Supplementary materials

Per- and polyfluoroalkyl substances may be a novel environmental etiology of nonalcoholic fatty liver: a national cross-sectional study

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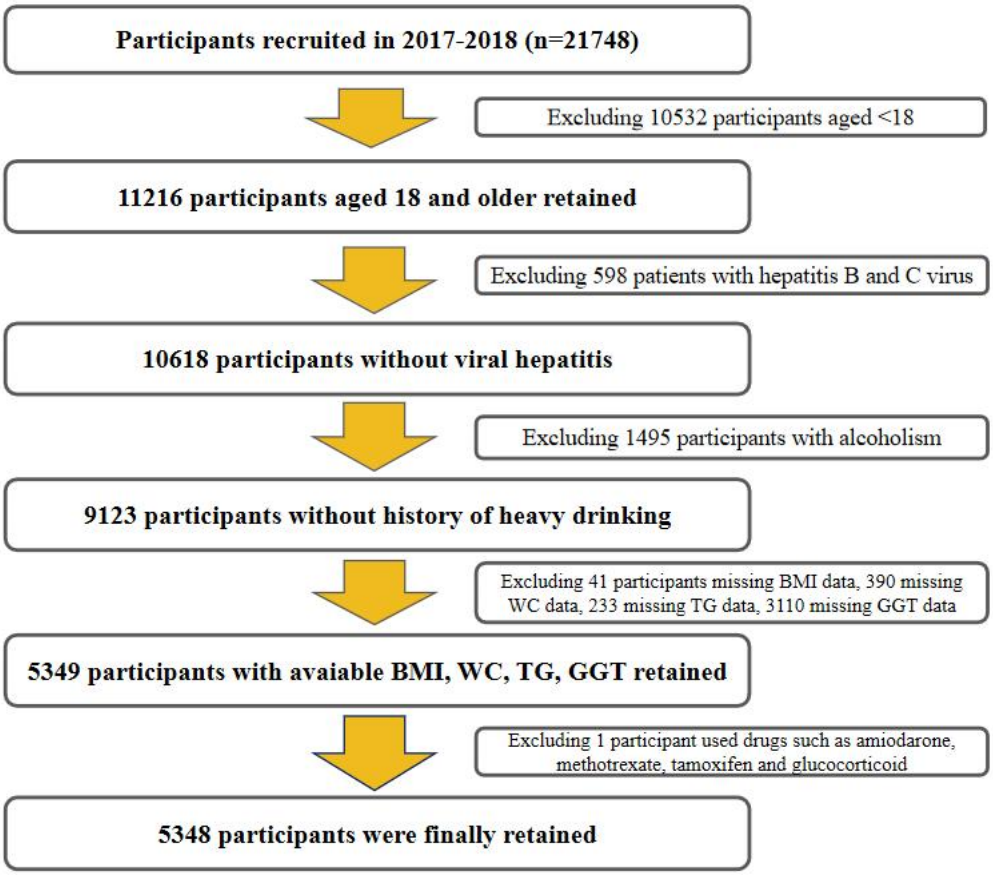
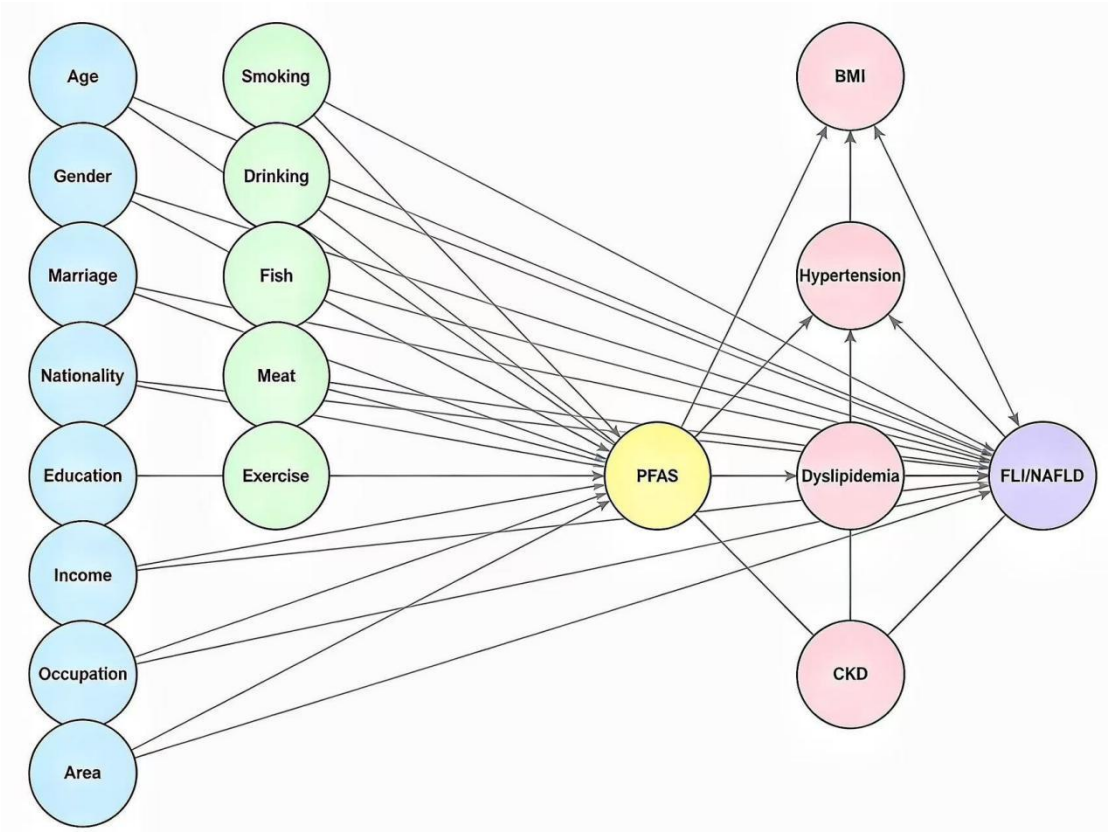
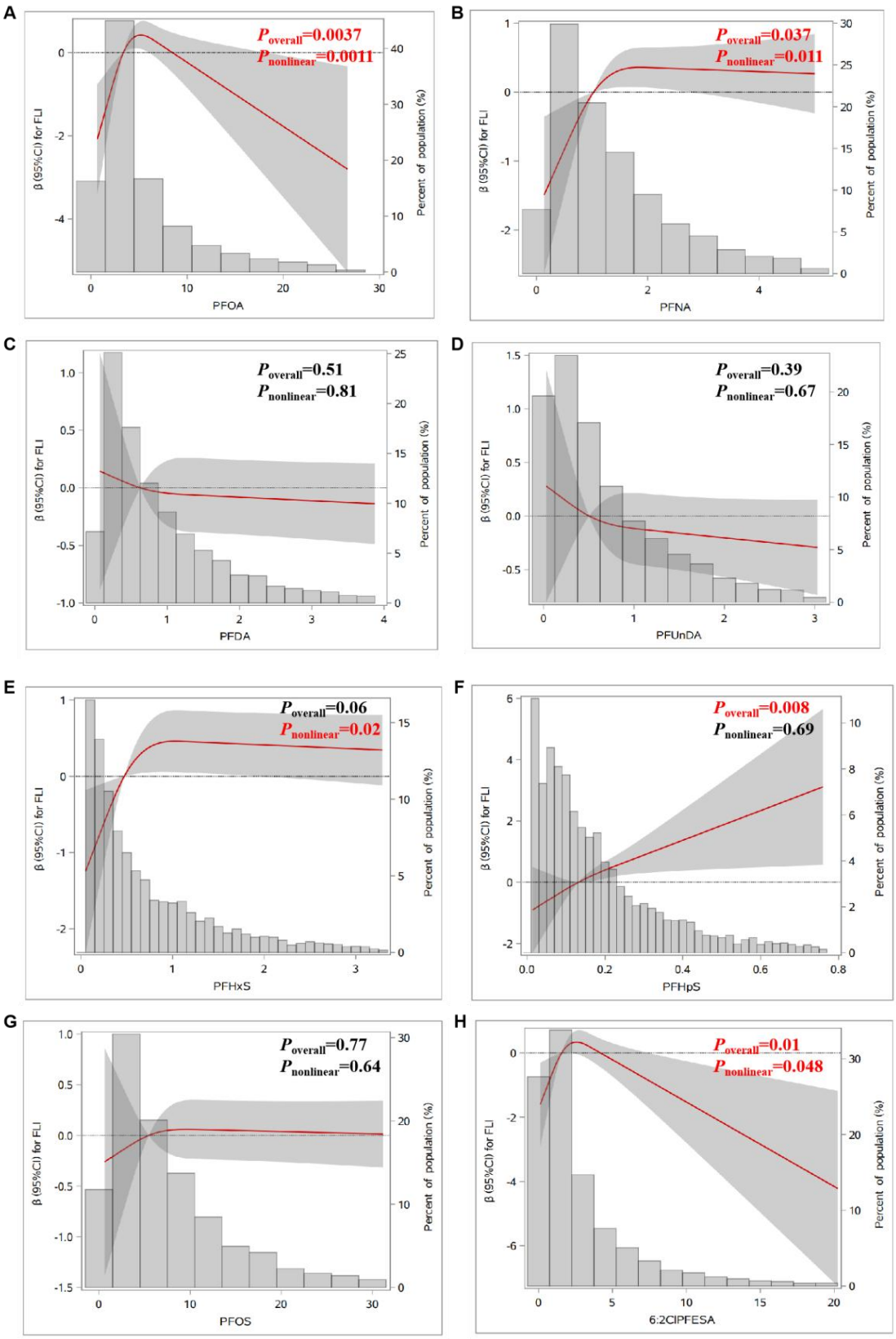


