

Supplementary Materials

Exogenous factors associated with legacy PFAS concentrations in the general U.S. population: NHANES 1999-2018

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Supplementary Table 1. Exogenous factors evaluated from NHANES 1999-2018

Factor	NHANES variable name	NHANES cycles measured	Categorical/continuous	Categories*
Demographics				
Six-month period	RIDEXMON	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1= Nov 1 through Apr 30 2= May 1 through Oct 31
NHANES year	--	--	Continuous	--
Ethnicity†	RIDRETH	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=Mexican-American 2=Other Hispanic 3=Non-Hispanic White 4=Non-Hispanic Black 5=Other race 6=Non-Hispanic Asian
Country of birth	DMDBORN4	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=Born in US or DC 2=Born Elsewhere
Sex	RIAGENDR	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=male 2=female
Age at screening	RIDAGEYR	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--

Veteran/military status	DMQMILIT	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Citizenship status	DMDCITZN	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=citizen by birth or naturalization 2=not a citizen of the US
Education level†	DMDEDUC	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=Less than high school 2=high school diploma 3=more than high school
Marital status	DMDMART L	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=married 2=widowed 3=divorced 4=separated 5=never married 6=living with partner
Total number of people in household	DMDHHSIZ	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Annual household income†	INDHHIN2	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=\$0 - \$4,999 2=\$5,000 - \$9,999 3=\$10,000 - \$14,999 4=\$15,000 - \$19,999 5=\$20,000 - \$24,999

				6=\$25,000 - \$34,999
				7=\$35,000 - \$44,999
				8=\$45,000 - \$54,999
				9=\$55,000 - \$64,999
				10=\$65,000 - \$74,999
				12=Over \$20,000
				13=Under \$20,000
				14=\$75,000 - \$99,999
				15= \geq \$100,000
Annual family income†	INDFMIN2	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=\$0 - \$4,999
				2=\$5,000 - \$9,999
				3=\$10,000 - \$14,999
				4=\$15,000 - \$19,999
				5=\$20,000 - \$24,999
				6=\$25,000 - \$34,999
				7=\$35,000 - \$44,999
				8=\$45,000 - \$54,999
				9=\$55,000 - \$64,999
				10=\$65,000 - \$74,999
				11=Over \$20,000
				12=Under \$20,000
				13=\$75,000 -

				\$99,999
				14= \geq \$100,000
Total number of people in family	DMDFMSIZ	09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=1 2=2 3=3 4=4 5=5 6=6 7= \geq 7
Family poverty income ratio	INDFMPIR	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Dietary interview				
<i>Food consumption</i>				
Shellfish consumption over the past 30 days	DRD340	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Types of shellfish consumed over the past 30 days‡	--	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=Multiple types consumed 2=One type consumed 3=None consumed
Fish consumption over the past 30 days	DRD360	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Consumed unknown, other, or breaded fish in the last 30 days§	--	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no

Consumed walleye, trout, pike, perch, or bass in the last 30 days †	--	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Consumed swordfish, shark, sea bass, sardines, porgy, pollock, mackerel, haddock, flatfish, cod, or tuna in the last 30 days ¶	--	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Consumed catfish or salmon in the last 30 days**	--	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
<i>Supplement use</i>				
Any dietary supplements taken	DSD010	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
<i>Fasting status</i>				
Consumed coffee or tea with cream or sugar since fasting time	PHQ020	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Consumed alcohol such as beer, wine, or liquor since fasting time	PHQ030	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Consumed gums,	PHQ040	99-00, 03-04,	Categorical	1=yes

mints, lozenges, or cough drops since fasting time		05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18		2=no
Consumed antacids, laxatives, or anti-diarrheal since fasting time	PHQ050	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Consumed dietary supplements since fasting time	PHQ060	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Total length of food fast, hours	PHAFSTHR	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Questionnaire data				
<i>Alcohol use</i>				
Have you had at least 12 alcoholic drinks in the last year?	ALQ101	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Average number of alcoholic drinks per day over past 12 months	ALQ130	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Ever have 5 or more drinks in a day	ALQ150	99-00, 03-04, 05-06, 07-08, 09-10	Categorical	1=yes 2=no
<i>Consumer behavior</i>				
Money spent at	CBD070	07-08, 11-12,	Continuous	--

