.01	0.593	0.476	0.040	<0.01	0.265	0.429	0.018	<0.01
					<0.01				0.52				0.87				0.55
Tobacco use																	
	No	1.025	3.697	0.544	0.89	2.080	2.959	0.371	0.34	0.632	0.534	0.042	0.93	0.248	0.420	0.016	0.94
	Yes	0.865	3.539	0.687	<0.01	1.709	2.214	0.471	<0.01	0.553	0.432	0.060	<0.01	0.210	0.400	0.014	<0.01
					0.13				0.12				0.13				0.76
Alcohol use																	
	No	1.000	3.657	0.541	0.05	2.010	2.814	0.375	0.11	0.608	0.507	0.043	<0.01	0.237	0.411	0.016	<0.01
	Yes	1.006	3.824	0.904	<0.01	2.148	2.979	0.488	<0.01	0.762	0.630	0.077	<0.01	0.302	0.477	0.023	<0.01
					0.13				0.81				0.55				0.72
Marijuana use																	
	No	1.042	3.838	0.474	0.25	2.111	2.934	0.372	0.02	0.616	0.528	0.041	0.37	0.250	0.426	0.016	<0.01
	Yes	0.917	3.336	0.741	<0.01	1.843	2.612	0.398	<0.02	0.628	0.494	0.051	<0.01	0.226	0.395	0.017	<0.01
					<0.01				0.50				0.33				0.39
Parity																	
	0	1.146	3.581	0.689	<0.01	2.175	2.960	0.299	0.28	0.715	0.554	0.051	<0.01	0.264	0.430	0.016	<0.01
	1	0.977	3.747	0.559	<0.01	2.006	2.784	0.464	<0.01	0.598	0.533	0.044	<0.01	0.227	0.428	0.019	<0.01
	≥2	0.800	3.741	0.418	0.01	1.783	2.670	0.450	0.02	0.496	0.445	0.037	0.93	0.222	0.382	0.015	0.44
First prenatal BMI (kg/m²)																	
	Underweight (< 18.5)	1.070	4.337	0.727	0.01	2.707	3.207	0.488	0.20	0.765	0.351	0.036	0.32	0.273	0.378	0.013	0.11
	Healthy weight (18.5-24.9)	1.122	3.789	0.450	<0.01	2.202	2.937	0.310	<0.01	0.634	0.575	0.040	<0.01	0.258	0.427	0.015	<0.01
	Overweight (25-29.9)	1.007	4.184	0.682	0.02	2.027	2.713	0.468	0.24	0.624	0.470	0.049	0.51	0.234	0.426	0.018	0.65
	Obese (≥30)	0.874	3.240	0.589		1.789	2.748	0.397		0.590	0.508	0.047		0.228	0.404	0.016	
Sex of infant																	
	Male	0.991	3.533	0.567	0.60	2.003	2.617	0.393	0.63	0.579	0.492	0.044	0.33	0.223	0.394	0.017	0.36
	Female	1.034	3.806	0.554	<0.01	2.056	3.039	0.372	0.01	0.666	0.541	0.044	<0.01	0.262	0.438	0.015	<0.01
					0.78				0.48				0.78				0.11

*P values were calculated through two-way ANOVA to evaluate: 1). The difference of maternal serum samples and newborn DBS between groups of prenatal predictors; 2). The difference of maternal serum samples and newborn DBS between pregnancy stages; 3). The potential interaction between groups of prenatal predictors and pregnancy stages; P values below 0.05 were highlighted in the table.

Abbreviations: ME: maternal samples in early pregnancy; ML: maternal samples in late pregnancy; DBS: Newborn dried blood sample; PFAS = perfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFOS = perfluorooctane sulfonic acid; PFHxS = perfluorohexane sulfonic acid.

Table S4. Sociodemographic and clinical characteristics of study participants in the Atlanta African American Maternal-Child Cohort, 2014-2020.

Characteristics	Overall^ N=531 (%)
Maternal age (years)	
Mean ± SD	25.08 ± 4.93
Married or cohabiting	
Yes	254 (47.8%)
No	277 (52.2%)
Maternal education level	
Less than high school	84 (15.8%)
High school	206 (38.8%)
Some college	154 (29.0%)
College and above	87 (16.4%)
Income-to-poverty ratio	
< 100	233 (43.9%)
≥100 and < 150	119 (22.4%)
≥150 and < 300	113 (21.3%)
≥ 300	66 (12.4%)
Health insurance	
Private	112 (21.1%)
Medicaid	419 (78.9%)
Hospital site	
Grady Memorial Hospital	316 (59.5%)
Emory University Hospital – Midtown	215 (40.5%)
Alcohol use in month prior to pregnancy	
No	482 (90.8%)
Yes	49 (9.2%)
Tobacco use in month prior to pregnancy	
No	460 (86.6%)
Yes	71 (13.4%)
Marijuana use in month prior to pregnancy	
No	353 (66.5%)
Yes	178 (33.5%)
Gestational age at first sample collection	

Mean ± SD	11.31 ± 2.22
Gestational age at second sample collection	
Mean ± SD	26.55 ± 2.51
Body mass index (kg/m^2)	
Mean ± SD	28.73 ± 7.88
Parity (#)	
0	248 (46.7%)
1	142 (26.7%)
>=2	141 (26.6%)
Sex of infant*	
Female	257 (48.4%)
Male	267 (50.3%)

[*] Total percentage doesn't sum to 100 due to missing information.