Supplementary Figure 1. Flowchart of participant enrollment.



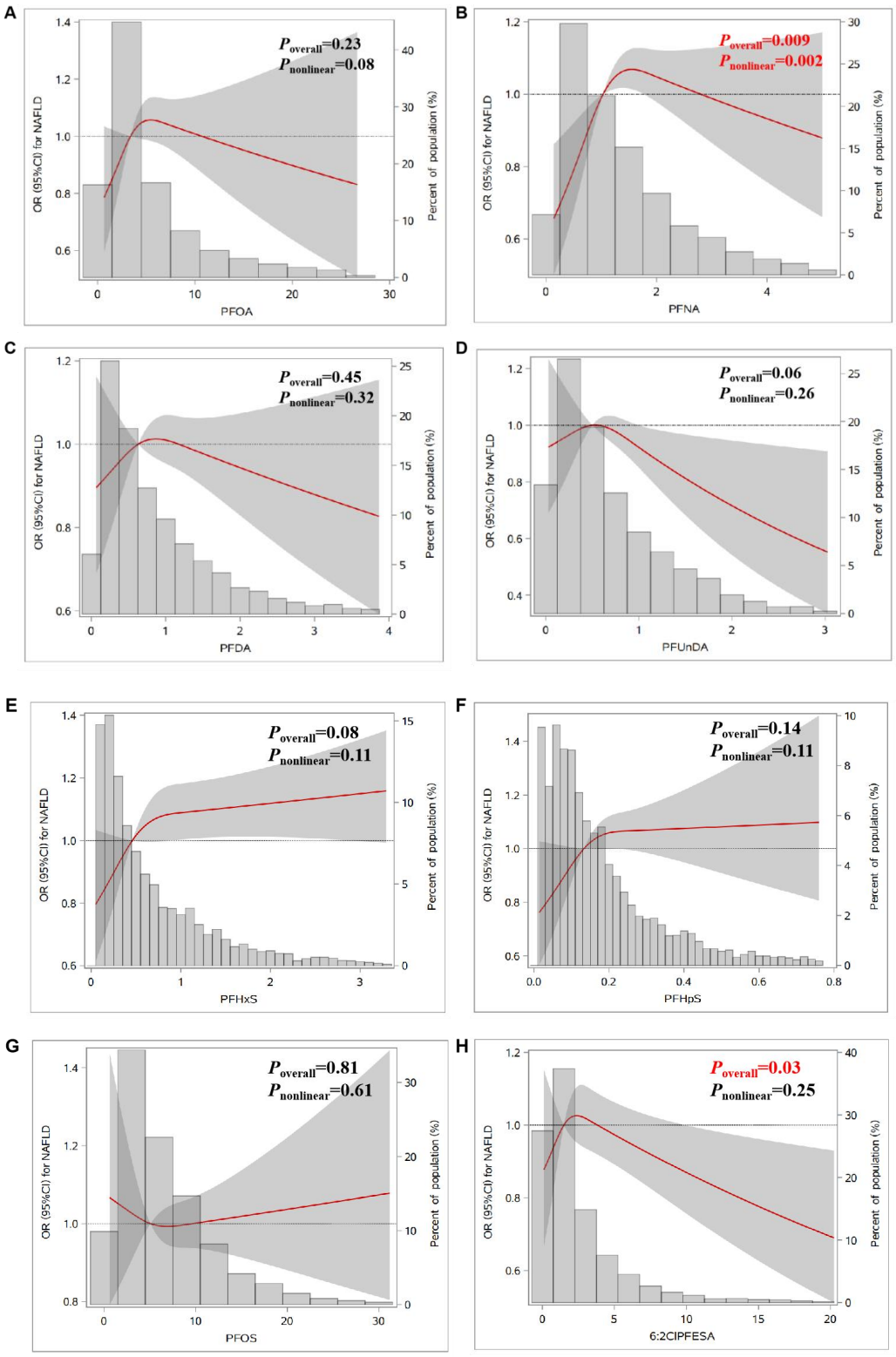
Supplementary Figure 2. Directed acyclic graph (DAG) for identifying confounders and mediators in the association between PFAS exposure and fatty liver outcomes (FLI/NAFLD).

Notes: Nodes represent PFAS exposure, fatty liver outcomes (FLI/NAFLD), potential confounders (Model 1: age, gender, marriage, nationality, education level, income, occupation, area; Model 2: smoking, drinking, fish consumption frequency, meat consumption frequency, physical activity), and potential mediators (Model 3: hypertension, dyslipidemia, CKD, BMI). Arrows indicate the hypothesized causal directions among variables. Confounders were associated with both PFAS exposure and fatty liver outcomes without lying on the causal pathway, while mediators lay on the causal pathway between PFAS exposure and fatty liver outcomes. The direct effect of PFAS exposure on fatty liver outcomes was also presented.



Supplementary Figure 3. Associations of individual PFAS with FLI in restricted cubic splines models. There were the dose−response relationships of PFOA (A), PFNA (B), PFDA (C), PFUnDA (D), PFHxS (E), PFHpS (F), PFOS (G) and

6:2ClPFESA (H) with FLI. Note: The curve represents adjusted estimates based on restricted quadratic splines with knots at the 5th, 50th, and 95th percentiles of the PFAS distribution. The red line and french grey shading indicate β and 95%CI. The reference value (β=0) was set at the 50th percentile of the PFAS. Differences were adjusted for age, gender, marriage, nationality, education level, income, occupation, area, smoking, drinking, fish consumption frequency, meat consumption frequency, physical activity, hypertension, dyslipidemia, CKD and BMI.



