

Supplementary Information

- **Supplementary Table S1.** Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) information.
- **Supplementary Table S2.** Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) concentration differences in males (n = 458) and females (n = 1356), as well as between individuals with and without biological children stratified by sex.
- **Supplementary Table S3.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects.
- **Supplementary Table S4.** Coefficients for mixed-linear regression model used for the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907).
- **Supplementary Table S5.** ANOVA F values and degrees of freedom for mixed-linear regression model used for the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907).
- **Supplementary Table S6.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females.
- **Supplementary Table S7.** Coefficients for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in Swedish or not.
- **Supplementary Table S8.** ANOVA F values and degrees of freedom for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in Swedish or not.
- **Supplementary Table S9.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects, considering whether they were born in Swedish or not.
- **Supplementary Table S10.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females, considering whether they were born in Swedish or not.
- **Supplementary Table S11.** Coefficients for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in a Nordic country or not.
- **Supplementary Table S12.** ANOVA F values and degrees of freedom for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in a Nordic country or not.
- **Supplementary Table S13.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects, considering whether they were born in a Nordic country or not.
- **Supplementary Table S14.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females, considering whether they were born in a Nordic country or not.
- **Supplementary Table S15.** Coefficients for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), with the residential area criteria removed.
- **Supplementary Table S16.** ANOVA F values and degrees of freedom for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), with the residential area criteria removed.
- **Supplementary Table S17.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects, with the residential area criteria removed.
- **Supplementary Table S18.** Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females, with the residential area criteria removed.

- **Supplementary Table S19.** Associations between single serum per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs), and the odds ratio of multiple sclerosis (MS) based on the Base model (n = 1,814).
- **Supplementary Table S20.** Coefficients for the logistic regression base model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females combined (n = 1,814).
- **Supplementary Table S21.** Coefficients for the logistic regression Base model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458).
- **Supplementary Table S22.** Coefficients for the logistic regression Base model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356).
- **Supplementary Table S23.** Coefficients for the logistic regression for the fully adjusted model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females (n = 1,814).
- **Supplementary Table S24.** Coefficients for the logistic regression for the fully adjusted model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458).
- **Supplementary Table S25.** Coefficients for the logistic regression for the fully adjusted model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356).
- **Supplementary Table S26.** Coefficients for the logistic regression for the fully adjusted model including Nordic born status used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females (n = 1,814).
- **Supplementary Table S27.** Coefficients for the logistic regression for the fully adjusted model including Nordic born status used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458).
- **Supplementary Table S28.** Coefficients for the logistic regression for the fully adjusted model including Nordic born used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356).
- **Supplementary Table S29.** Associations between single serum per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs), and the odds ratio of multiple sclerosis (MS) (n = 1,814).
- **Supplementary Table S30.** Coefficients for the logistic regression for the fully adjusted model, residential area not taken into account, used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females (n = 1,814).
- **Supplementary Table S31.** Coefficients for the logistic regression for the fully adjusted model, residential area not taken into account, used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458).
- **Supplementary Table S32.** Coefficients for the logistic regression for the fully adjusted model, residential area not taken into account, used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356).
- **Supplementary Table S33.** Associations between single serum per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs), and the odds ratio of multiple sclerosis (MS) (n = 1,814).
- **Supplementary Table S34.** General and clinical characteristics for the 551 individuals included in the Cox proportional hazard analysis regards confirmed disability worsening (CDW).
- **Supplementary Table S35.** Cox proportional hazard analysis output from confirmed disability worsening analysis in males and females (n = 551).
- **Supplementary Table S36.** Cox proportional hazard analysis output from confirmed disability worsening analysis in males (n = 137).
- **Supplementary Table S37.** Cox proportional hazard analysis output from confirmed disability worsening analysis in females (n = 414).
- **Supplementary Table S38.** Cox proportional hazard analysis output from confirmed disability worsening analysis in males and females (n = 551), adjusting for treatment during the follow-up time.
- **Supplementary Table S39.** Cox proportional hazard analysis output from confirmed disability worsening analysis in males (n = 137), adjusting for treatment during the follow-up time.
- **Supplementary Table S40.** Cox proportional hazard analysis output from confirmed disability worsening analysis in females (n = 414), adjusting for treatment during the follow-up time.
- **Supplementary Table S41.** Cox proportional hazard analysis for serum albumin concentrations association with confirmed disability worsening.

- **Supplementary Table S42.** Cox proportional hazard analysis output from confirmed disability worsening analysis in males and females (n = 551), adjusting for serum albumin concentrations.
- **Supplementary Table S43.** Cox proportional hazard analysis output from confirmed disability worsening analysis in males (n = 137), adjusting for serum albumin concentrations.
- **Supplementary Table S44.** Cox proportional hazard analysis output from confirmed disability worsening analysis in females (n = 414), adjusting for serum albumin concentrations.
- **Supplementary Table S45.** Cox proportional hazard analysis output from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) transition analysis (n = 801).
- **Supplementary Table S46.** Cox proportional hazard analysis output from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) transition analysis (n = 801), adjusting for treatment during the follow-up time.
- **Supplementary Table S47.** Cox proportional hazard analysis output from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) transition analysis (n = 801), adjusting for serum albumin concentrations.
- **Supplementary Table S48.** Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) two-tailed Spearman rank correlation test with 25(OH)D3.
- **Supplementary Table S49.** Cox proportional hazard analysis for 25(OH)D3 serum levels association with confirmed disability worsening.
- **Supplementary Table S50.** Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening adjusting for 25(OH)D3 levels (n = 551).
- **Supplementary Table S51.** Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening in males (n = 137), adjusting for 25(OH)D3 levels.
- **Supplementary Table S52.** Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening in females (n = 414), adjusting for 25(OH)D3 levels.
- **Supplementary Table S53.** Cox proportional hazard analysis for 25(OH)D3 serum levels association with the transition from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) (n = 801).
- **Supplementary Table S54.** Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with the transition from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) (n = 801), adjusting for 25(OH)D3 levels.
- **Supplementary Table S55.** P values for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) correlations.
- **Supplementary Table S56.** Correlation coefficient for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) correlations.
- **Supplementary Table S57.** Description of treatments included in each treatment category.
- **Supplementary Figure S1.** Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCB) concentration ($\log_2$ ng/mL) versus sample collection year of persons with multiple sclerosis (MS) and matched controls (HC), separated by sex.
- **Supplementary Figure S2.** Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCB) concentration ($\log_2$ ng/mL) versus age of persons with multiple sclerosis (MS) and matched controls (HC).
- **Supplementary Figure S3.** Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCB) concentration ($\log_2$ ng/mL) in males and females.
- **Supplementary Figure S4.** Perfluorobutanesulfonic acid (PFBS), perfluoropentanesulfonic acid (PFPeS), and perfluoroheptanoic acid (PFHpA) concentration distribution across Sweden.
- **Supplementary Figure S5.** Perfluorohexanesulfonic acid (PFHxS), perfluoroheptanesulfonic acid (PFHpS), and perfluorooctanesulfonic acid (PFOS) concentration distribution across Sweden.
- **Supplementary Figure S6.** Perfluoro-1-octanesulfonamide (FOSA), N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA), and N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) concentration distribution across Sweden.
- **Supplementary Figure S7.** Perfluorononanoic acid (PFNA), perfluorodecanoic acid (PFDA), and perfluorodecane sulfonic acid (PFDS) concentration distribution across Sweden.
- **Supplementary Figure S8.** Perfluoroundecanoic acid (PFUnA), perfluorododecanoic acid (PFDoA), and perfluorotridecanoic acid (PFTrDA) concentration distribution across Sweden.

- **Supplementary Figure S9.** 1h,1h,2h,2h-perfluoro-1-decanesulfonic acid (8:2) (8:2 FTS), 2,2',3,4',5,5',6-heptachloro-4-biphenylol (4-OH-CB187), 2,2',4,4',5,5',Hexachloro-3-biphenylol (3-OH-CB153), and 2,3,3',4',5-Pentachloro-4-biphenylol (4-OH-CB107) concentration distribution across Sweden.
- **Supplementary Figure S10.** Concentration distribution of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) subjects and matched control (HC) divided by sex.
- **Supplementary Figure S11.** Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening adjusting for 25(OH)D3 levels.
- **Supplementary Figure S12.** Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with the transition from relapsing-remitting multiple sclerosis (RRMS) to secondary progressive multiple sclerosis (SPMS) (n = 801) adjusted for 25(OH)D3 levels.
- **Supplementary Figure S13.** Spearman's rank correlation between per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs).
- **Supplementary Figure S14.** Spearman's rank correlation between per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs).

Supplementary Table S1. Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) information. Compound abbreviation, calibration type, coverage (%), grouping, and mean concentration (ng/mL), including the standard deviation (SD) in matched control (HC) subjects (n = 907), relapsing-remitting multiple sclerosis (RRMS) (n = 801) and progressive multiple sclerosis (PMS) (n = 106). Two forms of calibration used are calibration curves and one-point calibration.