[^] Overall: Total population with demographic information and at least one type of PFAS measured in either early or late pregnancy (n=533, with two subjects missing on demographic information)

Table S5. The Spearman correlation matrix of natural log-transformed PFAS among paired maternal samples (N=301) (A) and maternal-newborn pairs (N=199) (B).

A.

	PFHXS1	PFOS1	PFOA1	PFNA1	PFBS1	PFDA1	PFUNDA1	NMFOSAA1	PFHXS2	PFOS2	PFOA2	PFNA2	PFBS2	PFDA2	PFUNDA2	NMFOSAA2
PFHXS1	1.00	0.42	0.42	0.59	0.40	0.60	0.35	0.09	0.28	0.10	0.10	0.08	0.02	-0.04	-0.05	-0.11
PFOS1		1.00	0.66	0.61	-0.16	0.45	0.19	0.10	0.23	0.53	0.35	0.40	-0.09	0.22	0.10	0.12
PFOA1			1.00	0.64	-0.05	0.38	0.19	0.03	0.15	0.35	0.59	0.42	0.01	0.11	-0.04	0.04
PFNA1				1.00	0.19	0.67	0.46	0.19	0.03	0.23	0.29	0.42	0.02	0.15	0.05	-0.01
PFBS1					1.00	0.29	0.35	0.14	-0.07	-0.24	-0.15	-0.19	0.16	-0.14	-0.12	-0.17
PFDA1						1.00	0.40	0.22	0.02	0.08	0.12	0.16	0.01	0.15	0.06	-0.10
PFUNDA1							1.00	0.01	-0.01	-0.02	-0.10	0.02	-0.01	0.02	0.07	-0.17
NMFOSAA1								1.00	-0.08	-0.05	-0.09	0.02	0.08	-0.03	-0.02	0.26
PFHXS2									1.00	0.22	0.17	0.18	-0.06	0.06	0.07	0.05
PFOS2										1.00	0.66	0.62	0.29	0.45	0.31	0.31
PFOA2											1.00	0.67	0.27	0.45	0.26	0.21
PFNA2												1.00	0.19	0.43	0.30	0.26
PFBS2													1.00	0.30	0.25	0.18
PFDA2														1.00	0.69	0.22
PFUNDA2															1.00	0.22
NMFOSAA2																1.00

B.

	PFHXS1	PFHXS2	PFHXS_DBS	PFOS1	PFOS2	PFOS_DBS	PFOA1	PFOA2	PFOA_DBS	PFNA1	PFNA2	PFNA_DBS
PFHXS1	1.00	0.21	0.07	0.39	0.08	0.06	0.30	0.13	0.06	0.48	0.08	0.08
PFHXS2		1.00	0.06	0.25	0.24	0.13	0.13	0.20	0.12	-0.02	0.23	0.07
PFHXS_DBS			1.00	0.21	0.05	0.27	0.19	0.09	0.26	0.14	0.09	0.22
PFOS1				1.00	0.45	0.46	0.64	0.28	0.40	0.53	0.34	0.32
PFOS2					1.00	0.34	0.35	0.57	0.30	0.16	0.56	0.11
PFOS_DBS						1.00	0.27	0.25	0.44	0.20	0.27	0.39
PFOA1							1.00	0.57	0.57	0.64	0.40	0.27
PFOA2								1.00	0.41	0.25	0.64	0.13
PFOA_DBS									1.00	0.24	0.29	0.39

	PFNA1	PFNA2	PFNA_DBS
PFNA1	1.00	0.36	0.34
PFNA2		1.00	0.21
PFNA_DBS			1.00

Note: PFAS in DBS were normalized to serum concentrations for comparison with maternal serum PFAS; Samples measured below limit of detection (LOD) were imputed with LOD/$\sqrt{2}$. Corresponding figures can be found in Figure S2;
PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid; 1 = maternal early sample; 2= maternal late sample; DBS: dried blood spots.

Table S6. Intraclass correlation coefficients (ICC) and 95% confidence intervals (CIs) of natural log-transformed PFAS concentrations among paired maternal samples (N=376 (PFHxS, PFOS, PFOA, PFNA) or 301 (PFBS, PFDA, PFUnDA, NMFOSAA)) and maternal-newborn pairs (N=199).

Sample Type	PFAS	Estimate (95%CI)	Sample Type	PFAS	Estimate (95%CI)
	PFHxS	0.12 (-0.07, 0.32)		PFHxS	0.03 (-0.05, 0.06)
	PFOS	0.43 (0.25, 0.56)		PFOS	0.17 (0.06, 0.28)
	PFOA	0.55 (0.48, 0.62)		PFOA	0.24 (0.09, 0.37)
	PFNA	0.42 (0.28, 0.53)		PFNA	0.11 (0.01, 0.20)
Maternal	PFBS	0.06 (-0.05, 0.17)	Maternal & Newborn		
	PFDA	0.28 (0.17, 0.38)			
	PFUnDA	0.12 (0.01, 0.23)			
	NMFOSAA	0.59 (0.51, 0.66)			

Note: PFAS in DBS were normalized to serum concentrations for comparison with maternal serum PFAS. Samples measured below limit of detection (LOD) were imputed with LOD/$\sqrt{2}$. Corresponding figures can be found in Figure 4.
Abbreviations: PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid.

Table S7. Adjusted percent change[*] between natural log-transformed maternal serum PFAS concentrations (ng/ml) measured in early and late pregnancy, Atlanta African American Maternal-Child Cohort, 2014-2020.