Supplementary Figure 4. Associations of individual PFAS with NAFLD in restricted cubic splines models. There were the dose−response relationships of PFOA (A), PFNA (B), PFDA (C), PFUnDA (D), PFHxS (E), PFHpS (F), PFOS (G) and 6:2ClPFESA (H) with NAFLD. Note: The curve represents adjusted estimates based

on restricted quadratic splines with knots at the 5th, 50th, and 95th percentiles of the PFAS distribution. The red line and french grey shading indicate β and 95 % CI. The reference value (β = 0) was set at the 50th percentile of the PFAS. Differences were adjusted for age, gender, marriage, nationality, education level, income, occupation, area, smoking, drinking, fish consumption frequency, meat consumption frequency, physical activity, hypertension, dyslipidemia, CKD and BMI.

Supplementary Table 1. *P*-values of associations between PFAS and FLI before and after FDR correction

PFAS	*P*	
	before FDR correction	**after FDR correction**
PFOA	0.0021	0.0084
PFNA	0.0008	0.0064
PFDA	0.2525	0.2886
PFUnDA	0.3148	0.3148
PFHxS	0.0094	0.0144
PFHpS	0.0032	0.0085
PFOS	0.0072	0.0144
6:2 Cl-PFESA	0.0072	0.0144

Supplementary Table 2. *P*-values of associations between PFAS and NAFLD before and after FDR correction

PFAS	*P*	
	before FDR correction	**after FDR correction**
PFOA	0.1918	0.2557
PFNA	0.1151	0.2557
PFDA	0.3184	0.3184
PFUnDA	0.226	0.2583
PFHxS	0.006	0.0480
PFHpS	0.0582	0.2328
PFOS	0.128	0.2557
6:2 Cl-PFESA	0.1791	0.2557

Supplementary Table 3. Weighted Quantile Sum (WQS) Regression for the PFAS Mixture with Positive Association with FLI and NAFLD

Outcomes	Mixture effects			Estimated weights	
	β/OR	Std.Error	*P* value	PFAS	Weight (%)
FLI	0.9	0.406	0.026	PFOA	55.1%
				PFHxS	27.6%
				PFNA	9.47%
				PFHpS	6.40%
				6:2Cl-PFESA	0.77%
				PFOS	0.70%
				PFDA	0.00%
				PFUnDA	0.00%
NAFLD	0.13	0.079	0.106	PFHpS	37.9%
				PFHxS	36.8%
				PFOA	16.4%
				PFNA	6.95%
				PFOS	1.65%
				PFUnDA	0.25%
				PFDA	0.04%
				6:2Cl-PFESA	0.01%

Model Adjusted for age, gender, marriage, nationality, education level, income, occupation, area, smoking, drinking, fish consumption frequency, meat consumption frequency, physical activity, hypertension, dyslipidemia, CKD and BMI.

Supplementary Table 4. Association between PFAS and FLI in different sexes, ages, BMI, frequency of fish consumption, dyslipidemia and hypertension

Subgroup	PFOA β (95%CI)	PFNA β (95%CI)	PFDA β (95%CI)	PFUnDA β (95%CI)	PFHxS β (95%CI)	PFHpS β (95%CI)	PFOS β (95%CI)	6:2Cl-PFESA β (95%CI)
Age group								
18-39	1.62(1.90-5.14)	2.48(1.15-6.10)	-0.558(3.45-2.33)	-0.994(3.79-1.80)	3.34(0.337-6.34)#	2.75(0.223-5.73)	1.80(1.14-4.73)	2.03(1.63-5.69)
40-59	4.56(5.78-12.7)#	5.80(1.47-8.69)#	1.34(2.80-5.47)	3.05(1.06-7.11)	5.27(1.68-8.85)#	4.11(0.127-8.34)	3.20(0.009-6.52)	4.13(0.432-7.82)
≥60	3.56(0.503-6.62) #	2.38(0.713-5.47)	-0.720(2.98-1.54)	-0.475(3.34-2.39)	0.762(3.89-5.43)	1.78(1.90-5.44)	1.60(1.99-5.20)	1.68(1.99-5.34)
Gender								
Male	5.26(1.77-8.74)#	6.89(3.20-10.6)*	2.04(0.252-4.33)	1.47(1.41-4.35)	5.37(2.03-11.0)	4.67(0.318-9.03)#	4.45(1.07-7.83)#	5.75(1.64-9.86)#
Female	1.59(0.709-3.89)	1.27(0.842-3.39)	0.035(2.20-2.27)	0.691(1.61-3.00)	0.246(1.91-2.40)	0.925(1.55-3.40)	0.789(1.45-3.02)	0.953(1.76-3.67)
Fish								
<2times/week	5.03(2.34-7.73)*	5.15(2.36-7.95)*	1.90(1.01-4.82)	1.83(1.39-5.04)	5.42(2.22-8.61)#	5.12(2.11-8.13)#	3.88(1.47-6.29)#	4.25(1.99-7.10)#
≥2times/week	0.425(2.02-2.88)	-0.206(3.16-2.75)	-1.27(4.01-1.46)	-0.844(4.11-2.42)	-0.818(3.12-1.48)	1.58(0.975-4.13)	0.311(2.66-3.28)	2.92(1.23-7.06)