Compound	Abbreviation	Calibration	Coverage (%)	Group	Concentration (ng/ml) mean (SD)		
					HC	RRMS	PMS
Perfluorobutanesulfonic acid	PFBS	calibration curve	36	Short-chain PFAS	1.135e-02 (1.590e-02)	9.555e-03 (1.510e-02)	1.261e-02 (1.447e-02)
Perfluoropentanesulfonic acid	PFPeS	calibration curve	68	Short-chain PFAS	4.526e-02 (1.342e-01)	5.901e-02 (4.509e-01)	6.699e-02 (1.794e-01)
Perfluoroheptanoic acid	PFHpA	calibration curve	94	Short-chain PFAS	4.341e-02 (5.879e-02)	4.473e-02 (7.150e-02)	4.075e-02 (5.077e-02)
Perfluorohexanesulfonic acid	PFHxS	calibration curve	94	Long-chain PFAS	2.032 (3.580)	2.593 (21.130)	2.848 (4.325)
Perfluoroheptanesulfonic acid	PFHpS	calibration curve	96	Long-chain PFAS	2.339e-01 (1.949e-01)	2.715e-01 (1.108)	3.610e-01 (2.162e-01)
Perfluorooctanoic acid	PFOA	calibration curve	96	Long-chain PFAS	2.714 (1.780)	2.806 (3.379)	3.683 (2.652)
Perfluorooctanesulfonic acid	PFOS	calibration curve	95	Long-chain PFAS	9.432 (6.937)	9.813 (17.970)	12.970 (7.359)
Perfluoro-1-octanesulfonamide	FOSA	calibration curve	59	Long-chain PFAS	8.828e-03 (6.773e-03)	8.574e-03 (6.467e-03)	9.652e-03 (5.740e-03)
N-methylperfluoro-1-octanesulfonamidoacetic acid	N-MeFOSAA	calibration curve	97	Long-chain PFAS	8.378e-02 (1.061e-01)	9.134e-02 (1.214e-01)	1.033e-01 (1.074e-01)
N-ethylperfluoro-1-octanesulfonamidoacetic acid	N-EtFOSAA	calibration curve	42	Long-chain PFAS	4.373e-02 (5.420e-02)	4.503e-02 (4.531e-02)	5.014e-02 (4.226e-02)
Perfluorononanoic acid	PFNA	calibration curve	96	Long-chain PFAS	9.278e-01 (1.908)	8.132e-01 (4.912e-01)	1.009 (0.770)
Perfluorodecanoic acid	PFDA	calibration curve	93	Long-chain PFAS	3.726e-01 (2.536e-01)	3.497e-01 (0.2143e-01)	4.205e-01 (3.043e-01)
Perfluorodecane sulfonic acid	PFDS	calibration curve	27	Long-chain PFAS	1.046e-02 (9.510e-03)	9.253e-03 (8.775e-03)	1.084e-02 (6.766e-03)
Perfluoroundecanoic acid	PFUnA	calibration curve	96	Long-chain PFAS	3.327e-01 (2.441e-01)	3.030e-01 (2.122e-02)	3.459e-01 (1.942e-01)
Perfluorododecanoic acid	PFDoA	calibration curve	97	Long-chain PFAS	4.432e-02 (3.204e-02)	3.980e-02 (2.772e-02)	4.440e-02 (2.755e-02)
Perfluorotridecanoic acid	PFTTrDA	calibration curve	80	Long-chain PFAS	6.557e-02 (6.066e-02)	5.573e-02 (5.338e-02)	5.981e-02 (5.037e-02)
1H,1H,2H,2H-perfluoro-1-decanesulfonic acid (8:2)	8:2 FTS	calibration curve	76	FTS	3.271e-02 (4.132e-02)	3.391e-02 (4.581e-02)	3.008e-02 (3.484e-02)
2,2',3,4',5,5',6-heptachloro-4-biphenylol	4-OH-CB187	one-point calibration	90	OH-PCB	2.622e-02 (1.679e-02)	2.642e-02 (1.697e-02)	4.487e-02 (3.073e-02)
2,2',4,4',5,5',-Hexachloro-3-biphenylol	3-OH-CB153	one-point calibration	35	OH-PCB	6.229e-01 (1.640)	6.686e-01 (1.315)	1.326 (1.783)
2,3,3',4',5-Pentachloro-4-biphenylol	4-OH-CB107	one-point calibration	41	OH-PCB	1.250e-01 (2.218e-01)	1.186e-01 (1.642e-01)	2.328e-01 (4.089e-01)

Supplementary Table S2. Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) concentration differences in males (n = 458) and females (n = 1356), as well as between individuals with and without biological children stratified by sex. Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	Females vs Males (ref. = males)		Biological children vs no biological children			
			Females		Males	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	0.466	4.86e-01	-0.644	1.41e-01	-0.166	8.22e-01
PFPeS	-0.013	2.46e-01	-1.132	1.23e-03	0.443	4.70e-01
PFHpA	0.377	6.04e-01	-0.751	8.45e-04	-0.618	1.05e-01
PFHxS	-0.666	1.37e-09	-0.460	3.13e-07	0.189	2.90e-01
PFHpS	-0.844	5.30e-10	-0.473	1.10e-07	0.059	6.54e-01
PFOA	-0.284	2.54e-04	-0.539	2.98e-14	-0.050	6.08e-01
PFOS	-0.527	9.75e-05	-0.248	3.39e-03	0.013	9.30e-01
FOSA	-0.008	8.58e-01	-0.044	5.95e-01	-0.055	6.91e-01
N-MeFOSAA	-0.056	4.18e-01	-0.092	3.42e-01	-0.087	5.96e-01
N-EtFOSAA	-0.016	3.75e-01	-0.161	1.13e-01	-0.125	4.58e-01
PFNA	-0.151	1.03e-01	-0.359	1.11e-05	-0.138	3.71e-01
PFDA	-0.148	1.42e-01	-0.178	5.21e-02	0.045	7.26e-01
PFDS	0.070	7.16e-01	-0.067	5.72e-01	0.149	4.30e-01
PFUnA	0.186	1.11e-01	-0.135	1.69e-01	0.207	1.82e-01
PFDoA	0.188	1.55e-01	-0.205	1.39e-02	-0.255	6.98e-01
PFTrDA	0.393	2.59e-02	-0.072	6.61e-01	0.122	6.70e-01
8:2 FTS	0.391	1.68e-02	-0.054	7.27e-01	-0.093	7.05e-01
4-OH-CB187	-0.324	4.54e-02	0.024	8.45e-01	-0.302	1.61e-01
3-OH-CB153	-0.024	9.25e-01	-0.400	2.81e-02	0.051	8.69e-01
4-OH-CB107	0.099	8.54e-01	-0.399	7.20e-03	-0.299	3.53e-01

The model females vs. males was adjusted for age, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, number of childbirths, and disease phenotype.

The model biological children vs no biological children was adjusted for age, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, and disease phenotype.

Supplementary Table S3. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-2.57e-02	9.62e-01	-3.98e-02	9.16e-01	-1.87e-02	9.80e-01
PFPeS	-8.09e-01	6.12e-02	-3.76e-01	2.10e-01	-1.03	9.12e-02
PFHpA	-7.93e-01	6.18e-03	-2.50e-01	2.22e-01	-1.06	8.05e-03
PFHxS	2.03e-02	8.50e-01	-1.44e-01	5.12e-02	1.03e-01	5.00e-01
PFHpS	1.34e-01	2.01e-01	9.08e-03	8.99e-01	1.96e-01	1.86e-01
PFOA	6.17e-02	3.94e-01	-4.87e-02	3.26e-01	1.17e-01	2.56e-01
PFOS	4.71e-02	6.30e-01	-1.46e-04	9.98e-01	7.07e-02	6.10e-01
FOSA	6.62e-02	5.20e-01	-1.17e-02	8.71e-01	1.05e-01	4.63e-01
N-MeFOSAA	-5.25e-02	6.71e-01	4.63e-02	5.96e-01	-1.02e-01	5.53e-01
N-EtFOSAA	-1.05e-01	4.15e-01	-7.06e-02	4.40e-01	-1.23e-01	4.93e-01
PFNA	1.52e-03	9.88e-01	-2.84e-02	6.71e-01	1.65e-02	9.05e-01
PFDA	-4.09e-02	6.80e-01	-4.24e-02	5.33e-01	-4.01e-02	7.75e-01
PFDS	-2.66e-01	7.65e-02	-4.20e-02	6.93e-01	-3.78e-01	6.94e-02
PFUnA	2.12e-02	8.45e-01	5.44e-02	4.65e-01	4.64e-03	9.76e-01
PFDoA	-6.50e-02	5.27e-01	7.07e-02	3.27e-01	-1.33e-01	3.55e-01
PFTTrDA	-1.74e-01	3.99e-01	2.70e-02	8.53e-01	-2.75e-01	3.38e-01
8:2 FTS	3.39e-02	8.58e-01	-1.35e-01	3.11e-01	1.18e-01	6.56e-01
4-OH-CB187	2.83e-01	4.91e-02	2.17e-01	2.82e-02	3.16e-01	1.20e-01
3-OH-CB153	5.18e-01	3.14e-02	3.40e-01	4.45e-02	6.06e-01	7.03e-02
4-OH-CB107	-1.04e-01	5.97e-01	-3.64e-02	7.96e-01	-1.38e-01	6.13e-01

The fully adjusted model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking from indoors, type of undergoing treatment, and number of childbirths.