	PFHXS	PFOS	PFOA	PFNA	PFBS	PFDA	PFUNDA	NMFOSAA
$lnML_{PFAS} = \beta_0 + \beta_1 lnME_{PFAS} + \beta_i Covariates + \varepsilon$^								
PFAS in Early Pregnancy								
	0.22	0.63	0.73	0.34	0.13	0.21	0.08	0.37
	(0.13, 0.30)	(0.51, 0.74)	(0.60, 0.86)	(0.26, 0.42)	(0.01, 0.24)	(0.05, 0.36)	(-0.08,0.24)	(0.25, 0.50)
Age (years)								
	-0.68	-1.91	-4.39	-1.70	-2.49	-0.92	-2.46	-3.30
	(-2.27, 0.93)	(-4.41, 0.66)	(-6.99, -1.72)	(-3.40, 0.02)	(-6.00, 1.15)	(-5.07, 3.40)	(-6.63, 1.90)	(-6.80, 0.32)
Married or Cohabiting (Ref=Yes)								
No	-11.91	-8.52	-11.52	-13.91	10.80	23.42	-0.68	-7.07
	(-22.80, 0.52)	(-26.02, 13.12)	(-29.40, 10.89)	(-25.36, -0.72)	(-17.21, 48.30)	(-12.36, 73.82)	(-30.00, 40.93)	(-30.87, 24.92)
Education Level (Ref=Less than high school)								
High school	-8.51	0.79	-5.30	2.96	27.42	30.55	15.47	3.75
	(-24.72, 11.18)	(-26.28, 37.78)	(-32.17, 32.22)	(-16.59, 27.09)	(-17.22, 96.14)	(-21.41, 116.86)	(-30.87, 92.85)	(-33.19, 61.11)
Some college	-3.34	11.15	20.67	16.31	19.61	67.01	17.60	-26.30
	(-22.08, 19.90)	(-21.30, 56.99)	(-16.59, 74.56)	(-7.83, 46.77)	(-25.18, 91.20)	(-3.69, 189.59)	(-32.57, 105.11)	(-54.34, 18.95)
College and above	-8.09	28.34	36.28	39.62	41.39	125.01	87.84	-31.72
	(-31.16, 22.71)	(-19.23, 103.93)	(-17.04, 123.85)	(2.18, 90.76)	(-24.01, 163.10)	(8.40, 367.06)	(-10.20, 292.94)	(-63.70, 28.43)
Income-to-poverty ratio (%) (Ref= <100)								
≥100 and < 150	4.12	-17.03	-21.98	-7.27	-25.69	-29.63	-7.13	-16.08
	(-11.98, 23.17)	(-36.53, 8.45)	(-41.39, 3.87)	(-22.58, 11.07)	(-48.53, 7.27)	(-54.32, 8.42)	(-40.21, 44.23)	(-42.22, 21.88)
≥150 and < 300	-1.46	-15.09	-5.63	-4.41	17.14	-31.63	-10.67	-11.79
	(-18.31, 18.87)	(-36.95, 14.35)	(-31.31, 29.65)	(-21.86, 16.94)	(-21.00, 73.70)	(-56.92, 8.53)	(-44.34, 43.37)	(-40.65, 31.09)
≥ 300	-24.86	-20.35	-18.82	-25.29	13.34	-28.89	-44.09	-14.31
	(-41.86, -2.88)	(-47.17, 20.10)	(-47.68, 25.96)	(-43.42, -1.35)	(-36.61,102.66)	(-64.31, 41.66)	(-72.16, 12.25)	(-52.58, 54.85)
Hospital Site (Ref=Grady)								
Emory Midtown	-2.55	1.51	3.93	-1.58	22.73	3.26	-25.55	-7.65
	(-17.46, 15.05)	(-22.22, 32.48)	(-21.90, 38.31)	(-17.76, 17.77)	(-14.28, 75.74)	(-32.22, 57.32)	(-51.33, 13.88)	(-35.88, 33.00)
Parity (Ref=0)								
1	8.30	2.48	21.67	5.08	-10.53	19.89	19.62	-0.80
	(-7.47, 26.76)	(-20.23, 31.66)	(-6.98, 59.14)	(-11.30, 24.50)	(-36.75, 26.58)	(-20.47, 80.71)	(-21.02, 81.17)	(-30.30, 41.17)
≥2	5.25	5.79	20.18	-5.50	5.97	34.89	28.28	-9.27
	(-11.51, 25.19)	(-19.81, 39.55)	(-10.80, 61.91)	(-21.56, 13.85)	(-28.42, 56.89)	(-14.77, 113.47)	(-19.35, 104.05)	(-38.98, 34.89)
First prenatal BMI (kg/m2)								
	-1.21 (-0.42, 2.00)	0.45 (-0.84,1.76)	0.67 (-0.70,2.06)	0.15 (-0.71,1.02)	1.95 (0.22, 3.71)	1.14 (-0.88, 3.19)	0.93 (-1.10,3.00)	-0.75 (-2.46,0.99)
Alcohol Use (Ref=No)								
Yes	-0.84	-3.21	-4.38	0.51	-2.17	1.85	10.16	17.34
	(-20.42, 23.55)	(-31.94, 37.65)	(-34.49, 39.56)	(-20.76, 27.49)	(-39.48, 58.13)	(-42.28, 79.72)	(-37.85, 95.26)	(-28.07, 91.44)