BMI								
<24	2.67(0.192-5.30)	1.74(1.02-4.50)	-0.614(3.16-1.93)	-1.12(3.64-1.40)	2.59(0.149-5.04)#	3.35(1.30-5.40)#	2.76(0.596-4.93)#	1.82(0.843-4.49)
≥24	3.27(1.01-7.56)	3.73(0.0247-7.44)#	-0.803(4.18-2.58)	-2.28(6.12-1.55)	3.93(2.35-10.2)	4.61(0.944-10.2)	2.06(2.02-6.15)	4.03(0.270-8.33)
Dyslipidemia								
No	4.03(1.44-6.62)#	3.59(0.984-6.20)#	0.909(1.20-3.01)	0.787(1.64-3.21)	3.71(0.613-6.80)	5.25(2.39-8.09)*	3.88(1.50-6.26)#	3.29(0.078-6.50)#
Yes	3.13(0.960-7.22)	4.49(0.409-9.40)	1.34(3.71-6.39)	1.17(3.46-5.81)	2.63(1.17-6.42)	0.700(3.46-4.86)	1.15(3.76-6.05)	4.10(0.607-8.08)
Hypertension								
No	3.41(0.836-5.99)#	3.74(0.726-6.76)#	1.36(0.899-3.62)	1.87(0.733-4.48)	4.23(1.91-6.56)#	3.84(1.56-6.11)#	3.52(1.20-5.85)	4.43(1.29-7.55)#
Yes	4.47(1.02-7.91)#	5.70(2.40-9.01)#	0.848(2.22-3.92)	-0.377(4.03-3.27)	2.78(2.53-7.99)	4.27(0.513-8.97)	2.61(1.31-6.53)	2.50(1.55-6.56)

Note: CI, confidence interval. Adjusted for age, gender, marriage, study site, nationality, education, occupation and household income, smoking, drinking, fish consumption frequency, meat consumption frequency, activity, BMI, CKD, dyslipidemia and hypertension. (When grouped by sex, the covariates did not include sex; When grouped by age, the covariates did not include age; When grouped by fish consumption frequency, the covariates did not include fish consumption frequency; When grouped by BMI, the covariates did not include BMI; When grouped by dyslipidemia, the covariates did not include dyslipidemia; When grouped by hypertension, the covariates did not include hypertension.)
#:$P<0.05$; *:$P<0.001$.

Supplementary Table 5. Associations of PFAS quartile with FLI after removing the maximum of PFAS (>P_{99})

Exposure		Crude model	Model 1	Model 2	Model 3
		β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)
PFOA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	5.3(2.2-8.3) #	2.3(-1.1-5.7)	2.5(-1.0-6.0)	2.2(0.7-3.8) #
	Q3	8.4(4.4-12.4) *	5.3(0.9-9.8) #	5.3(0.8-9.8) #	3.1(0.7-5.5) #
	Q4	8.9(3.2-14.6) #	5.7(1.4-10.1) #	5.7(1.2-10.3) #	3.3(0.8-5.8) #
PFNA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	3.3(0.4-6.2) #	3.2(0.5-5.8) #	3.1(0.4-5.7) #	0.6(-1.2-2.4)
	Q3	9.0(5.1-13.0) *	7.6(3.6-11.6) *	7.5(3.5-11.5) *	4.3(2.0-6.6) *
	Q4	7.1(3.2-11.0) *	4.9(0.5-9.4) #	5.0(0.7-9.3) #	3.8(1.2-6.3) #
PFDA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	2.6(-1.3-6.6)	1.2(-1.5-3.9)	0.8(-2.1-3.6)	1.0(-1.0-2.9)
	Q3	4.7(1.2-8.2) #	2.5(-1.0-6.0)	2.1(-1.4-5.6)	2.7(0.6-4.8) #
	Q4	-0.3(-3.4-2.8)	-2.6(-7.5-2.2)	-3.1(-7.6-1.3)	-0.3(-2.4-1.8)
PFUnDA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	3.0(-0.1-6.0)	1.2(-1.4-3.7)	0.6(-1.9-3.0)	-0.1(-2.0-1.8)
	Q3	3.0(-0.9-6.9)	0.2(-3.5-3.8)	-0.5(-4.3-3.3)	1.6(-0.5-3.8)
	Q4	-3.2(-6.6-0.1)	-4.5(-9.3-0.3)	-5.6(-10.0--1.1) #	-0.4(-2.7-1.9)
PFHxS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.5(2.0-7.0) *	1.6(-1.3-4.6)	1.6(-1.3-4.5)	0.3(-2.3-3.0)
	Q3	11.0(7.7-14.3) *	5.7(1.6-9.9) #	5.3(1.0-9.7) #	3.0(0.4-5.5) #
	Q4	13.8(6.8-20.8) *	8.2(2.8-13.7) #	8.1(2.2-14.0) #	3.9(0.6-7.2) #