Supplementary Table S4. Coefficients for mixed-linear regression model used for the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)				Number of childbirths		Disease type * Sex
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β (First line DMT)	β (Other drugs)	β (Second line DMT)	<i>P</i>	β	<i>P</i>	<i>P</i>
PFBS	4.12e-02	6.15e-01	-3.45e-02	1.10e-01	1.26e-01	4.86e-01	-8.16e-03	8.76e-01	5.79e-02	3.87e-01	1.58e-02	4.91e-01	3.55e-01	2.09e-02	1.09e-02	7.97e-01	4.35e-01	4.21	-1.61	3.60e-01	-6.81e-02	7.43e-01	5.76e-01
PFPeS	-1.76e-01	8.50e-03	3.92e-02	2.64e-02	-7.97e-01	2.46e-01	-4.48e-02	2.88e-01	-3.92e-02	4.67e-01	1.69e-02	3.59e-01	6.38e-02	6.08e-01	-4.06e-02	2.31e-01	4.49e-01	3.31	-2.68e-01	5.32e-01	1.00e-01	5.49e-01	1.23e-01
PFHpA	-1.62e-01	2.14e-05	4.54e-02	8.44e-06	-5.98e-02	6.04e-01	-5.75e-02	3.21e-02	6.54e-02	5.69e-02	-3.53e-03	7.65e-01	-9.50e-02	2.18e-01	-2.00e-02	3.52e-01	-6.72e-01	3.15e-01	-7.68e-01	4.88e-01	-2.21e-02	8.32e-01	1.32e-01
PFHxS	-6.86e-02	4.54e-04	3.35e-02	5.42e-11	-9.98e-01	8.33e-10	-1.62e-02	1.40e-01	-4.41e-03	7.52e-01	7.48e-03	1.16e-01	6.70e-03	8.42e-01	-1.34e-02	1.29e-01	1.81e-01	9.83e-02	-9.50e-02	8.50e-01	-6.98e-02	1.25e-01	2.89e-02
PFHpS	-8.80e-02	8.98e-06	3.70e-02	6.75e-13	-1.01	3.33e-10	4.42e-03	6.81e-01	-1.05e-02	4.43e-01	-9.98e-04	8.30e-01	1.56e-02	6.40e-01	-6.36e-03	4.63e-01	1.60e-01	-8.60e-01	-3.20e-01	2.81e-01	-1.05e-01	2.07e-02	2.12e-01
PFOA	-7.78e-02	2.57e-07	2.88e-02	1.75e-13	-4.63e-01	2.33e-04	-3.64e-03	6.32e-01	-1.57e-02	1.05e-01	7.40e-04	8.21e-01	-2.36e-02	3.30e-01	-4.95e-03	4.18e-01	1.66e-01	-3.79e-03	-5.03e-02	7.39e-01	-6.23e-02	5.80e-02	1.44e-01
PFOS	-9.41e-02	1.21e-06	3.39e-02	1.60e-11	-6.35e-01	8.97e-05	-2.71e-02	7.65e-03	-1.08e-02	4.01e-01	-7.36e-03	9.21e-02	2.85e-02	3.71e-01	-2.33e-02	4.31e-03	-4.08e-02	-1.10	-1.92e-01	2.19e-01	-5.57e-02	1.97e-01	3.07e-01
FOSA	-1.41e-01	3.65e-23	3.33e-02	1.78e-18	-6.47e-02	8.59e-01	-4.87e-02	5.15e-07	1.35e-02	2.78e-01	-1.09e-02	1.07e-02	4.87e-02	8.28e-02	-1.92e-02	1.40e-02	-2.80e-01	-7.74e-01	-5.01e-01	8.91e-02	6.08e-03	8.72e-01	8.24e-01
N-MeFOSAA	-2.33e-01	1.32e-43	2.52e-02	1.77e-08	-8.56e-02	4.18e-01	-3.40e-02	3.36e-03	2.65e-02	7.36e-02	-1.03e-02	4.36e-02	-3.32e-02	3.21e-01	-1.13e-03	9.04e-01	-2.37e-02	-1.11	-6.07e-01	1.28e-01	1.89e-02	6.75e-01	9.84e-01
N-EtFOSAA	-1.86e-01	1.23e-27	1.82e-02	6.91e-05	-9.75e-02	3.75e-01	-5.26e-03	6.61e-01	-9.52e-03	5.35e-01	-4.79e-03	3.63e-01	-6.38e-02	6.43e-02	-1.64e-03	8.65e-01	-3.02e-01	-6.17e-01	8.34e-02	5.05e-01	2.09e-02	6.52e-01	9.74e-01
PFNA	-3.23e-02	7.29e-02	2.80e-02	2.32e-09	-2.59e-01	1.02e-01	-2.18e-02	2.93e-02	-8.76e-03	4.90e-01	-3.71e-03	3.91e-01	3.57e-02	2.45e-01	-5.71e-03	4.77e-01	-1.17e-01	-6.50e-01	-3.62e-01	3.75e-01	-5.38e-02	1.96e-01	3.23e-01
PFDA	-8.68e-03	6.25e-01	2.84e-02	9.73e-10	-2.66e-01	1.41e-01	-4.09e-02	4.88e-05	-1.21e-02	3.46e-01	-6.81e-03	1.19e-01	3.67e-02	2.33e-01	-4.21e-03	6.03e-01	-1.74e-01	-1.62e-01	-1.97e-01	7.52e-01	-1.89e-02	6.50e-01	5.51e-01
PFDS	-1.10e-01	2.40e-08	1.53e-02	3.73e-03	-3.33e-01	7.18e-01	-5.54e-02	6.87e-05	2.85e-02	1.10e-01	-3.15e-03	6.06e-01	-1.64e-02	6.82e-01	2.24e-03	8.41e-01	-3.69e-01	-1.01	5.08e-01	1.90e-01	6.68e-02	2.15e-01	2.27e-02
PFUnA	2.54e-02	2.16e-01	3.58e-02	2.11e-11	1.36e-01	1.10e-01	-5.94e-02	1.07e-07	1.15e-02	4.17e-01	-6.59e-03	1.72e-01	8.11e-02	1.92e-02	-7.03e-03	4.34e-01	-3.68e-01	-1.04	-3.42e-01	9.81e-02	-5.32e-02	2.56e-01	3.18e-01
PFDoA	-1.52e-02	2.96e-01	3.27e-02	2.85e-17	1.38e-01	1.55e-01	-6.72e-02	6.39e-12	6.92e-03	5.80e-01	-1.39e-02	1.17e-03	5.63e-02	4.69e-02	-1.55e-02	4.84e-02	-2.24e-01	-1.03	-6.55e-01	2.67e-02	-3.04e-02	4.27e-01	9.84e-01
PFTTrDA	-4.40e-02	1.10e-01	6.07e-02	1.32e-16	4.19e-01	2.57e-02	-1.09e-01	1.28e-08	3.61e-02	1.42e-01	-2.88e-02	6.37e-04	1.34e-01	1.54e-02	-2.37e-02	1.24e-01	-3.14e-01	-2.14	-2.21e-01	2.26e-01	-3.71e-02	6.19e-01	7.87e-01
8:2 FTS	-2.45e-01	2.07e-19	1.67e-03	8.17e-01	5.13e-01	1.65e-02	-4.78e-02	8.37e-03	2.94e-02	2.03e-01	-8.59e-03	2.79e-01	1.51e-02	7.74e-01	8.49e-03	5.60e-01	-3.76e-02	-9.90e-01	-3.41e-01	7.32e-01	-7.89e-02	2.66e-01	6.51e-01
4-OH-CB187	-1.23e-01	1.42e-06	4.72e-02	1.18e-12	-4.26e-01	4.49e-02	-4.78e-02	1.04e-03	1.80e-02	3.30e-01	-3.62e-03	5.67e-01	5.08e-02	2.52e-01	-4.94e-03	6.73e-01	-4.27e-02	4.34e-02	-1.30	2.93e-02	4.87e-02	4.16e-01	4.04e-01
3-OH-CB153	-2.02e-01	1.34e-09	1.34e-01	1.35e-51	1.81e-02	9.27e-01	-5.18e-02	2.24e-02	1.00e-01	5.39e-04	-1.39e-02	1.61e-01	1.66e-02	8.00e-01	-2.07e-02	2.57e-01	-3.53e-01	4.51e-01	-1.03	4.05e-01	-8.24e-02	3.50e-01	1.51e-01
4-OH-CB107	-1.64e-01	8.98e-11	9.06e-02	9.15e-41	7.44e-02	8.54e-01	-7.62e-02	2.58e-05	1.03e-01	9.43e-06	-9.51e-04	9.05e-01	2.09e-02	6.87e-01	1.15e-02	4.28e-01	2.28e-02	-2.55e-02	-9.13e-01	4.25e-01	2.28e-02	7.44e-01	3.90e-01

β beta (regression coefficient)

Supplementary Table S5. ANOVA F values and degrees of freedom for mixed-linear regression model used for the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907). The two-way ANOVA *F* value and degrees of freedom (Df) for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)		Number of childbirth		Disease type * Sex	
	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df
PFBS	2.53e-01	1	2.56	1	4.84e-01	1	2.41e-02	1	7.45e-01	1	4.72e-01	1	5.33	1	6.62e-02	1	1.07	3	1.07e-01	1	6.60e-01	3
PFPeS	6.92	1	4.92	1	1.35	1	1.12	1	5.28e-01	1	8.39e-01	1	2.62e-01	1	1.43	1	7.30e-01	3	3.57e-01	1	1.92	3
PFHpA	1.80e+01	1	1.98e+01	1	2.68e-01	1	4.58	1	3.61	1	8.93e-02	1	1.51	1	8.62e-01	1	8.08e-01	3	4.51e-02	1	1.87	3
PFHxS	1.23e+01	1	4.30e+01	1	3.76e+01	1	2.17	1	9.93e-02	1	2.46	1	3.96e-02	1	2.29	1	2.65e-01	3	2.35	1	3.00	3
PFHpS	1.97e+01	1	5.16e+01	1	3.94e+01	1	1.68e-01	1	5.87e-01	1	4.59e-02	1	2.18e-01	1	5.37e-01	1	1.27	3	5.34	1	1.50	3
PFOA	2.65e+01	1	5.42e+01	1	1.35e+01	1	2.28e-01	1	2.63	1	5.12e-02	1	9.47e-01	1	6.53e-01	1	4.19e-01	3	3.58	1	1.80	3
PFOS	2.35e+01	1	4.54e+01	1	1.53e+01	1	7.09	1	7.02e-01	1	2.83	1	7.97e-01	1	8.12	1	1.47	3	1.66	1	1.20	3
FOSA	9.82e+01	1	7.68e+01	1	3.18e-02	1	2.51e+01	1	1.17	1	6.49	1	3.00	1	6.02	1	2.16	3	2.58e-02	1	3.01e-01	3
N-MeFOSAA	1.92e+02	1	3.17e+01	1	6.56e-01	1	8.57	1	3.19	1	4.05	1	9.85e-01	1	1.46e-02	1	1.89	3	1.76e-01	1	5.20e-02	3
N-EtFOSAA	1.19e+02	1	1.58e+01	1	7.86e-01	1	1.91e-01	1	3.83e-01	1	8.23e-01	1	3.42	1	2.89e-02	1	7.77e-01	3	2.03e-01	1	7.36e-02	3
PFNA	3.21	1	3.57e+01	1	2.67	1	4.73	1	4.74e-01	1	7.34e-01	1	1.35	1	5.03e-01	1	1.03	3	1.67	1	1.16	3
PFDA	2.38e-01	1	3.73e+01	1	2.16	1	1.64e+01	1	8.83e-01	1	2.43	1	1.42	1	2.70e-01	1	4.00e-01	3	2.06e-01	1	7.00e-01	3
PFDS	3.11e+01	1	8.40	1	1.30e-01	1	1.58e+01	1	2.55	1	2.65e-01	1	1.68e-01	1	3.99e-02	1	1.58	3	1.54	1	3.18	3
PFUnA	1.53	1	4.48e+01	1	2.55	1	2.81e+01	1	6.56e-01	1	1.86	1	5.47	1	6.09e-01	1	2.09	3	1.29	1	1.17	3
PFDoA	1.09	1	7.14e+01	1	2.02	1	4.70e+01	1	3.06e-01	1	1.05e+01	1	3.94	1	3.88	1	3.05	3	6.31e-01	1	5.34e-02	3
PFTTrDA	2.55	1	6.83e+01	1	4.97	1	3.23e+01	1	2.14	1	1.16e+01	1	5.86	1	2.35	1	1.44	3	2.47e-01	1	3.52e-01	3
8:2 FTS	8.11e+01	1	5.33e-02	1	5.74	1	6.93	1	1.61	1	1.17	1	8.25e-02	1	3.39e-01	1	4.27e-01	3	1.24	1	5.43e-01	3
4-OH-CB187	2.32e+01	1	5.05e+01	1	4.02	1	1.07e+01	1	9.45e-01	1	3.27e-01	1	1.31	1	1.77e-01	1	2.99	3	6.60e-01	1	9.71e-01	3
3-OH-CB153	3.67e+01	1	2.28e+02	1	8.36e-03	1	5.20	1	1.19e+01	1	1.96	1	6.38e-02	1	1.28	1	9.68e-01	3	8.71e-01	1	1.76	3
4-OH-CB107	4.20e+01	1	1.78e+02	1	3.35e-02	1	1.76e+01	1	1.96e+01	1	1.42e-02	1	1.62e-01	1	6.27e-01	1	9.26e-01	3	1.07e-01	1	9.99e-01	3