supermarket/grocery store in the last 30 days		13-14, 15-16, 17-18		
Money spent on nonfood items in the last 30 days	CBD090	07-08, 11-12, 13-14, 15-16, 17-18	Continuous	--
Money spent eating out in the last 30 days	CBD120	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Money spent on carryout/delivered foods in the last 30 days	CBD130	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Eat at restaurants with a waiter in	CBQ550	07-08, 09-10, 17-18	Categorical	1=yes 2=no
Number of meals not prepared at home in the last 30 days	DBD895	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Number of meals from fast food or pizza place in the last 30 days	DBD900	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Number of ready-to-eat foods consumed in the last 30 days	DBD905	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Number of frozen meals or frozen pizzas consumed in the last 30 days	DBD910	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--

Current health status

General health status	HSD010	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=excellent 2=very good 3=good 4=fair
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Head/chest cold in the last 30 days	HSQ500	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	5=poor 1=yes 2=no
Stomach or intestinal illness in the last 30 days	HSQ510	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Flu, pneumonia, or ear infection in the last 30 days	HSQ520	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Donated blood in last 12 months	HSQ571	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Blood ever tested for HIV virus?	HSQ590	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no

Diet

How often do you add salt to your food?	DBD100	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=rarely 2=occasionally 3=very often
What type of salt do you add to your food?	DBQ095Z	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=ordinary salt 2=lite salt 3=salt substitute 4=don't use or add salt products

Are you on a special diet?	DRQSDIET	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	91=other 1=yes 2=no
How healthy is your overall diet?	DBQ700	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=excellent 2=very good 3=good 4=fair 5=poor
Past 30 days milk consumption	DBQ197	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	0=never 1=rarely—less than once a week 2=sometimes—once a week or more, but less than once a day 3=often—once a day or more 4=varied
What kind of milk do you drink? ††	--	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=Whole or regular 2=2% 3=1% 4=fat free/skim 5=soy 6=other
Regular milk consumption (drink milk 5 or more times per week)	DBQ229	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=regular milk drinker for most of life 2=never been a regular milk drinker 3=milk drinking has varied over life
Number of meals from fast food or	DBD900	07-08, 09-10, 11-12, 13-14,	Continuous	--

pizza place in last 7 days		15-16, 17-18		
Number of frozen meals/pizzas consumed in the last 30 days	DBD910	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
<i>Drug use</i>				
Ever used cocaine/heroin/meth	DUQ240	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Ever used a needle to inject an illegal drug	DUQ370	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
<i>Food security</i>				
Household worries about running out of food	FSD032A	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=often true 2=sometimes true 3=never true
Household food doesn't last	FSD032B	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=often true 2=sometimes true 3=never true
Household cannot afford balanced meals	FSD032C	03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=often true 2=sometimes true 3=never true
Household ever received emergency food	FSD151	03-04, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=often true 2=sometimes true 3=never true
Household ever received food stamp benefits	FSQ165	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=often true 2=sometimes true 3=never true
<i>Health insurance</i>				

Time without insurance in the last year	HIQ210	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Does your plan cover prescriptions?	HIQ270	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Are you covered by health insurance?	HIQ011	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no

Hospital use

General health condition	HUQ010	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=excellent 2=very good 3=good 4=fair 5=poor
Health now versus one year ago	HUQ020	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=better 2=worse 3=about the same
Do you have a routine place to go for healthcare?	HUQ030	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=there is no place 3=there is more than one place
What type of place do you go to most often for healthcare?	HUQ040	99-00, 03-04, 05-06, 07-08, 09-10, 11-12	Categorical	1=clinic or health center 2=doctor's office or HMO 3=hospital emergency room 4=hospital

				outpatient department 5=other place 6=doesn't go to one place most often
How many times have you received healthcare over the past year? †	HUQ050	99-00, 03-04, 05-06, 07-08, 09-10, 11-12	Categorical	0=0 1=1 2=2-3 3=4-9 4=10-12 5=>12
Have you been an overnight hospital patient in the last year?	HUQ071	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
<i>Housing characteristics</i>				
Number of rooms in home	HOD050	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
How many years have you lived in your home?	HOD060	99-00, 03-04, 05-06, 07-08, 09-10	Categorical	1=<1 year 2=1-2 years 3=3-5 years 4=6-10 years 5=>10 years
Is your home owned, bought, rented, or do you have another arrangement?	HOQ065	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=owned or being bought 2=rented 3=other arrangement
What is the source of your tap water?	HOQ070	99-00, 03-04, 05-06, 07-08, 09-10	Categorical	1=private/public water company 2=private/public well