PFHpS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	5.2(2.9-7.4) *	3.3(1.0-5.6) #	3.3(0.9-5.7) #	1.3(-0.5-3.1)
	Q3	11.9(9.2-14.5) *	7.4(4.5-10.4) *	7.4(4.3-10.5) *	1.9(-0.6-4.5)
	Q4	18.8(12.6-25.0) *	12.5(6.7-18.3) *	12.2(5.8-18.5) *	4.5(1.2-7.7) #
PFOS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.9(2.7-7.2) *	3.3(1.1-5.4) #	3.3(1.1-5.6) #	0.4(-1.8-2.7)
	Q3	10.2(5.6-14.8) *	6.8(3.2-10.3) *	6.6(3.0-10.3) *	2.2(-0.2-4.6)
	Q4	12.4(8.2-16.5) *	7.8(3.7-11.8) *	7.6(3.4-11.7) *	2.6(0.1-5.1) #
6:2					
Cl-PFES	quartile				
A					
	Q1	Reference	Reference	Reference	Reference
	Q2	3.1(0.3-6.0) #	1.5(-1.2-4.2)	1.2(-1.6-4.1)	2.4(0.2-4.6) #
	Q3	7.7(3.4-12.0) *	4.4(1.2-7.6) #	4.3(1.1-7.4) #	3.9(1.7-6.0) *
	Q4	6.2(1.4-11.0) #	3.7(-0.7-8.1)	3.4(-1.1-8.0)	2.8(0.2-5.4) #

Note: CI, confidence interval

Model 1 adjusted for age, gender, marriage, nationality, education level, income, occupation and area.

Model 2 further adjusted smoking, drinking, fish consumption frequency, meat consumption frequency and physical activity.

Model 3 further adjusted hypertension, dyslipidemia, CKD and BMI.

$^{\#}$:$P<0.05$; *:$P<0.001$.

Supplementary Table 6. Associations of PFAS quartile with FLI after excluding participants below the LOD of PFAS

Exposure		Crude model	Model 1	Model 2	Model 3
		β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)
PFOA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	6.7(3.0-10.4) *	4.4(0.4-8.5) #	4.5(0.6-8.5) #	3.2(1.3-5.2) #
	Q3	8.0(3.5-12.5) *	6.3(1.6-10.9) #	6.3(1.6-10.9) #	3.2(0.6-5.8) #
	Q4	7.8(3.2-12.4) #	6.5(1.8-11.3) #	6.8(2.0-11.6) #	4.3(1.8-6.8) #
PFNA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.3(1.0-7.6) #	5.8(2.5-9.1) *	5.9(2.6-9.2) *	1.9(-0.4-4.2)
	Q3	9.0(4.9-13.0) *	10.2(5.8-14.5) *	10.3(5.9-14.6) *	5.5(2.8-8.2) *
	Q4	5.8(2.4-9.1) #	6.6(1.1-12.0) #	6.9(1.8-12.1) #	5.5(2.7-8.2) *
PFDA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	2.6(-1.4-6.6)	2.8(-0.2-5.8)	2.6(-0.4-5.5)	1.9(-0.6-4.5)
	Q3	3.8(0.3-7.2) #	3.9(0.2-7.6) #	3.6(0.0-7.3) #	4.0(1.6-6.3) #
	Q4	-1.2(-4.3-1.8)	-1.6(-7.2-3.9)	-1.8(-6.9-3.3)	2.0(-0.2-4.2)
PFUnDA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	2.8(-0.7-6.3)	2.4(-0.7-5.6)	2.1(-0.9-5.1)	0.6(-1.7-2.9)
	Q3	1.7(-2.3-5.7)	0.9(-3.2-5.0)	0.5(-3.7-4.6)	2.4(0.1-4.8) #
	Q4	-3.6(-7.0--0.3) #	-4.1(-9.5-1.4)	-4.7(-9.8-0.4)	1.6(-0.8-4.0)
PFHxS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.4(1.2-7.6) #	1.6(-1.9-5.2)	1.5(-2.0-5.1)	0.6(-2.2-3.4)
	Q3	10.5(6.7-14.3) *	5.6(1.0-10.3) #	5.4(0.5-10.3) #	2.8(0.2-5.4) #
	Q4	10.3(5.2-15.4) *	5.7(1.0-10.4) #	5.8(0.7-10.8) #	3.8(0.7-6.8) #