Supplementary Table S6. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	Males						Females					
	MS vs HC		RRMS vs HC		PMS vs HC		MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-7.47e-01	3.52e-01	-2.66e-01	6.62e-01	-9.88e-01	3.76e-01	6.96e-01	3.16e-01	1.87e-01	6.57e-01	9.51e-01	3.38e-01
PFPeS	-1.75	6.35e-03	-3.94e-01	4.15e-01	-2.43	6.64e-03	1.31e-01	8.14e-01	-3.58e-01	2.86e-01	3.75e-01	6.37e-01
PFHpA	-1.41	1.13e-03	-3.64e-01	2.75e-01	-1.94	1.12e-03	-1.72e-01	6.38e-01	-1.37e-01	5.48e-01	-1.90e-01	7.14e-01
PFHxS	-2.59e-01	1.01e-01	-2.24e-01	5.90e-02	-2.77e-01	2.13e-01	3.00e-01	3.30e-02	-6.50e-02	4.34e-01	4.82e-01	1.72e-02
PFHpS	-5.45e-02	7.22e-01	-7.62e-02	5.06e-01	-4.36e-02	8.40e-01	3.22e-01	1.89e-02	9.43e-02	2.42e-01	4.36e-01	2.74e-02
PFOA	-6.55e-02	5.34e-01	-1.03e-01	1.90e-01	-4.66e-02	7.55e-01	1.89e-01	4.79e-02	6.01e-03	9.14e-01	2.81e-01	4.21e-02
PFOS	-1.01e-01	4.76e-01	-7.76e-02	4.67e-01	-1.13e-01	5.74e-01	1.96e-01	1.27e-01	7.73e-02	3.05e-01	2.55e-01	1.69e-01
FOSA	2.68e-02	8.62e-01	-6.42e-02	5.84e-01	7.23e-02	7.33e-01	1.06e-01	4.20e-01	4.08e-02	6.12e-01	1.38e-01	4.57e-01
N-MeFOSAA	-4.23e-02	8.19e-01	7.19e-02	6.12e-01	-9.94e-02	6.96e-01	-6.28e-02	6.89e-01	2.07e-02	8.31e-01	-1.05e-01	6.39e-01
N-EtFOSAA	-6.26e-02	7.46e-01	-5.37e-02	7.18e-01	-6.71e-02	8.00e-01	-1.48e-01	3.65e-01	-8.75e-02	3.89e-01	-1.78e-01	4.40e-01
PFNA	-7.04e-02	6.23e-01	-6.92e-02	5.19e-01	-7.10e-02	7.25e-01	7.34e-02	5.65e-01	1.23e-02	8.70e-01	1.04e-01	5.71e-01
PFDA	-8.26e-02	5.69e-01	-1.36e-01	2.14e-01	-5.62e-02	7.84e-01	8.55e-04	9.95e-01	5.07e-02	5.07e-01	-2.41e-02	8.97e-01
PFDS	-5.12e-01	2.29e-02	-3.55e-01	4.08e-02	-5.91e-01	5.53e-02	-1.99e-02	9.17e-01	2.71e-01	2.19e-02	-1.65e-01	5.38e-01
PFUnA	-7.97e-02	6.16e-01	-6.96e-02	5.59e-01	-8.47e-02	7.06e-01	1.22e-01	3.90e-01	1.78e-01	3.35e-02	9.40e-02	6.46e-01
PFDoA	-8.58e-02	5.76e-01	4.56e-02	6.96e-01	-1.52e-01	4.75e-01	-4.43e-02	7.36e-01	9.58e-02	2.33e-01	-1.14e-01	5.40e-01
PFTTrDA	-3.68e-01	2.34e-01	-2.44e-03	9.92e-01	-5.51e-01	1.94e-01	1.93e-02	9.41e-01	5.65e-02	7.27e-01	6.20e-04	9.99e-01
8:2 FTS	1.94e-01	4.92e-01	-1.66e-01	4.41e-01	3.75e-01	3.39e-01	-1.27e-01	6.02e-01	-1.03e-01	4.86e-01	-1.38e-01	6.89e-01
4-OH-CB187	5.98e-02	7.77e-01	2.14e-01	1.78e-01	-1.72e-02	9.54e-01	5.07e-01	6.94e-03	2.21e-01	4.67e-02	6.50e-01	1.60e-02
3-OH-CB153	2.86e-01	4.26e-01	3.94e-01	1.52e-01	2.32e-01	6.39e-01	7.49e-01	1.43e-02	2.86e-01	1.28e-01	9.81e-01	2.39e-02
4-OH-CB107	-1.13e-01	7.03e-01	1.25e-01	5.85e-01	-2.32e-01	5.66e-01	-9.55e-02	7.01e-01	-1.98e-01	2.03e-01	-4.42e-02	9.00e-01

The fully adjusted model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, and number of childbirths.

Supplementary Table S7. Coefficients for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in Swedish or not. The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)				Number of childbirths		Born in Sweden (ref = 0)		Disease type * Sex
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β (First line DMT)	β (Other drugs)	β (Second line DMT)	<i>P</i>	β	<i>P</i>	β	<i>P</i>	
PFBS	3.30e-02	6.64e-01	-4.04e-02	3.22e-02	5.62e-01	1.59e-01	-1.44e-02	7.41e-01	6.84e-03	9.01e-01	1.21e-02	5.50e-01	3.54e-01	1.80e-02	-3.56e-03	9.18e-01	-5.92e-02	4.87	-2.22	1.18e-01	-1.61e-01	2.83e-01	1.35e-01	7.53e-01	6.23e-01
PFPeS	-1.83e-01	2.81e-03	2.92e-02	5.58e-02	2.76e-02	5.69e-01	-1.32e-02	7.08e-01	-5.32e-02	2.30e-01	1.26e-02	4.40e-01	5.47e-02	6.52e-01	-4.00e-02	1.54e-01	4.22e-01	2.55	-5.28e-01	5.84e-01	-1.81e-01	1.35e-01	-6.65e-02	8.48e-01	2.14e-01
PFHpA	-1.76e-01	2.33e-07	2.44e-02	5.07e-03	4.18e-01	7.47e-03	-2.98e-02	1.91e-01	3.88e-02	1.75e-01	-5.78e-03	5.85e-01	-7.77e-02	3.11e-01	-2.54e-02	1.63e-01	-1.86e-01	-1.15	-2.15e-01	8.31e-01	-1.77e-01	1.99e-02	-8.79e-02	6.94e-01	2.47e-01
PFHxS	-6.79e-02	2.15e-04	2.51e-02	2.00e-08	-7.61e-01	1.35e-08	-3.30e-03	7.20e-01	-3.95e-04	9.73e-01	4.80e-03	2.60e-01	1.60e-02	6.23e-01	-2.16e-03	7.68e-01	1.28e-01	2.53e-02	2.17e-01	8.08e-01	-1.40e-01	1.80e-05	4.68e-02	6.06e-01	1.83e-01
PFHpS	-8.90e-02	1.06e-06	2.81e-02	2.14e-10	-8.17e-01	6.46e-10	4.60e-03	5.95e-01	2.94e-03	7.89e-01	-2.76e-03	4.90e-01	2.13e-02	4.89e-01	2.37e-03	7.29e-01	1.49e-01	-7.26e-01	-2.26e-02	4.28e-01	-1.57e-01	4.21e-07	8.73e-02	3.05e-01	1.51e-01
PFOA	-8.05e-02	8.71e-09	1.88e-02	2.77e-08	-1.70e-01	2.74e-01	-2.47e-03	7.11e-01	-2.01e-03	8.12e-01	-1.02e-03	7.40e-01	-3.13e-03	8.95e-01	-1.41e-03	7.89e-01	1.91e-01	-1.51e-01	1.47e-01	4.54e-01	-1.50e-01	3.61e-10	-8.52e-02	1.94e-01	1.81e-01
PFOS	-9.86e-02	3.01e-08	2.74e-02	2.23e-10	-5.03e-01	2.25e-04	-2.42e-02	4.34e-03	1.31e-03	9.03e-01	-9.04e-03	2.10e-02	3.13e-02	2.98e-01	-1.41e-02	3.51e-02	-5.86e-03	-8.98e-01	-9.35e-02	3.60e-01	-8.71e-02	4.20e-03	2.51e-02	7.63e-01	9.03e-02
FOSA	-1.54e-01	8.42e-33	3.10e-02	2.86e-21	-4.05e-02	9.54e-01	-3.72e-02	6.66e-06	2.58e-04	9.80e-01	-1.24e-02	1.22e-03	5.56e-02	4.68e-02	-1.81e-02	6.11e-03	-2.81e-01	-3.92e-01	-4.37e-01	1.25e-01	-3.89e-03	8.89e-01	2.26e-02	7.81e-01	9.23e-01
N-MeFOSAA	-2.56e-01	5.77e-67	2.31e-02	9.27e-10	-7.37e-03	5.38e-01	-3.61e-02	2.24e-04	2.14e-02	8.07e-02	-1.24e-02	6.31e-03	-2.54e-02	4.40e-01	1.68e-03	8.30e-01	-1.69e-03	-8.91e-01	-4.69e-01	2.30e-01	-2.17e-03	9.47e-01	-2.67e-02	7.81e-01	9.02e-01
N-EtFOSAA	-2.00e-01	3.14e-38	1.27e-02	1.28e-03	1.76e-02	7.65e-01	-4.03e-03	6.94e-01	-1.75e-02	1.74e-01	-6.70e-03	1.60e-01	-6.14e-02	7.54e-02	3.30e-03	6.87e-01	-3.13e-01	-3.55e-01	-7.48e-02	4.64e-01	-3.25e-02	3.42e-01	1.03e-01	3.06e-01	8.22e-01
PFNA	-3.96e-02	1.25e-02	1.95e-02	5.09e-07	-6.50e-02	8.69e-01	-1.35e-02	1.00e-01	-7.63e-03	4.62e-01	-6.76e-03	7.53e-02	4.48e-02	1.19e-01	-1.95e-03	7.64e-01	-1.16e-01	-1.06	-2.97e-01	1.08e-01	-1.12e-01	1.15e-04	-1.10e-01	1.74e-01	3.80e-01
PFDA	-1.28e-02	4.40e-01	2.18e-02	8.20e-08	-1.54e-01	4.42e-01	-3.15e-02	2.99e-04	-6.10e-03	5.79e-01	-7.61e-03	5.93e-02	4.67e-02	1.24e-01	-2.89e-03	6.75e-01	-3.32e-01	-1.45e-01	-2.96e-02	3.07e-01	-4.69e-02	1.25e-01	1.23e-02	8.86e-01	5.74e-01
PFDS	-1.02e-01	1.84e-08	1.11e-02	1.56e-02	-1.37e-01	6.50e-01	-3.65e-02	1.97e-03	2.26e-03	8.79e-01	-4.39e-03	4.23e-01	-1.73e-02	6.63e-01	1.19e-03	9.00e-01	-3.91e-02	-9.18e-01	5.56e-01	2.89e-01	1.96e-02	6.20e-01	1.08e-01	3.49e-01	1.85e-01
PFUnA	1.53e-02	4.17e-01	3.29e-02	7.20e-13	1.71e-01	3.30e-02	-5.43e-02	1.27e-08	9.28e-03	4.42e-01	-8.80e-03	4.59e-02	8.24e-02	1.39e-02	-7.42e-03	3.26e-01	-4.30e-01	-1.06	-2.64e-01	3.39e-02	-5.19e-02	1.24e-01	8.02e-02	3.92e-01	5.62e-01
PFDoA	-2.10e-02	1.13e-01	2.75e-02	2.39e-16	2.54e-01	2.54e-03	-5.89e-02	1.84e-12	6.36e-03	5.45e-01	-1.29e-02	8.60e-04	5.84e-02	3.90e-02	-1.57e-02	1.84e-02	-1.82e-01	-9.06e-01	-3.93e-01	1.09e-01	-6.07e-02	3.10e-02	8.46e-03	9.18e-01	9.92e-01
PFTTrDA	-5.05e-02	4.20e-02	5.90e-02	1.74e-20	3.64e-01	7.41e-03	-1.01e-01	1.27e-09	1.80e-02	3.90e-01	-2.45e-02	1.57e-03	1.35e-01	1.65e-02	-2.38e-02	7.39e-02	-3.06e-01	-2.40	1.49e-01	1.02e-01	-3.28e-02	5.55e-01	2.34e-01	1.53e-01	6.64e-01
8:2 FTS	-2.60e-01	6.40e-27	-5.14e-03	4.01e-01	4.23e-01	4.50e-03	-4.37e-02	4.24e-03	4.39e-02	2.21e-02	-8.04e-03	2.56e-01	7.43e-03	8.86e-01	6.87e-03	5.73e-01	4.53e-02	-1.63e-01	-1.79e-01	9.80e-01	-4.27e-02	4.07e-01	2.96e-01	4.81e-02	4.20e-01
4-OH-CB187	-1.15e-01	7.75e-07	4.40e-02	1.25e-14	-3.89e-01	1.31e-02	-3.26e-02	8.62e-03	-1.04e-02	5.05e-01	-1.77e-03	7.58e-01	5.94e-02	1.69e-01	-3.39e-03	7.31e-01	-3.93e-01	-6.38e-01	-1.30	4.05e-03	3.05e-02	4.82e-01	-1.31e-01	2.84e-01	9.57e-01
3-OH-CB153	-1.91e-01	4.04e-11	1.26e-01	3.34e-66	1.94e-01	4.44e-01	-6.83e-02	2.03e-04	6.96e-02	2.61e-03	-1.58e-02	6.46e-02	2.76e-02	6.57e-01	-1.94e-02	1.86e-01	-1.34e-01	1.60	-7.06e-01	3.14e-01	-1.35e-01	2.91e-02	1.81e-01	3.16e-01	3.48e-01
4-OH-CB107	-1.64e-01	9.12e-14	8.51e-02	4.04e-51	3.05e-01	2.71e-01	-7.54e-02	5.30e-07	8.17e-02	1.49e-05	1.11e-03	8.73e-01	3.22e-02	5.24e-01	-4.82e-03	6.88e-01	1.61e-01	-6.24e-01	-6.68e-01	4.48e-01	-6.66e-02	1.82e-01	-1.68e-01	2.55e-01	5.09e-01