Marijuana Use (Ref=No)								
Yes	-11.85	-1.40	-4.74	1.36	4.17	-14.44	-26.23	11.76
	(-23.73, 1.88))	(-21.82, 24.36)	(-25.67, 22.09)	(-13.28, 18.47)	(-24.15, 43.06)	(-41.16, 24.43)	(-49.45, 7.67)	(-19.14, 54.48)
Sex of Infant (Ref=Male)								
Female	7.70	5.13	-9.16	4.49	1.18	2.53	-25.85	-1.56
	(-5.15, 22.29)	(-14.23, 28.86)	(-27.01, 13.05)	(-8.96, 19.92)	(-23.69, 34.14)	(-26.58, 43.18)	(-46.99, 3.72)	(-26.25, 31.40)

Note: N=375: subset to PFHxS, PFOS, PFOA and PFNA maternal early and late sample pairs (N=376), with one subject missing in demographic information; N=301: subset to PFBS, PFDA, PFUNDA and NMFOSAA maternal early and late sample pairs; Values below LOD were replaced by LOD/$\sqrt{2}$;

[*]Both dependent and independent variables were log transformed, so the beta coefficient was interpreted as $(1.01^{\beta} - 1) * 100$ percent increase in dependent variable for every 1% increase in the independent variable; For covariates, only dependent variable was log transformed, so beta estimates was converted to percent change with the equation: $(e^{\beta}-1) * 100\%$;

[^]List of covariates include: age, education level, income to poverty ratio, hospital site, first prenatal BMI, parity, alcohol use, marijuana use and infant's sex; collinearity of covariates was examined;

Abbreviations: ME: maternal samples in early pregnancy; ML: maternal samples in late pregnancy; PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid.

Table S8. Adjusted percent change[*] between natural log transformed newborn dried blood PFASs (ng/ml) samples and maternal serum PFASs (ng/ml) samples[#] in early and late pregnancy, respectively, Atlanta African American Maternal-Child Cohort, 2014-2020 (N=199).

	PFHXS	PFOS	PFOA	PFNA	PFHXS	PFOS	PFOA	PFNA
	$lnDBS_{PFASs} = \beta_0 + \beta_1 lnME_{PFASs} + \beta_i Covariates + \varepsilon$				$lnDBS_{PFASs} = \beta_0 + \beta_1 lnML_{PFASs} + \beta_i Covariates + \varepsilon$ ^			
PFAS during Pregnancy								
	0.06	0.31	0.56	0.23	-0.05	0.25	0.19	0.17
	(-0.10, 0.22)	(0.16, 0.46)	(0.39, 0.73)	(0.11, 0.34)	(-0.25, 0.16)	(0.13, 0.36)	(0.08, 0.31)	(0.03, 0.30)
Age (years)								
	1.44	-0.78	-1.54	1.56	1.53	0.19	-0.27	2.27
	(-1.84, 4.84)	(-4.23, 2.78)	(-4.71, 1.73)	(-0.73, 3.90)	(-1.75, 4.91)	(-3.29, 3.79)	(-3.78, 3.37)	(-0.10, 4.69)
Married or Cohabiting (Ref=Yes)								
No	-12.24	-2.24	0.51	2.49	-12.98	0.12	6.96	7.74
	(-34.24, 17.14)	(-28.56, 33.77)	(-24.66, 34.09)	(-16.16, 25.30)	(-34.87, 16.26)	(-26.88, 37.09)	(-21.87, 46.41)	(-12.37, 32.46)
Education Level (Ref=Less than high school)								
High school	37.96	14.90	13.72	-0.57	37.94	15.75	13.10	-1.92
	(-8.81, 108.70)	(-26.50, 79.64)	(-24.78, 71.92)	(-25.46, 32.63)	(-8.90, 108.86)	(-25.89, 80.79)	(-27.71, 76.95)	(-26.92, 31.63)
Some college	66.59	40.74	48.60	6.99	65.98	35.37	42.01	1.62
	(2.76, 170.05)	(-16.40, 136.93)	(-8.28, 140.74)	(-23.54, 49.71)	(2.35, 169.15)	(-19.50, 127.63)	(-15.96, 139.97)	(-27.98, 43.37)
College and above	78.35	89.63	75.06	58.97	81.04	68.86	76.99	43.78
	(-3.61, 230.02)	(-2.25, 267.90)	(-5.42, 224.04)	(3.69, 143.74)	(-2.14, 234.92)	(-13.02, 227.82)	(-9.51, 246.19)	(-7.93, 124.54)
Income-to-poverty ratio (%) (Ref= <100)								
≥100 and < 150	15.93	2.31	47.03	33.87	18.27	11.80	63.68	39.25
	(-19.46, 66.86)	(-30.75, 51.15)	(2.38, 111.14)	(4.04, 72.25)	(-17.71, 69.97)	(-24.35, 65.24)	(10.59, 142.27)	(7.68, 80.10)
≥150 and < 300	-13.04	-10.91	16.43	16.04	-9.64	8.06	44.65	28.89
	(-41.96, 30.30)	(-42.45, 37.94)	(-22.07, 73.94)	(-12.47, 53.83)	(-39.17, 34.23)	(-29.32, 65.22)	(-5.65, 121.77)	(-2.66, 70.68)
≥ 300	-37.03	-19.99	55.57	47.11	-38.86	-6.37	104.98	69.95
	(-65.70, 15.62)	(-58.42, 53.95)	(-15.44, 186.23)	(-3.69, 124.70)	(-66.82, 12.65)	(-51.34, 80.16)	(6.32, 295.18)	(10.05, 162.44)
Hospital Site (Ref=Grady)								
Emory Midtown	27.98	12.10	47.12	9.53	28.44	16.60	67.71	13.56
	(-11.11, 84.27)	(-24.33, 66.07)	(1.73, 112.78)	(-15.13, 41.36)	(-10.81, 84.96)	(-21.28, 72.71)	(12.82, 149.32)	(-12.38, 47.19)
Parity (Ref=0)								
1	-17.10	29.53	-5.45	2.28	-18.62	24.39	-23.09	-4.69
	(-41.07, 16.61)	(-10.12, 86.65)	(-32.70, 32.84)	(-19.28, 29.60)	(-42.02, 14.21)	(-13.58, 79.04)	(-46.86, 11.33)	(-25.11, 21.31)
≥2	-46.03	49.13	-2.12	-7.59	-46.23	50.53	-19.30	-7.64
	(-62.33, -22.69)	(1.26, 119.64)	(-31.79, 40.44)	(-28.01, 18.61)	(-62.47, -22.96)	(2.30, 121.50)	(-45.33, 19.13)	(-28.44, 19.20)
First prenatal BMI (kg/m2)								
	1.12	1.27	-0.05	-0.06	1.06	0.72	-0.35	-0.14
	(-0.63, 2.91)	(-0.64, 3.21)	(-1.78, 1.71)	(-1.27, 1.16)	(-0.70, 2.85)	(-1.15, 2.64)	(-2.23, 1.56)	(-1.37, 1.11)