Do you have water treatment devices?	HOQ080	99-00, 03-04, 05-06, 07-08, 09-10	Categorical	3=something else 1=yes 2=no
<i>Immunization history</i>				
Did you receive the hepatitis A vaccine?	IMQ011	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes, at least 2 doses 2=less than 2 doses 3=no doses
Did you receive the hepatitis B 3-dose series?	IMQ020	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes, at least 3 doses 2=less than 3 doses 3=no doses
<i>Income</i>				
Do you receive income from wages/salaries?	INQ020	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from self-employment?	INQ012	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from social security or railroad retirement?	INQ030	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from another disability pension?	INQ060	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from retirement or survivor pension?	INQ080	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from	INQ090	07-08, 09-10, 11-12, 13-14,	Categorical	1=yes 2=no

supplemental security income?		15-16, 17-18		
Do you receive income from state or county cash assistance?	INQ132	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from interest/dividends or rentals?	INQ140	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you receive income from other sources?	INQ150	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Monthly family income	IND235	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=\$0-\$399 2=\$400 - \$799 3=\$800 - \$1249 4=\$1250 - \$1649 5=\$1650 - \$2099 6=\$2100 - \$2899 7=\$2900 - \$3749 8=\$3750 - \$4599 9=\$4600 - \$5399 10=\$5400 - \$6249 11=\$6250 - \$8399 12=\$8400 and over
Family monthly poverty level category	INDFMMPC	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=Monthly poverty level index \leq 1.30 2=1.30 < Monthly poverty level index \leq 1.85 3= Monthly poverty level index > 1.85
<i>Depression screening</i>				
Depression screening results ^{††}		05-06, 07-08, 09-10, 11-12,	Categorical	1=no depression 2=mild depression

		13-14, 15-16, 17-18		3=moderate or severe depression
<i>Occupation</i>				
Type of work done in the last week	OCD150	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=working at a job or business 2=with a job or business but not at work 3=looking for work 4=not working at a job or business
Hours worked last week among all jobs	OCQ180	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--
Description of job/work situation	OCQ260	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=An employee of a private company, business, or individual for wages, salary, or commission 2=a federal government employee 3=a state government employee 4=a local government employee 5=self-employed in own business, professional practice, or farm 6=working without

Kind of work you have done the longest	OCD390G	09-10, 11-12, 13-14, 15-16, 17-18	Categorical	pay in family business or farm 1=enter occupation 2=same as current occupation 3=armed forces 4=never worked
<i>Oral health</i>				
How often in the last year have you had aching in your mouth	OHQ620	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=very often 2=fairly often 3=occasionally 4=hardly ever 5=never
In the last year, have you had difficulty with your job because of your mouth	OHQ640	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=very often 2=fairly often 3=occasionally 4=hardly ever 5=never
In the last year, have you been embarrassed because of your mouth	OHQ680	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=very often 2=fairly often 3=occasionally 4=hardly ever 5=never
When did you last visit the dentist?	OHQ030	99-00, 03-04, 11-12, 13-14, 15-16, 17-18	Categorical	1=6 months or less 2=More than 6 months, but not more than 1 year ago 3=More than 1 year, but not more than 2 years ago 4=More than 2 years, but not more than 3 years ago 5=More than 3 years, but not more

Rate the health of your teeth and gums	OHQ845	09-10, 11-12, 13-14, 15-16, 17-18	Categorical	than 5 years ago 6=More than 5 years ago 1=excellent 2=very good 3=good 4=fair 5=poor
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Pesticide use

Products used in the home to control insects	PUQ100	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Products used at home to kill weeds	PUQ110	05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no

Physical activity

Does your work involve vigorous activity?	PAQ605	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Does your work involve moderate activity?	PAQ620	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?	PAQ635	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Do you do any vigorous-intensity sports, fitness, or recreational activities that cause large increases in breathing or heart	PAQ650	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no

rate, such as running or basketball for at least 10 minutes continuously?
 Do you do any moderate-intensity sports, fitness, or recreational activities that cause a small increase in breathing or heart rate, such as brisk walking, bicycling, swimming, or golf for at least 10 minutes continuously?

PAQ665

07-08, 09-10, 11-12, 13-14, 15-16, 17-18

Categorical

1=yes
2=no

Sexual behavior

How old were you when you first had sex?