β beta (regression coefficient)

Supplementary Table S8. ANOVA F values and degrees of freedom for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in Swedish or not. The two-way ANOVA F value and degrees of freedom (Df) for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)		Number of childbirth		Born in Sweden (ref = 0)		Disease type * Sex	
	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df
PFBS	1.89e-01	1	4.58	1	1.99	1	1.09e-01	1	1.55e-02	1	3.56e-01	1	5.59	1	1.05e-02	1	1.95	3	1.15	1	9.91e-02	1	5.86e-01	3
PFPeS	8.93	1	3.66	1	3.24e-01	1	1.40e-01	1	1.43	1	5.95e-01	1	2.04e-01	1	2.03	1	6.47e-01	3	2.22	1	3.67e-02	1	1.49	3
PFHpA	2.67e+01	1	7.85	1	7.15	1	1.70	1	1.84	1	2.97e-01	1	1.03	1	1.94	1	2.91e-01	3	5.41	1	1.54e-01	1	1.38	3
PFHxS	1.37e+01	1	3.15e+01	1	3.22e+01	1	1.28e-01	1	1.15e-03	1	1.27	1	2.42e-01	1	8.72e-02	1	3.23e-01	3	1.83e+01	1	2.66e-01	1	1.61	3
PFHpS	2.38e+01	1	4.03e+01	1	3.82e+01	1	2.81e-01	1	7.16e-02	1	4.76e-01	1	4.79e-01	1	1.20e-01	1	9.22e-01	3	2.55e+01	1	1.05	1	1.76	3
PFOA	3.31e+01	1	3.08e+01	1	1.20	1	1.37e-01	1	5.66e-02	1	1.10e-01	1	1.74e-02	1	7.13e-02	1	8.71e-01	3	3.92e+01	1	1.68	1	1.62	3
PFOS	3.07e+01	1	4.02e+01	1	1.36e+01	1	8.12	1	1.49e-02	1	5.32	1	1.08	1	4.43	1	1.07	3	8.18	1	9.05e-02	1	2.16	3
FOSA	1.42e+02	1	8.96e+01	1	3.37e-03	1	2.02e+01	1	6.16e-04	1	1.04e+01	1	3.94	1	7.50	1	1.91	3	1.96e-02	1	7.72e-02	1	1.60e-01	3
N-MeFOSAA	2.99e+02	1	3.74e+01	1	3.79e-01	1	1.36e+01	1	3.04	1	7.44	1	5.95e-01	1	4.60e-02	1	1.43	3	4.40e-03	1	7.71e-02	1	1.92e-01	3
N-EtFOSAA	1.67e+02	1	1.04e+01	1	8.90e-02	1	1.54e-01	1	1.85	1	1.97	1	3.15	1	1.61e-01	1	8.53e-01	3	9.00e-01	1	1.05	1	3.04e-01	3
PFNA	6.24	1	2.52e+01	1	2.74e-02	1	2.70	1	5.40e-01	1	3.16	1	2.42	1	8.98e-02	1	2.02	3	1.48e+01	1	1.84	1	1.02	3
PFDA	5.96e-01	1	2.87e+01	1	5.90e-01	1	1.30e+01	1	3.06e-01	1	3.55	1	2.35	1	1.75e-01	1	1.20	3	2.35	1	2.05e-02	1	6.63e-01	3
PFDS	3.16e+01	1	5.84	1	2.05e-01	1	9.55	1	2.33e-02	1	6.41e-01	1	1.90e-01	1	1.58e-02	1	1.25	3	2.45e-01	1	8.75e-01	1	1.61	3
PFUnA	6.59e-01	1	5.15e+01	1	4.55	1	3.23e+01	1	5.91e-01	1	3.97	1	6.04	1	9.63e-01	1	2.89	3	2.36	1	7.30e-01	1	6.83e-01	3
PFDoA	2.52	1	6.72e+01	1	9.10	1	4.95e+01	1	3.66e-01	1	1.11e+01	1	4.25	1	5.54	1	2.01	3	4.64	1	1.06e-02	1	3.19e-02	3
PFTTrDA	4.13	1	8.60e+01	1	7.16	1	3.68e+01	1	7.36e-01	1	9.96	1	5.73	1	3.18	1	2.06	3	3.48e-01	1	2.04	1	5.25e-01	3
8:2 FTS	1.15e+02	1	7.03e-01	1	8.06	1	8.16	1	5.22	1	1.28	1	2.06e-02	1	3.17e-01	1	6.15e-02	3	6.87e-01	1	3.90	1	9.37e-01	3
4-OH-CB187	2.44e+01	1	5.94e+01	1	6.15	1	6.88	1	4.44e-01	1	9.44e-02	1	1.89	1	1.18e-01	1	4.42	3	4.94e-01	1	1.15	1	1.05e-01	3
3-OH-CB153	4.36e+01	1	2.95e+02	1	5.84e-01	1	1.38e+01	1	9.04	1	3.41	1	1.97e-01	1	1.74	1	1.18	3	4.75	1	1.00	1	1.10	3
4-OH-CB107	5.55e+01	1	2.26e+02	1	1.21	1	2.51e+01	1	1.87e+01	1	2.54e-02	1	4.05e-01	1	1.61e-01	1	8.82e-01	3	1.78	1	1.29	1	7.71e-01	3

Supplementary Table S9. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects, considering whether they were born in Swedish or not. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-6.51e-02	8.97e-01	-2.62e-01	4.50e-01	3.34e-02	9.63e-01
PFPeS	-8.54e-01	3.68e-02	-3.26e-01	2.45e-01	-1.12	5.23e-02
PFHpA	-7.67e-01	5.75e-03	-3.06e-01	1.18e-01	-9.98e-01	9.53e-03
PFHxS	-7.24e-02	4.86e-01	-1.50e-01	3.45e-02	-3.38e-02	8.18e-01
PFHpS	1.25e-01	1.96e-01	-1.96e-02	7.65e-01	1.97e-01	1.51e-01
PFOA	4.55e-02	5.41e-01	-5.09e-02	3.14e-01	9.37e-02	3.76e-01
PFOS	7.72e-02	4.15e-01	-3.14e-02	6.26e-01	1.31e-01	3.28e-01
FOSA	4.64e-02	6.40e-01	-2.61e-02	7.06e-01	8.26e-02	5.50e-01
N-MeFOSAA	-1.01e-01	3.95e-01	-5.17e-03	9.50e-01	-1.49e-01	3.66e-01
N-EtFOSAA	-6.96e-02	5.76e-01	-5.43e-02	5.35e-01	-7.72e-02	6.55e-01
PFNA	8.95e-03	9.23e-01	-1.75e-02	7.82e-01	2.22e-02	8.66e-01
PFDA	-1.91e-02	8.47e-01	-5.64e-02	4.03e-01	-4.79e-04	9.97e-01
PFDS	-2.89e-01	4.18e-02	-1.53e-01	1.25e-01	-3.58e-01	7.04e-02
PFUnA	-7.35e-03	9.46e-01	2.02e-02	7.83e-01	-2.11e-02	8.90e-01
PFDoA	-4.99e-02	6.17e-01	2.70e-02	6.96e-01	-8.83e-02	5.25e-01
PFTTrDA	-1.86e-01	3.61e-01	1.99e-02	8.90e-01	-2.89e-01	3.06e-01
8:2 FTS	1.07e-02	9.53e-01	-1.38e-01	2.77e-01	8.49e-02	7.38e-01
4-OH-CB187	1.76e-01	2.13e-01	2.55e-01	8.33e-03	1.36e-01	4.95e-01
3-OH-CB153	3.56e-01	1.05e-01	2.52e-01	1.01e-01	4.09e-01	1.82e-01
4-OH-CB107	-1.54e-01	4.04e-01	-4.91e-02	7.08e-01	-2.07e-01	4.18e-01

The model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, number of childbirths, and Swedish born.