Alcohol Use (Ref=No)								
Yes	-2.77	-25.16	-9.44	-9.88	-1.15	-19.12	19.11	-1.76
	(-43.89, 68.47)	(-58.56, 35.16)	(-47.85, 57.27)	(-38.54, 32.14)	(-42.89, 71.08)	(-55.19, 45.99)	(-34.18, 115.54)	(-33.46, 45.06)
Marijuana Use (Ref=No)								
Yes	20.58	16.66	18.49	26.47	19.25	21.36	31.39	25.28
	(-11.08, 63.51)	(-16.26, 62.54)	(-13.00, 61.36)	(2.34, 56.28)	(-12.21, 61.97)	(-12.63, 68.57)	(-5.79, 83.23)	(0.89, 55.58)
Sex of Infant (Ref=Male)								
Female	-6.95	6.10	-4.78	-0.70	-6.84	4.43	1.60	-1.05
	(-28.93, 21.82)	(-20.66, 41.88)	(-27.29, 24.68)	(-17.67, 19.77)	(-28.88, 22.03)	(-21.85, 39.54)	(-24.08, 35.97)	(-18.31, 19.84)

Note: PFAS in DBS were normalized to serum concentrations for comparison with maternal serum PFAS; Values below LOD were replaced by LOD/$\sqrt{2}$;

[*]Both dependent and independent variables were log transformed, so the beta coefficient was interpreted as $(1.01^{\beta} - 1) * 100$ percent increase in dependent variable for every 1% increase in the independent variable; For covariates, only dependent variable was log transformed, so beta estimates was converted to percent change with the equation: $(e^{\beta}-1) * 100\%$;

[^]List of covariates include: age, education level, income to poverty ratio, hospital site, first prenatal BMI, parity, alcohol use, marijuana use and infant's sex; collinearity of covariates was examined;