SXD031

99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16

Continuous

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Sleep

How much sleep do you get regularly?

SLD010H

05-06, 07-08, 09-10, 11-12, 13-14

Continuous

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Have you ever told a doctor you had trouble sleeping?

SLQ050

05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18

Categorical

1=yes
2=no

Have you ever been told by a doctor you have a sleep disorder?

SLQ060

05-06, 07-08, 09-10, 11-12, 13-14

Categorical

1=yes
2=no

<i>Smoking</i>				
Have you smoked at least 100 cigarettes in your lifetime?	SMQ020	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
Does anyone in your home smoke?	SMD410	99-00, 03-04, 05-06, 07-08, 09-10, 11-12	Categorical	1=yes 2=no
Have you used tobacco/nicotine in the last 5 days?	SMQ680	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
<i>Weight</i>				
How do you consider your weight?	WHQ030	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=overweight 2=underweight 3=about the right weight
Have you tried to lose weight in the last year?	WHQ070	99-00, 03-04, 05-06, 07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Categorical	1=yes 2=no
At what age were you at your heaviest weight?	WHQ150	07-08, 09-10, 11-12, 13-14, 15-16, 17-18	Continuous	--

*Each categorical variable also included option 7=refused or 9=don't know

†Indicates variable changed over time during NHANES cycles and we recoded to indicated categories.

‡Due to small numbers of respondents and many categories of shellfish, we created this variable with NHANES variables DRD350A-J.

§Due to small numbers of respondents and many categories of fish, we created this variable with NHANES variables DRD370 A, T, and U based on the type of fish and fish habitat.

|| Due to small numbers of respondents and many categories of fish, we created this variable with NHANES variables DRD370 C, I, J, and S based on the type of fish and fish habitat.

¶ Due to small numbers of respondents and many categories of fish, we created this variable with NHANES variables DRD370 B, E, F, G, H, K, L, N, O, and Q based on the type of fish and fish habitat.

** Due to small numbers of respondents and many categories of fish, we created this variable with NHANES variables DRD370 D and M based on the type of fish and fish habitat.

†† Due to small numbers of respondents and many categories of milk, we created this variable with NHANES variables DBQ 223A-E and DBQ223U.

‡‡ Categorized depression status based on NHANES variables DBQ010-100 based on the PHQ-9 referenced by NHANES (Kroenke, Spitzer, & Williams, 2001).

Supplementary Table 2. Covariate descriptions and levels shown in Figures 1-5

Covariate name (in Figure)	NHANES variable name	Reference group (categorical variables only)	Description
Year	*	-	NHANES cycle (e.g., 2003-2004)
Sex (Male)	RIAGENDR	Female sex	Sex (male vs female)
Age	RIDAGEYR	-	Age (in years) at screening
Poverty Index	INDFMPIR	Family poverty income ratio	Poverty and income measure
Native-born	DMDBORN4	Born outside of US	Born in US versus born outside of US
Household size	DMDHHSIZ	-	Total number of people in household
Health Access: Clinic Health Access: Office Health Access: ER Health Access: Outpatient	HUQ040	Receive healthcare at some other place (i.e., not a clinic, doctor's office, ER, or outpatient center)	Type of place participant most often goes to for healthcare
Emergency Food Sometimes	FSD151	Emergency food received often	Statement with three levels of responses (often true, sometimes true, never true): Household ever received emergency food
Food Insecurity Sometimes Food Insecurity Never	FSD032A	Food insecurity experienced often	Statement with three levels of responses (often true, sometimes true, never true): Household worries about running out of food
Health Visits	HUQ050	Health care visits: Zero in	Number of times participants