PFHpS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	6.1(2.8-9.4) *	4.2(0.6-7.8) #	4.2(0.7-7.8) #	1.5(-0.4-3.4)
	Q3	12.1(8.7-15.5) *	7.7(3.8-11.6) *	7.8(3.8-11.7) *	2.0(-0.5-4.6)
	Q4	15.9(10.9-21.0) *	10.2(5.3-15.1) *	10.3(5.0-15.5) *	4.1(1.5-6.7) #
PFOS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.7(1.9-7.6) #	3.9(0.7-7.0) #	3.9(0.7-7.2) #	0.3(-2.2-2.8)
	Q3	9.2(4.6-13.8) *	7.2(3.2-11.1) *	7.1(3.1-11.2) *	1.7(-1.0-4.4)
	Q4	9.0(5.3-12.7) *	6.6(2.2-11.1) #	6.8(2.5-11.1) #	3.0(0.4-5.5) #
6:2 Cl-PFESA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	3.2(-0.6-7.0)	2.3(-1.7-6.3)	2.1(-1.9-6.1)	2.8(-0.2-5.8)
	Q3	6.7(2.4-11.0) #	4.9(1.0-8.9) #	4.9(1.1-8.8) #	4.3(1.4-7.1) #
	Q4	3.8(-0.3-8.0)	3.0(-1.5-7.5)	3.0(-1.4-7.5)	4.0(0.8-7.1) #

Note: CI, confidence interval

Model 1 adjusted for age, gender, marriage, nationality, education level, income, occupation and area.

Model 2 further adjusted smoking, drinking, fish consumption frequency, meat consumption frequency and physical activity.

Model 3 further adjusted hypertension, dyslipidemia, CKD and BMI.

$^{\#}$:$P<0.05$; *:$P<0.001$.

Supplementary Table 7. Associations of PFAS quartile with FLI after excluding participants with hypertension and dyslipidemia

Exposure		Crude model	Model 1	Model 2	Model 3
		β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)
PFOA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	2.4(-0.4-5.1)	1.1(-2.0-4.2)	0.9(-2.1-3.9)	1.0(-1.0-3.0)
	Q3	5.7(2.7-8.8) *	4.2(1.3-7.1) #	4.2(1.2-7.2) #	2.8(0.6-5.0) #
	Q4	5.4(2.1-8.8) #	3.9(0.8-7.0) #	3.9(0.8-6.9) #	3.3(1.2-5.5) #
PFNA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.2(-0.0-8.4)	3.6(0.2-7.1) #	3.6(0.1-7.2) #	1.1(-0.8-3.0)
	Q3	4.7(1.4-8.0) #	2.4(-1.2-6.1)	2.5(-1.1-6.0)	2.9(0.5-5.3) #
	Q4	1.6(-1.4-4.5)	-1.3(-6.0-3.5)	-1.0(-5.5-3.6)	2.0(-0.5-4.5)
PFDA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	1.2(-2.9-5.2)	-0.5(-3.9-2.9)	-0.6(-4.0-2.7)	0.1(-1.6-1.7)
	Q3	1.2(-2.5-5.0)	-0.9(-5.4-3.6)	-1.0(-5.3-3.3)	1.7(-0.5-3.9)
	Q4	-2.9(-6.0-0.2)	-6.5(-12.0--1.1) #	-6.5(-11.7--1.3) #	-0.1(-2.2-2.0)
PFUnDA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	1.7(-1.5-4.9)	0.3(-2.9-3.4)	-0.0(-3.1-3.0)	0.4(-1.4-2.2)
	Q3	1.3(-2.3-4.8)	-1.6(-6.2-3.0)	-1.9(-6.4-2.7)	1.3(-1.1-3.6)
	Q4	-3.5(-6.8--0.1) #	-6.6(-12.3--0.8)	-6.9(-12.5--1.3) #	0.7(-1.6-2.9)
PFHxS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	4.0(0.9-7.2) #	1.9(-1.1-4.9)	1.8(-1.1-4.8)	1.0(-0.6-2.6)
	Q3	9.2(5.7-12.7) *	5.7(2.4-8.9) *	5.6(2.2-9.0) #	3.2(1.1-5.4) #
	Q4	6.2(2.6-9.8) *	3.1(-0.0-6.2)	3.3(0.0-6.6) #	3.2(1.1-5.3) #

PFHpS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	3.9(0.8-6.9) #	2.3(-0.9-5.4)	2.4(-0.7-5.5)	1.5(-0.2-3.1)
	Q3	7.1(3.6-10.5) *	3.4(0.2-6.6) #	3.7(0.1-7.2) #	2.3(0.2-4.5) #
	Q4	9.1(5.4-12.8) *	4.5(1.2-7.8) #	4.8(1.0-8.5) #	3.9(1.5-6.3) #
PFOS	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	7.2(3.4-10.9) *	5.9(2.7-9.2) *	5.8(2.5-9.1) *	3.2(1.3-5.1) #
	Q3	4.8(1.7-7.8) #	2.2(-1.0-5.4)	2.1(-1.0-5.3)	2.0(0.2-3.9) #
	Q4	5.6(2.4-8.8) *	3.1(-0.3-6.5)	3.4(0.2-6.7) #	3.1(1.1-5.2) #
6:2 Cl-PFESA	quartile				
	Q1	Reference	Reference	Reference	Reference
	Q2	5.1(1.0-9.2) #	3.7(0.0-7.4) #	3.4(-0.3-7.1)	2.9(1.0-4.8) #
	Q3	5.4(2.2-8.7) #	3.2(-0.4-6.8)	3.0(-0.4-6.5)	4.3(2.4-6.2) *
	Q4	2.2(-0.7-5.1)	0.0(-3.9-3.9)	0.3(-3.4-3.9)	2.9(0.4-5.3) #

Note: CI, confidence interval

Model 1 adjusted for age, gender, marriage, nationality, education level, income, occupation and area.