Abbreviations: ME: maternal samples in early pregnancy; ML: maternal samples in late pregnancy; DBS: dried blood spots; PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid;
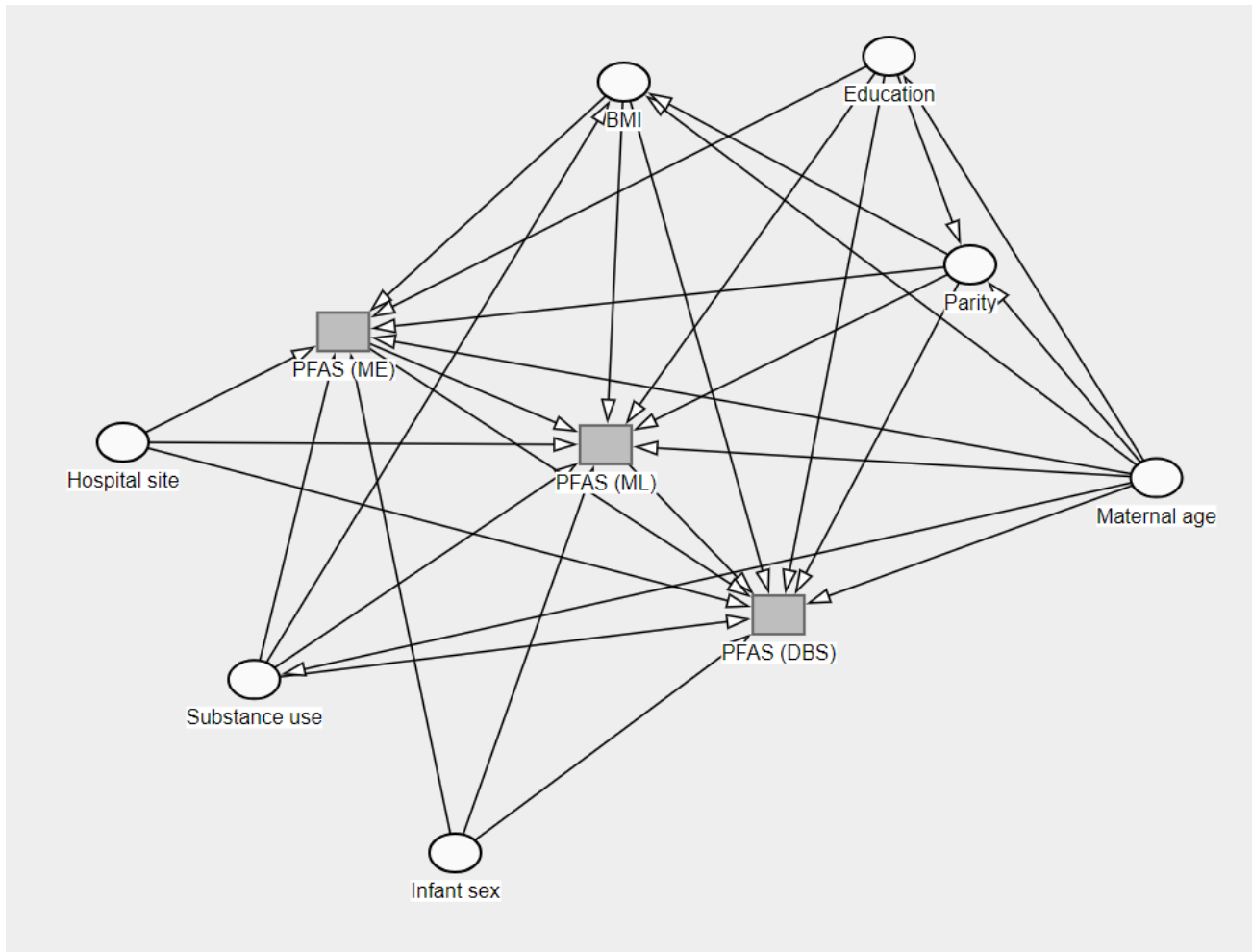
Figure S1. Directed acyclic graph (DAG)(*https://www.dagitty.net/)* for hypothesized relationships between repeated maternal serum per- and polyfluoroalkyl substances (PFAS) and newborn DBS PFAS.
Note: BMI: body mass index; ME: maternal serum samples during early pregnancy; ML: maternal serum samples during late pregnancy; DBS: dried blood spots.
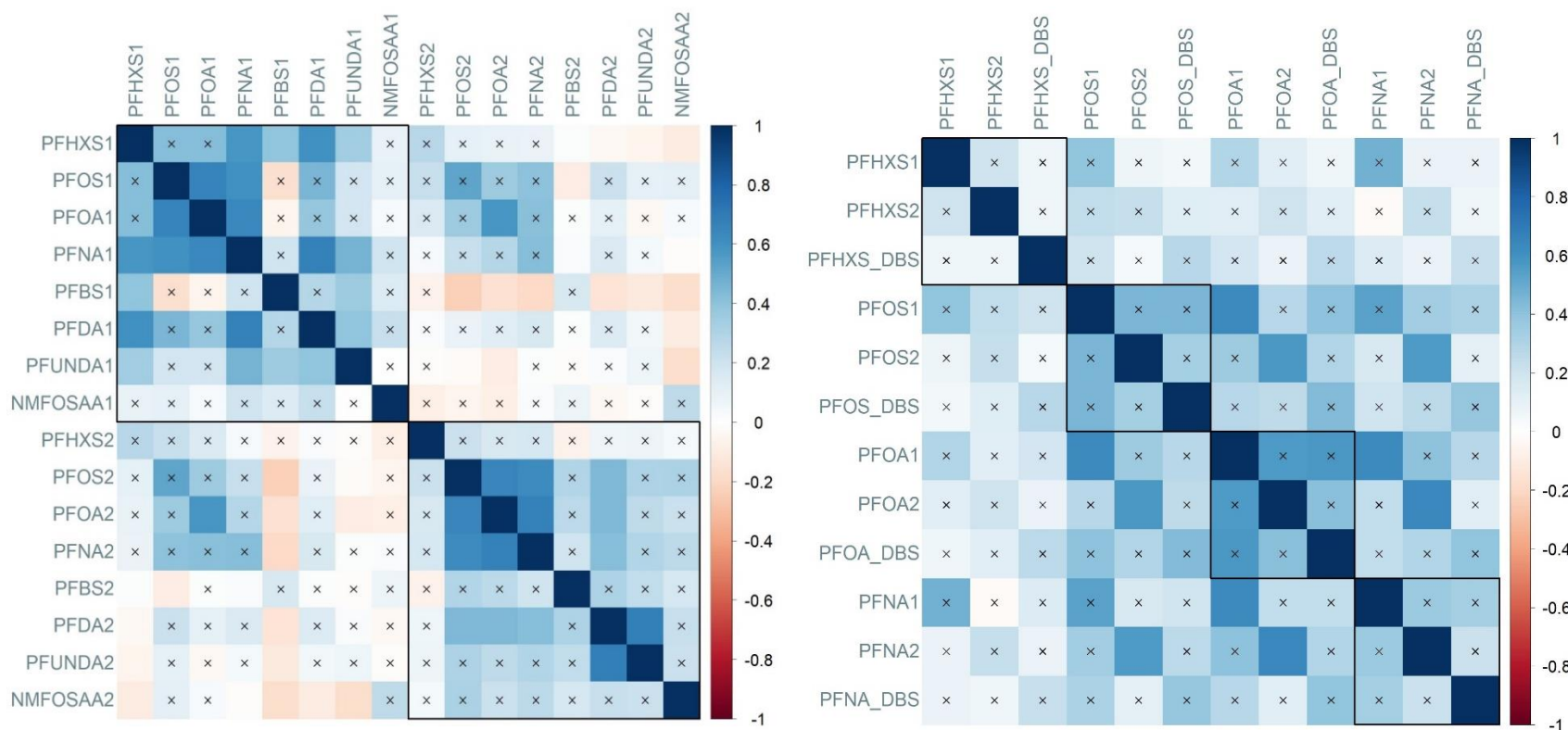
Figure S2. The Spearman correlation matrix of natural log-transformed PFAS among paired maternal samples (N=301) (left) and maternal-newborn pairs (N=199) (right). The summary data can be found in Table S5.