Supplementary Table S10. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females, considering whether they were born in Swedish or not. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	Males						Females					
	MS vs HC		RRMS vs HC		PMS vs HC		MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-6.39e-01	4.15e-01	-2.80e-01	6.38e-01	-8.19e-01	4.55e-01	5.09e-01	3.97e-01	-2.44e-01	4.64e-01	8.85e-01	3.06e-01
PFPeS	-1.64	9.87e-03	-3.73e-01	4.39e-01	-2.28	1.04e-02	-6.56e-02	8.93e-01	-2.80e-01	3.00e-01	4.15e-02	9.53e-01
PFHpA	-1.30	2.88e-03	-4.08e-01	2.26e-01	-1.74	3.41e-03	-2.38e-01	4.65e-01	-2.04e-01	2.83e-01	-2.55e-01	5.81e-01
PFHxS	-2.43e-01	1.31e-01	-2.34e-01	5.33e-02	-2.47e-01	2.76e-01	9.80e-02	4.32e-01	-6.49e-02	3.36e-01	1.79e-01	3.19e-01
PFHpS	-6.46e-02	6.66e-01	-1.06e-01	3.47e-01	-4.41e-02	8.35e-01	3.14e-01	6.96e-03	6.64e-02	2.89e-01	4.38e-01	9.39e-03
PFOA	-6.21e-02	5.90e-01	-1.22e-01	1.60e-01	-3.23e-02	8.43e-01	1.53e-01	8.75e-02	1.99e-02	6.80e-01	2.20e-01	9.05e-02
PFOS	-1.19e-01	4.18e-01	-9.58e-02	3.84e-01	-1.30e-01	5.30e-01	2.73e-01	1.66e-02	3.31e-02	5.89e-01	3.93e-01	1.73e-02
FOSA	2.46e-02	8.74e-01	-6.79e-02	5.68e-01	7.09e-02	7.39e-01	6.81e-02	5.60e-01	1.57e-02	8.14e-01	9.43e-02	5.71e-01
N-MeFOSAA	-6.52e-02	7.25e-01	5.63e-02	6.94e-01	-1.26e-01	6.20e-01	-1.36e-01	3.27e-01	-6.66e-02	4.09e-01	-1.71e-01	3.87e-01
N-EtFOSAA	-5.36e-02	7.83e-01	-7.58e-02	6.15e-01	-4.25e-02	8.73e-01	-8.56e-02	5.58e-01	-3.28e-02	7.00e-01	-1.12e-01	5.90e-01
PFNA	-3.08e-02	8.31e-01	-7.37e-02	4.98e-01	-9.41e-03	9.63e-01	4.87e-02	6.62e-01	3.87e-02	5.24e-01	5.38e-02	7.38e-01
PFDA	-5.49e-02	7.21e-01	-1.45e-01	2.12e-01	-1.00e-02	9.63e-01	1.66e-02	8.88e-01	3.18e-02	6.23e-01	9.07e-03	9.58e-01
PFDS	-4.97e-01	2.54e-02	-3.52e-01	4.00e-02	-5.69e-01	6.21e-02	-8.19e-02	6.24e-01	4.65e-02	6.30e-01	-1.46e-01	5.40e-01
PFUnA	-7.69e-02	6.45e-01	-7.65e-02	5.42e-01	-7.70e-02	7.43e-01	6.22e-02	6.30e-01	1.17e-01	9.51e-02	3.48e-02	8.52e-01
PFDoA	-7.80e-02	6.16e-01	2.36e-02	8.43e-01	-1.29e-01	5.48e-01	-2.17e-02	8.53e-01	3.05e-02	6.49e-01	-4.79e-02	7.76e-01
PFTrDA	-3.84e-01	2.28e-01	-2.84e-02	9.09e-01	-5.62e-01	1.97e-01	1.25e-02	9.58e-01	6.81e-02	6.25e-01	-1.53e-02	9.64e-01
8:2 FTS	1.6e-01	5.73e-01	-2.2e-01	3.13e-01	3.5e-01	3.72e-01	-1.39e-01	5.19e-01	-5.56e-02	6.49e-01	-1.80e-01	5.57e-01
4-OH-CB187	1.25e-01	5.68e-01	2.43e-01	1.43e-01	6.65e-02	8.29e-01	2.27e-01	1.80e-01	2.67e-01	3.91e-03	2.06e-01	3.98e-01
3-OH-CB153	2.44e-01	4.76e-01	3.51e-01	1.83e-01	1.91e-01	6.87e-01	4.69e-01	7.11e-02	1.52e-01	3.07e-01	6.27e-01	9.05e-02
4-OH-CB107	-6.14e-02	8.32e-01	1.18e-01	6.01e-01	-1.51e-01	7.01e-01	-2.47e-01	2.53e-01	-2.16e-01	9.00e-02	-2.63e-01	3.91e-01

The model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, number of childbirths, and Swedish born.

Supplementary Table S11. Coefficients for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n =907) and matched control (HC) subjects (n = 907), considering whether they were born in a Nordic country or not. The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)				Number of childbirths		Born in a Nordic country (ref = 0)		Disease type * Sex
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β (First line DMT)	β (Other drugs)	β (Second line DMT)	<i>P</i>	β	<i>P</i>	β	<i>P</i>	<i>P</i>
PFBS	2.99e-02	6.94e-01	-4.03e-02	3.28e-02	5.60e-01	1.57e-01	-1.40e-02	7.47e-01	6.52e-03	9.05e-01	1.22e-02	5.45e-01	3.56e-01	1.74e-02	-3.78e-03	9.13e-01	-6.27e-02	4.99	-2.23	1.09e-01	-1.63e-01	2.75e-01	4.21e-01	3.81e-01	6.08e-01
PFPeS	-1.81e-01	3.11e-03	2.91e-02	5.64e-02	2.84e-02	5.70e-01	-1.36e-02	6.99e-01	-5.29e-02	2.33e-01	1.25e-02	4.45e-01	5.37e-02	6.57e-01	-3.99e-02	1.53e-01	4.25e-01	2.47	-5.21e-01	6.02e-01	-1.79e-01	1.39e-01	-2.61e-01	5.03e-01	2.21e-01
PFFHpA	-1.75e-01	2.93e-07	2.44e-02	5.10e-03	4.20e-01	7.36e-03	-2.97e-02	1.91e-01	3.87e-02	1.75e-01	-5.75e-03	5.87e-01	-7.80e-02	3.09e-01	-2.51e-02	1.66e-01	-1.82e-01	-1.18	-2.09e-01	8.24e-01	-1.77e-01	1.99e-02	-1.75e-01	4.85e-01	2.52e-01
PFFHxS	-6.82e-02	2.06e-04	2.51e-02	2.07e-08	-7.62e-01	1.27e-08	-3.54e-03	7.00e-01	-2.04e-04	9.86e-01	4.75e-03	2.65e-01	1.61e-02	6.20e-01	-2.46e-03	7.35e-01	1.27e-01	2.37e-02	2.17e-01	8.10e-01	-1.40e-01	1.93e-05	2.63e-02	7.96e-01	1.87e-01
PFFHpS	-9.00e-02	8.27e-07	2.80e-02	2.22e-10	-8.19e-01	6.06e-10	4.36e-03	6.13e-01	3.08e-03	7.78e-01	-2.77e-03	4.87e-01	2.20e-02	4.75e-01	1.92e-03	7.78e-01	1.48e-01	-7.03e-01	-2.48e-02	4.52e-01	-1.57e-01	4.35e-07	1.15e-01	2.30e-01	1.47e-01
PFOA	-7.97e-02	1.23e-08	1.89e-02	2.59e-08	-1.69e-01	2.81e-01	-2.17e-03	7.44e-01	-2.23e-03	7.92e-01	-9.81e-04	7.50e-01	-3.62e-03	8.78e-01	-9.23e-04	8.60e-01	1.92e-01	-1.66e-01	1.49e-01	4.44e-01	-1.51e-01	3.00e-10	-9.05e-02	2.20e-01	1.83e-01
PFOS	-9.92e-02	2.53e-08	2.74e-02	2.18e-10	-5.04e-01	2.29e-04	-2.41e-02	4.43e-03	1.18e-03	9.12e-01	-8.96e-03	2.20e-02	3.18e-02	2.91e-01	-1.41e-02	3.38e-02	-6.79e-03	-8.71e-01	-9.56e-02	3.86e-01	-8.76e-02	3.95e-03	8.44e-02	3.67e-01	8.34e-02
FOSA	-1.54e-01	1.10e-32	3.10e-02	3.15e-21	-4.12e-02	9.42e-01	-3.74e-02	5.77e-06	4.02e-04	9.69e-01	-1.25e-02	1.17e-03	5.56e-02	4.68e-02	-1.83e-02	5.44e-03	-2.81e-01	-4.05e-01	-4.37e-01	1.22e-01	-3.20e-03	9.08e-01	-1.98e-02	8.28e-01	9.23e-01
N-MeFOSAA	-2.56e-01	6.50e-67	2.32e-02	8.65e-10	-6.41e-03	5.49e-01	-3.58e-02	2.44e-04	2.13e-02	8.32e-02	-1.24e-02	6.51e-03	-2.54e-02	4.40e-01	1.92e-03	8.05e-01	-9.00e-04	-8.73e-01	-4.69e-01	2.38e-01	-3.12e-03	9.24e-01	3.37e-02	7.54e-01	9.03e-01
N-EtFOSAA	-2.01e-01	1.38e-38	1.27e-02	1.26e-03	1.57e-02	7.72e-01	-4.23e-03	6.80e-01	-1.73e-02	1.78e-01	-6.75e-03	1.56e-01	-6.10e-02	7.70e-02	2.86e-03	7.26e-01	-3.17e-01	-3.33e-01	-8.12e-02	4.57e-01	-3.23e-02	3.44e-01	1.55e-01	1.69e-01	8.23e-01
PFNA	-3.88e-02	1.46e-02	1.95e-02	4.82e-07	-6.26e-02	8.86e-01	-1.31e-02	1.11e-01	-7.97e-03	4.42e-01	-6.67e-03	7.91e-02	4.43e-02	1.24e-01	-1.31e-03	8.40e-01	-1.15e-01	-1.07	-2.94e-01	1.06e-01	-1.13e-01	9.90e-05	-9.81e-02	2.80e-01	3.80e-01
PFDA	-1.34e-02	4.19e-01	2.18e-02	7.75e-08	-1.54e-01	4.47e-01	-3.13e-02	3.14e-04	-6.25e-03	5.69e-01	-7.52e-03	6.19e-02	4.71e-02	1.21e-01	-2.83e-03	6.81e-01	-3.32e-01	-1.16e-01	-3.22e-02	3.08e-01	-4.77e-02	1.19e-01	8.35e-02	3.85e-01	5.74e-01
PFFDS	-1.03e-01	1.54e-08	1.11e-02	1.60e-02	-1.39e-01	6.66e-01	-3.69e-02	1.70e-03	2.62e-03	8.60e-01	-4.49e-03	4.12e-01	-1.71e-02	6.68e-01	5.63e-04	9.52e-01	-4.29e-02	-9.22e-01	5.52e-01	2.91e-01	2.08e-02	5.98e-01	7.48e-02	5.64e-01	1.86e-01
PFFUnA	1.43e-02	4.48e-01	3.29e-02	7.22e-13	1.70e-01	3.35e-02	-5.45e-02	1.06e-08	9.39e-03	4.35e-01	-8.80e-03	4.59e-02	8.30e-02	1.32e-02	-7.79e-03	3.00e-01	-4.32e-01	-1.03	-2.67e-01	3.55e-02	-5.18e-02	1.25e-01	1.21e-01	2.52e-01	5.56e-01
PFFDoA	-2.15e-02	1.05e-01	2.75e-02	2.17e-16	2.54e-01	2.44e-03	-5.87e-02	1.91e-12	6.27e-03	5.50e-01	-1.29e-02	8.81e-04	5.86e-02	3.84e-02	-1.57e-02	1.84e-02	-1.82e-01	-8.85e-01	-3.95e-01	1.14e-01	-6.14e-02	2.91e-02	6.88e-02	4.55e-01	9.91e-01
PFFTrDA	-5.34e-02	3.16e-02	5.91e-02	1.55e-20	3.60e-01	7.58e-03	-1.02e-01	1.01e-09	1.83e-02	3.81e-01	-2.46e-02	1.48e-03	1.35e-01	1.58e-02	-2.48e-02	6.23e-02	-3.16e-01	-2.34	1.33e-01	1.12e-01	-3.27e-02	5.55e-01	3.81e-01	3.79e-02	6.52e-01
8:2 FTS	-2.63e-01	1.70e-27	-5.15e-03	4.01e-01	4.17e-01	4.85e-03	-4.45e-02	3.52e-03	4.45e-02	2.01e-02	-8.21e-03	2.47e-01	8.59e-03	8.68e-01	5.44e-03	6.54e-01	3.56e-02	-1.14e-01	-1.94e-01	9.80e-01	-4.14e-02	4.20e-01	3.80e-01	2.39e-02	4.18e-01
4-OH-CB187	-1.14e-01	9.88e-07	4.40e-02	1.18e-14	-3.86e-01	1.38e-02	-3.20e-02	9.73e-03	-1.09e-02	4.87e-01	-1.65e-03	7.74e-01	5.89e-02	1.73e-01	-2.61e-03	7.90e-01	-3.91e-01	-6.46e-01	-1.30	4.17e-03	2.93e-02	5.00e-01	-1.09e-01	4.27e-01	9.55e-01
3-OH-CB153	-1.92e-01	3.02e-11	1.26e-01	3.40e-66	1.90e-01	4.56e-01	-6.90e-02	1.71e-04	7.01e-02	2.41e-03	-1.59e-02	6.19e-02	2.81e-02	6.51e-01	-2.04e-02	1.63e-01	-1.39e-01	1.60	-7.11e-01	3.10e-01	-1.33e-01	3.10e-02	1.52e-01	4.53e-01	3.51e-01
4-OH-CB107	-1.63e-01	1.40e-13	8.52e-02	3.58e-51	3.10e-01	2.58e-01	-7.47e-02	6.59e-07	8.12e-02	1.69e-05	1.26e-03	8.57e-01	3.18e-02	5.29e-01	-3.87e-03	7.46e-01	1.68e-01	-6.14e-01	-6.61e-01	4.53e-01	-6.87e-02	1.69e-01	-1.10e-01	5.05e-01	5.07e-01