Model 2 further adjusted smoking, drinking, fish consumption frequency, meat consumption frequency and physical activity.

Model 3 further adjusted hypertension, dyslipidemia, CKD and BMI.

#:$P<0.05$; *:$P<0.001$.

Supplementary Table 8. Associations of PFAS quartile with FLI after redefining NAFLD as FLI > 60

PFAS	Crude model	Model 1	Model 2	Model 3
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
PFOA				
Q1	Reference	Reference	Reference	Reference
Q2	1.52(1.16-2.01)#	1.32(0.98-1.78)	1.34(0.99-1.79)	1.97(1.27-3.05)#
Q3	1.55(1.17-2.05)#	1.39(1.01-1.90)#	1.38(1.00-1.91)#	1.58(0.92-2.71)
Q4	1.72(1.20-2.48)#	1.65(1.17-2.32)#	1.68(1.18-2.37)#	2.48(1.37-4.49)#
PFNA				
Q1	Reference	Reference	Reference	Reference
Q2	1.37(0.99-1.89)	1.58(1.17-2.13)#	1.59(1.17-2.16)#	1.60(1.01-2.53)#
Q3	1.95(1.44-2.65)*	2.34(1.70-3.21)*	2.33(1.69-3.22)*	2.69(1.49-4.85)*
Q4	1.45(1.05-2.00)#	1.69(1.14-2.50)#	1.71(1.15-2.54)#	2.61(1.44-4.75)#
PFDA				
Q1	Reference	Reference	Reference	Reference
Q2	1.29(0.98-1.70)	1.32(1.03-1.69)#	1.30(1.02-1.66)#	1.52(0.94-2.45)
Q3	1.41(1.04-1.91)#	1.44(1.05-1.97)#	1.40(1.02-1.93)#	1.81(1.09-3.00)#
Q4	0.98(0.74-1.31)	0.96(0.61-1.51)	0.93(0.61-1.42)	1.42(0.91-2.23)
PFUnDA				
Q1	Reference	Reference	Reference	Reference
Q2	1.35(1.01-1.82)#	1.37(1.05-1.80)#	1.34(1.03-1.74)#	1.40(0.91-2.14)
Q3	1.35(0.96-1.91)	1.36(0.96-1.91)	1.30(0.91-1.86)	1.80(1.03-3.15)#
Q4	0.86(0.65-1.13)	0.86(0.54-1.36)	0.81(0.52-1.26)	1.58(0.88-2.84)
PFHxS				
Q1	Reference	Reference	Reference	Reference
Q2	1.35(1.02-1.78)#	1.19(0.86-1.65)	1.19(0.86-1.66)	1.00(0.51-1.97)
Q3	2.00(1.44-2.79)*	1.60(0.99-2.58)	1.58(0.96-2.62)	1.50(0.68-3.27)
Q4	2.12(1.37-3.29)*	1.76(1.06-2.95)#	1.77(1.01-3.12)#	1.93(0.76-4.92)

PFHpS				
Q1	Reference	Reference	Reference	Reference
Q2	1.46(1.11-1.94)#	1.41(1.09-1.82)#	1.43(1.10-1.86)#	1.29(0.87-1.94)
Q3	2.23(1.68-2.96)*	1.90(1.42-2.53)*	1.91(1.42-2.58)*	1.38(0.85-2.24)
Q4	2.71(1.83-4.03)*	2.17(1.43-3.28)*	2.16(1.34-3.50)#	1.81(0.93-3.51)
PFOS				
Q1	Reference	Reference	Reference	Reference
Q2	1.32(0.99-1.76)	1.29(0.98-1.71)	1.30(0.97-1.75)	1.04(0.59-1.82)
Q3	2.06(1.47-2.87)*	1.91(1.38-2.65)*	1.92(1.37-2.67)*	1.57(0.93-2.64)
Q4	1.78(1.29-2.44)*	1.65(1.12-2.45)#	1.65(1.08-2.52)#	1.64(0.83-3.24)
6:2Cl-PFESA				
Q1	Reference	Reference	Reference	Reference
Q2	1.16(0.87-1.55)	1.11(0.82-1.51)	1.10(0.80-1.52)	1.53(0.88-2.68)
Q3	1.51(1.07-2.14)#	1.43(0.98-2.08)	1.43(0.97-2.13)	1.70(0.92-3.13)
Q4	1.43(0.99-2.06)	1.48(0.98-2.24)	1.47(0.95-2.27)	2.24(1.22-4.13)#

Note: CI, confidence interval

Model 1 adjusted for age, gender, marriage, nationality, education level, income, occupation and area.

Model 2 further adjusted smoking, drinking, fish consumption frequency, meat consumption frequency and physical activity.

Model 3 further adjusted hypertension, dyslipidemia, CKD and BMI.

#:$P<0.05$; *:$P<0.001$.