Note: PFAS in DBS were normalized to serum concentrations for comparison with maternal serum PFAS. Samples measured below limit of detection (LOD) were imputed with $LOD/\sqrt{2}$. The color scale represents the spearman correlation coefficients. The "X" symbol refers to a correlation that was not statistically significant at $p<0.05$.

Abbreviations: PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid; 1 = maternal early sample; 2= maternal late sample; DBS: dried blood spots.
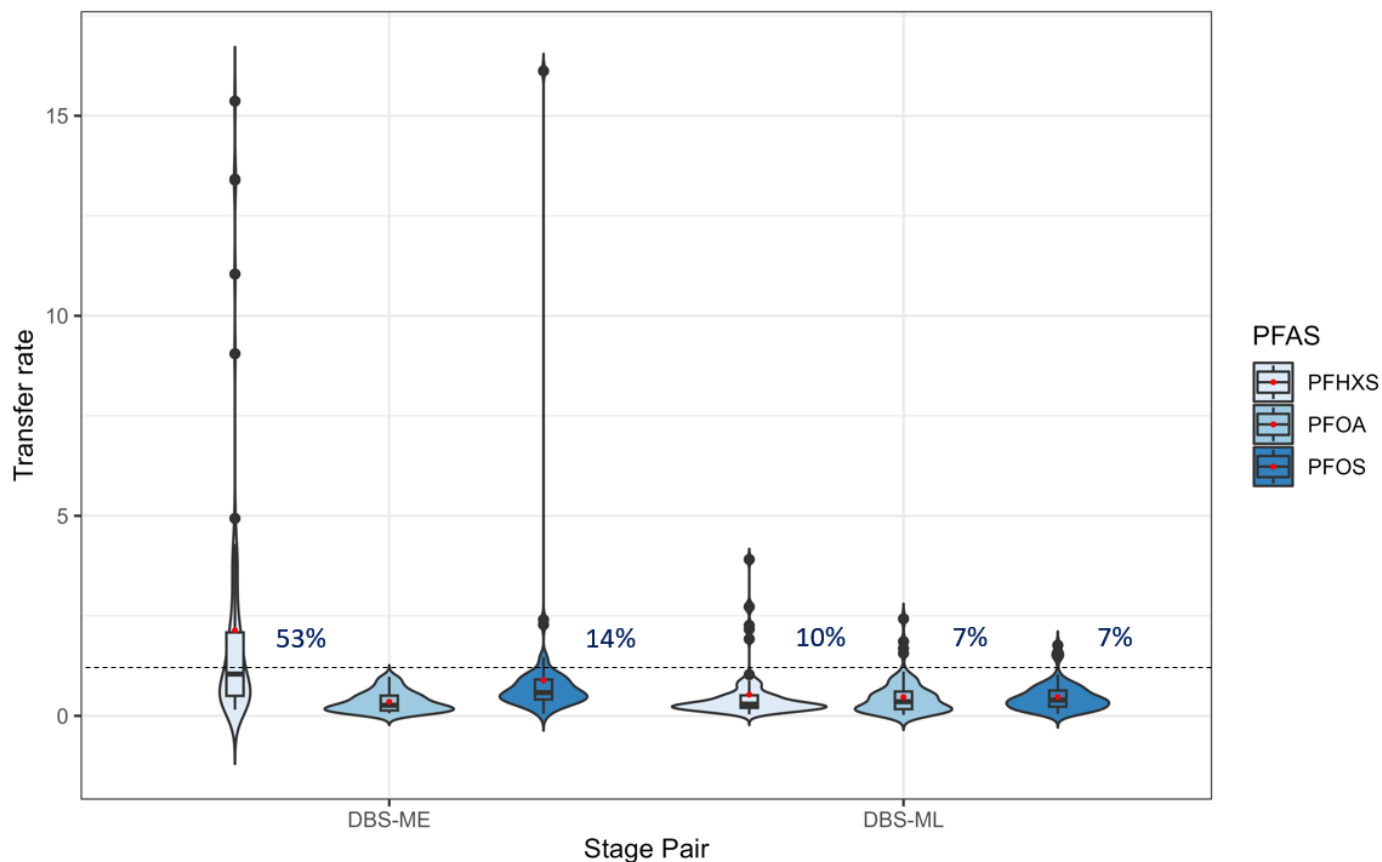
Figure S3. Violin plots of PFAS transfer ratio among maternal-newborn pairs in the Atlanta African American Maternal-Child Cohort, 2014 – 2020 (N=73).