β beta (regression coefficient)

Supplementary Table S12. ANOVA F values and degrees of freedom for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), considering whether they were born in a Nordic country or not. The two-way ANOVA F value and degrees of freedom (Df) for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)		Number of childbirth		Born in a Nordic country (ref = 0)		Disease type * Sex	
	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df
PFBS	1.55e-01	1	4.55	1	2.00	1	1.04e-01	1	1.41e-02	1	3.65e-01	1	5.64	1	1.20e-02	1	2.02	3	1.19	1	7.66e-01	1	6.10e-01	3
PFPeS	8.74	1	3.64	1	3.22e-01	1	1.49e-01	1	1.42	1	5.82e-01	1	1.96e-01	1	2.04	1	6.18e-01	3	2.19	1	4.48e-01	1	1.46	3
PFHpA	2.63e+01	1	7.83	1	7.18	1	1.70	1	1.83	1	2.95e-01	1	1.03	1	1.91	1	3.01e-01	3	5.41	1	4.85e-01	1	1.36	3
PFHxS	1.38e+01	1	3.14e+01	1	3.24e+01	1	1.48e-01	1	3.05e-04	1	1.24	1	2.46e-01	1	1.15e-01	1	3.21e-01	3	1.82e+01	1	6.66e-02	1	1.60	3
PFHpS	2.43e+01	1	4.02e+01	1	3.83e+01	1	2.55e-01	1	7.91e-02	1	4.81e-01	1	5.08e-01	1	7.92e-02	1	8.75e-01	3	2.55e+01	1	1.44	1	1.79	3
PFOA	3.24e+01	1	3.10e+01	1	1.16	1	1.06e-01	1	6.96e-02	1	1.01e-01	1	2.34e-02	1	3.09e-02	1	8.91e-01	3	3.96e+01	1	1.50	1	1.62	3
PFOS	3.10e+01	1	4.03e+01	1	1.36e+01	1	8.08	1	1.22e-02	1	5.24	1	1.11	1	4.50	1	1.01	3	8.29	1	8.11e-01	1	2.22	3
FOSA	1.42e+02	1	8.94e+01	1	5.24e-03	1	2.05e+01	1	1.50e-03	1	1.05e+01	1	3.94	1	7.71	1	1.93	3	1.33e-02	1	4.69e-02	1	1.61e-01	3
N-MeFOSAA	2.98e+02	1	3.76e+01	1	3.58e-01	1	1.34e+01	1	2.99	1	7.38	1	5.95e-01	1	6.06e-02	1	1.40	3	9.10e-03	1	9.77e-02	1	1.90e-01	3
N-EtFOSAA	1.69e+02	1	1.04e+01	1	8.35e-02	1	1.70e-01	1	1.81	1	2.01	1	3.12	1	1.22e-01	1	8.65e-01	3	8.93e-01	1	1.88	1	3.02e-01	3
PFNA	5.96	1	2.53e+01	1	2.05e-02	1	2.53	1	5.90e-01	1	3.08	1	2.37	1	4.07e-02	1	2.03	3	1.51e+01	1	1.17	1	1.02	3
PFDA	6.53e-01	1	2.88e+01	1	5.78e-01	1	1.30e+01	1	3.23e-01	1	3.48	1	2.39	1	1.69e-01	1	1.20	3	2.43	1	7.52e-01	1	6.63e-01	3
PFDS	3.20e+01	1	5.80	1	1.85e-01	1	9.82	1	3.11e-02	1	6.70e-01	1	1.83e-01	1	3.58e-03	1	1.24	3	2.78e-01	1	3.31e-01	1	1.60	3
PFUnA	5.76e-01	1	5.14e+01	1	4.52	1	3.27e+01	1	6.07e-01	1	3.98	1	6.13	1	1.07	1	2.85	3	2.35	1	1.31	1	6.93e-01	3
PFDoA	2.63	1	6.74e+01	1	9.18	1	4.94e+01	1	3.56e-01	1	1.10e+01	1	4.28	1	5.54	1	1.98	3	4.75	1	5.58e-01	1	3.69e-02	3
PFTTrDA	4.62	1	8.62e+01	1	7.12	1	3.72e+01	1	7.66e-01	1	1.01e+01	1	5.81	1	3.47	1	1.99	3	3.47e-01	1	4.30	1	5.43e-01	3
8:2 FTS	1.18e+02	1	7.06e-01	1	7.93	1	8.49	1	5.39	1	1.34	1	2.76e-02	1	2.00e-01	1	6.12e-02	3	6.48e-01	1	5.09	1	9.42e-01	3
4-OH-CB187	2.39e+01	1	5.95e+01	1	6.06	1	6.67	1	4.81e-01	1	8.23e-02	1	1.86	1	7.09e-02	1	4.40	3	4.55e-01	1	6.30e-01	1	1.08e-01	3
3-OH-CB153	4.41e+01	1	2.95e+02	1	5.55e-01	1	1.41e+01	1	9.19	1	3.47	1	2.04e-01	1	1.94	1	1.19	3	4.64	1	5.62e-01	1	1.09	3
4-OH-CB107	5.47e+01	1	2.26e+02	1	1.28	1	2.47e+01	1	1.85e+01	1	3.25e-02	1	3.95e-01	1	1.04e-01	1	8.72e-01	3	1.89	1	4.43e-01	1	7.75e-01	3

Supplementary Table S13. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects, considering whether they were born in a Nordic country or not. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-8.48e-02	8.67e-01	-2.80e-01	4.20e-01	1.28e-02	9.86e-01
PFPeS	-8.40e-01	4.02e-02	-3.15e-01	2.62e-01	-1.10	5.56e-02
PFHpA	-7.6e-01	6.29e-03	-3.0e-01	1.26e-01	-9.9e-01	1.02e-02
PFHxS	-7.23e-02	4.87e-01	-1.49e-01	3.53e-02	-3.39e-02	8.18e-01
PFHpS	1.21e-01	2.11e-01	-2.24e-02	7.33e-01	1.93e-01	1.61e-01
PFOA	4.80e-02	5.20e-01	-4.93e-02	3.31e-01	9.66e-02	3.61e-01
PFOS	7.30e-02	4.41e-01	-3.49e-02	5.87e-01	1.27e-01	3.45e-01
FOSA	4.85e-02	6.25e-01	-2.42e-02	7.26e-01	8.48e-02	5.39e-01
N-MeFOSAA	-1.04e-01	3.81e-01	-7.93e-03	9.24e-01	-1.52e-01	3.56e-01
N-EtFOSAA	-7.49e-02	5.47e-01	-5.86e-02	5.04e-01	-8.31e-02	6.31e-01
PFNA	1.10e-02	9.06e-01	-1.64e-02	7.96e-01	2.46e-02	8.52e-01
PFDA	-2.38e-02	8.10e-01	-6.04e-02	3.72e-01	-5.52e-03	9.69e-01
PFDS	-2.90e-01	4.18e-02	-1.53e-01	1.25e-01	-3.58e-01	7.03e-02
PFUnA	-1.18e-02	9.13e-01	1.68e-02	8.18e-01	-2.61e-02	8.64e-01
PFDoA	-5.37e-02	5.90e-01	2.37e-02	7.32e-01	-9.25e-02	5.06e-01
PFTrDA	-2.00e-01	3.27e-01	8.52e-03	9.53e-01	-3.04e-01	2.82e-01
8:2 FTS	-6.85e-04	9.97e-01	-1.47e-01	2.47e-01	7.23e-02	7.76e-01
4-OH-CB187	1.78e-01	2.09e-01	2.56e-01	8.22e-03	1.39e-01	4.87e-01
3-OH-CB153	3.54e-01	1.08e-01	2.50e-01	1.04e-01	4.06e-01	1.86e-01
4-OH-CB107	-1.55e-01	4.04e-01	-4.94e-02	7.07e-01	-2.07e-01	4.18e-01

The model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, number of childbirths, and born in a Nordic country.