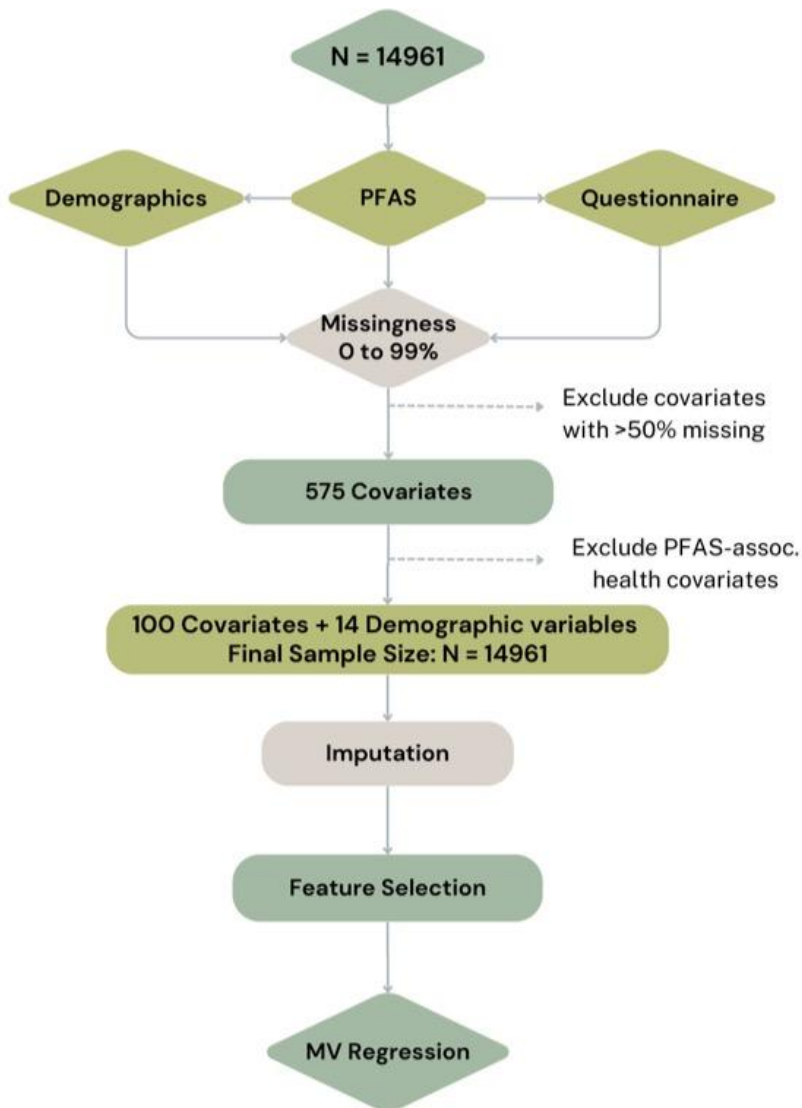
Once Health Visits 2-3 times		the last year	received healthcare over the past year
Health Visits 4-9 times			
Health Visits 10-12 times			
Health Visits >12 times			
Eats Fish	*	Has not consumed freshwater fish over last 30 days	Ever vs never has the participants consumed freshwater fish over last 30 days
Eats Shellfish	DRD340	Has not consumed shellfish over last 30 days	Ever vs never has the participants consumed shellfish over last 30 days
Food Insecurity Sometimes Food Insecurity Never	FSD032B	Food insecurity experienced often	Statement with three levels of responses (often true, sometimes true, never true): Household food doesn't last
Race: Mexican Race: Other Hispanic Race: NH Black Race: NH Asian Race: Other	RIDRETH	Non-Hispanic White	Participant's race or ethnicity identification
Home Renter	HOQ065	Other arrangement	Response to: "Is your home owned, bought, rented, or do you have another arrangement?"
Home Owner			
Has Sleep Issues	SLQ050	Does not have sleep issues	Yes/no response to: "Have you ever told a doctor you had

			trouble sleeping?"
Married			
Widowed			
Divorced			
Separated	DMDMARTL	Living with partner	Marital status
Never Married			
Income Level			
75K-99K			
Income Level	INDHHIN2	\$0-\$4,999	Annual household income
<2K			
Has Retirement Income	INQ030	Does not receive retirement income	Yes/no response to: "Do you receive income from social security or railroad retirement?"
Is Smoker	SMD410	No smoking	Yes/no response to: "Does anyone in your home smoke?"
Eats Freshwater Fish	DRD360	Has not eaten fish in the last 30 days	Ever vs never has the participant consumed fish over last 30 days
Fast Duration	PHAFSTHR	-	Total length of food fast, hours
US Citizen	DMDCITZN	Not a US citizen	US citizenship status

*Variable created for this study using information from NHANES.

Process Flow

1999-2018 (2001-2 omitted)
18 years or older with complete PFAS data



Supplementary Figure 1. Workflow pipeline including sample selection from NHANES cycles 1999-2018 (2001-2 omitted), imputation, feature selection and regression.