Note: PFAS in DBS were normalized to serum concentrations for comparison with maternal serum PFAS. Three types of PFAS indicated in different blue color scale. Median and interquartile range shown in center boxplot and arithmetic mean indicated by red dot. Dashed line symbolizes transfer ratio of 100%, where samples above had transfer ratio greater than 100%. Only samples with PFAS concentrations detected above LOD were included in analysis; PFNA was detected in <20% of newborn dried blood spot samples and excluded from this analysis. Abbreviations: DBS-ME: transfer ratio from maternal early to newborn; DBS-ML: transfer ratio from maternal late to newborn; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFOS = perfluorooctane sulfonic acid; PFHxS = perfluorohexane sulfonic acid.
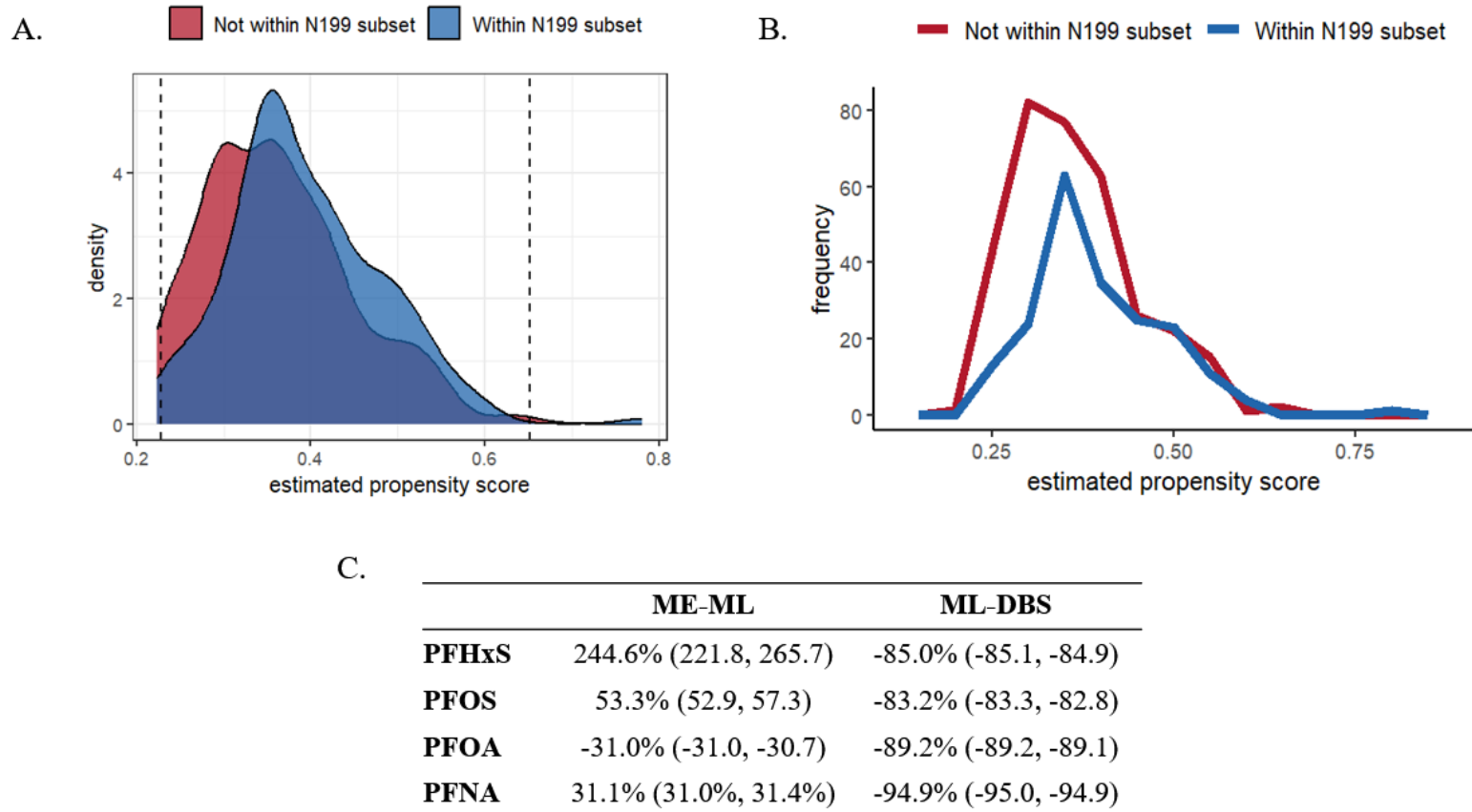
A.

Not within N199 subset Within N199 subset

B.

Not within N199 subset Within N199 subset

C.

	ME-ML	ML-DBS
PFHxS	244.6% (221.8, 265.7)	-85.0% (-85.1, -84.9)
PFOS	53.3% (52.9, 57.3)	-83.2% (-83.3, -82.8)
PFOA	-31.0% (-31.0, -30.7)	-89.2% (-89.2, -89.1)
PFNA	31.1% (31.0%, 31.4%)	-94.9% (-95.0, -94.9)

Figure S4. The adjusted percent change and 95% confidence interval (CI) for PFAS concentrations among maternal-newborn pairs (N=199) using inverse probability weights (IPW). A. The density plots of estimated propensity scores among N=199 subsets and remaining subsets from overall N=533 populations; B. The frequency plots of estimated propensity scores among N=199 subsets and remaining subsets from overall N=533 populations; C. The adjusted percent change and 95% confidence interval (CI) for PFAS concentrations using linear mixed effect model after applying IPW.
 Note: The inverse probability weights were calculated based on propensity scores. PFAS in DBS were normalized to serum concentrations for comparison with maternal serum PFAS. Samples measured below limit of detection (LOD) were imputed with LOD/$\sqrt{2}$. Models were adjusted for age, education, hospital site, parity, body mass index, alcohol, marijuana use, and infant sex.

Abbreviations: PFAS = per- and polyfluoroalkyl substances; PFHxS = perfluorohexane sulfonic acid; PFOS = perfluorooctane sulfonic acid; PFOA = perfluorooctanoic acid; PFNA = perfluorononanoic acid; PFBS = perfluorobutanesulfonic acid; PFDA = perfluorodecanoic acid; PFUnDA = perfluoroundecanoic acid; NMFOSAA = N-methyl perfluorooctane sulfonamido acetic acid; ME: maternal early samples; ML: maternal late samples; DBS: dried blood spots