Supplementary Table S14. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females, considering whether they were born in in a Nordic country or not. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	Males						Females					
	MS vs HC		RRMS vs HC		PMS vs HC		MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-6.71e-01	3.93e-01	-3.00e-01	6.15e-01	-8.56e-01	4.34e-01	5.01e-01	4.04e-01	-2.60e-01	4.35e-01	8.82e-01	3.07e-01
PFPeS	-1.62	1.10e-02	-3.61e-01	4.55e-01	-2.25	1.13e-02	-6.02e-02	9.02e-01	-2.70e-01	3.19e-01	4.47e-02	9.49e-01
PFHpA	-1.29	3.13e-03	-4.01e-01	2.35e-01	-1.73	3.65e-03	-2.34e-01	4.73e-01	-1.99e-01	2.96e-01	-2.51e-01	5.87e-01
PFHxS	-2.42e-01	1.34e-01	-2.34e-01	5.37e-02	-2.45e-01	2.80e-01	9.70e-02	4.36e-01	-6.44e-02	3.41e-01	1.78e-01	3.24e-01
PFHpS	-6.98e-02	6.41e-01	-1.09e-01	3.33e-01	-5.03e-02	8.12e-01	3.12e-01	7.40e-03	6.39e-02	3.08e-01	4.36e-01	9.77e-03
PFOA	-5.95e-02	6.06e-01	-1.20e-01	1.67e-01	-2.93e-02	8.58e-01	1.55e-01	8.28e-02	2.12e-02	6.60e-01	2.23e-01	8.64e-02
PFOS	-1.26e-01	3.90e-01	-9.96e-02	3.65e-01	-1.39e-01	5.01e-01	2.72e-01	1.69e-02	2.98e-02	6.27e-01	3.93e-01	1.72e-02
FOSA	2.84e-02	8.55e-01	-6.59e-02	5.80e-01	7.55e-02	7.23e-01	6.86e-02	5.57e-01	1.75e-02	7.95e-01	9.41e-02	5.72e-01
N-MeFOSAA	-7.06e-02	7.03e-01	5.32e-02	7.10e-01	-1.33e-01	6.02e-01	-1.37e-01	3.25e-01	-6.91e-02	3.93e-01	-1.71e-01	3.87e-01
N-EtFOSAA	-6.05e-02	7.56e-01	-8.10e-02	5.91e-01	-5.03e-02	8.50e-01	-8.93e-02	5.41e-01	-3.62e-02	6.70e-01	-1.16e-01	5.77e-01
PFNA	-2.96e-02	8.38e-01	-7.22e-02	5.07e-01	-8.25e-03	9.68e-01	5.15e-02	6.44e-01	3.94e-02	5.17e-01	5.75e-02	7.21e-01
PFDA	-6.31e-02	6.81e-01	-1.49e-01	1.99e-01	-2.01e-02	9.26e-01	1.54e-02	8.96e-01	2.81e-02	6.64e-01	9.09e-03	9.58e-01
PFDS	-4.96e-01	2.59e-02	-3.53e-01	4.00e-02	-5.67e-01	6.33e-02	-8.38e-02	6.16e-01	4.69e-02	6.27e-01	-1.49e-01	5.31e-01
PFUnA	-8.32e-02	6.18e-01	-8.03e-02	5.23e-01	-8.47e-02	7.19e-01	5.96e-02	6.44e-01	1.14e-01	1.04e-01	3.25e-02	8.62e-01
PFDoA	-8.42e-02	5.88e-01	1.99e-02	8.68e-01	-1.36e-01	5.26e-01	-2.33e-02	8.43e-01	2.76e-02	6.81e-01	-4.87e-02	7.72e-01
PFTTrDA	-4.02e-01	2.07e-01	-4.21e-02	8.65e-01	-5.82e-01	1.81e-01	3.03e-03	9.90e-01	5.91e-02	6.72e-01	-2.50e-02	9.41e-01
8:2 FTS	1.46e-01	6.06e-01	-2.31e-01	2.90e-01	3.35e-01	3.93e-01	-1.48e-01	4.92e-01	-6.27e-02	6.09e-01	-1.90e-01	5.36e-01
4-OH-CB187	1.26e-01	5.66e-01	2.44e-01	1.41e-01	6.69e-02	8.28e-01	2.30e-01	1.74e-01	2.68e-01	3.90e-03	2.11e-01	3.87e-01
3-OH-CB153	2.43e-01	4.79e-01	3.50e-01	1.86e-01	1.90e-01	6.88e-01	4.65e-01	7.35e-02	1.51e-01	3.10e-01	6.22e-01	9.33e-02
4-OH-CB107	-6.43e-02	8.25e-01	1.18e-01	6.01e-01	-1.56e-01	6.93e-01	-2.45e-01	2.58e-01	-2.17e-01	8.91e-02	-2.59e-01	3.99e-01

The model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, number of childbirths, and born in a Nordic country.

Supplementary Table S15. Coefficients for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), with the residential area criteria removed.
The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)				Number of childbirths		Disease type * Sex
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β (First line DMT)	β (Other drugs)	β (Second linde DMT)	<i>P</i>	β	<i>P</i>	<i>P</i>
PFBS	3.08e-02	6.46e-01	-3.90e-02	2.47e-02	6.04e-01	1.03e-01	-1.53e-02	7.41e-01	2.38e-02	6.85e-01	3.13e-02	1.49e-01	3.45e-01	2.80e-02	-3.12e-03	9.33e-01	-4.75e-01	3.80	-2.33	2.25e-01	-1.80e-01	2.45e-01	5.74e-01
PFPeS	-1.81e-01	8.85e-04	3.18e-02	2.37e-02	9.98e-02	3.28e-01	-2.47e-02	5.10e-01	-3.93e-02	4.07e-01	1.48e-02	4.00e-01	4.31e-02	7.34e-01	-3.26e-02	2.79e-01	5.58e-01	2.20	-7.93e-01	6.06e-01	-2.28e-01	6.88e-02	1.48e-01
PFFHpA	-1.73e-01	1.63e-07	2.56e-02	2.59e-03	4.56e-01	4.46e-03	-3.17e-02	1.63e-01	3.74e-02	1.92e-01	-5.92e-03	5.77e-01	-7.31e-02	3.41e-01	-2.59e-02	1.56e-01	-1.41e-01	-1.30	-2.44e-01	7.95e-01	-1.96e-01	9.64e-03	2.93e-01
PFFhS	-6.84e-02	1.21e-05	2.84e-02	2.54e-12	-7.15e-01	6.44e-09	-1.60e-02	1.37e-01	-8.32e-06	1.00	5.89e-03	2.42e-01	1.71e-02	6.39e-01	-4.73e-03	5.84e-01	1.14e-01	1.14e-01	-1.93e-01	8.92e-01	-1.63e-01	6.13e-06	2.98e-01
PFFHpS	-8.93e-02	7.07e-09	3.09e-02	1.09e-14	-7.91e-01	3.00e-11	-7.11e-03	5.02e-01	4.03e-03	7.63e-01	-1.57e-03	7.51e-01	1.73e-02	6.29e-01	-4.92e-03	5.63e-01	1.93e-01	-5.12e-01	-4.87e-01	3.20e-01	-1.75e-01	8.26e-07	2.95e-01
PFOA	-7.92e-02	3.15e-11	2.11e-02	8.19e-12	-1.56e-01	3.84e-01	-8.47e-03	3.00e-01	-3.80e-03	7.13e-01	-1.40e-03	7.14e-01	3.58e-03	8.97e-01	-4.68e-03	4.76e-01	2.58e-01	-3.02e-01	-1.68e-01	3.44e-01	-1.67e-01	1.22e-09	3.29e-01
PFOS	-1.04e-01	7.42e-12	3.01e-02	1.60e-14	-4.62e-01	2.13e-04	-3.32e-02	1.40e-03	2.24e-03	8.64e-01	-8.65e-03	7.43e-02	2.76e-02	4.30e-01	-2.02e-02	1.54e-02	1.34e-01	-7.34e-01	-4.31e-01	3.34e-01	-1.13e-01	1.13e-03	4.05e-01
FOSA	-1.54e-01	2.06e-35	3.12e-02	6.43e-23	-3.35e-02	9.21e-01	-3.79e-02	5.82e-06	-9.08e-04	9.31e-01	-1.22e-02	1.77e-03	5.36e-02	5.73e-02	-1.94e-02	3.82e-03	-2.33e-01	-5.01e-01	-4.44e-01	1.57e-01	-4.26e-03	8.78e-01	9.64e-01
N-MeFOSAA	-2.56e-01	2.34e-66	2.30e-02	3.78e-10	-3.54e-04	5.59e-01	-3.57e-02	2.67e-04	1.97e-02	1.11e-01	-1.26e-02	5.87e-03	-3.12e-02	3.46e-01	8.40e-04	9.15e-01	3.77e-02	-9.38e-01	-4.08e-01	2.56e-01	-5.09e-03	8.76e-01	9.07e-01
N-EtFOSAA	-2.00e-01	2.68e-39	1.25e-02	1.09e-03	6.46e-03	8.65e-01	-5.58e-03	5.86e-01	-1.84e-02	1.56e-01	-7.14e-03	1.36e-01	-5.83e-02	9.28e-02	1.95e-03	8.13e-01	-1.93e-01	-4.20e-01	-7.18e-02	7.30e-01	-2.97e-02	3.85e-01	7.87e-01
PFNA	-3.87e-02	4.61e-03	2.06e-02	5.94e-09	-5.10e-02	8.22e-01	-1.86e-02	4.84e-02	-8.06e-03	4.99e-01	-6.30e-03	1.53e-01	5.09e-02	1.11e-01	-5.87e-03	4.38e-01	-3.91e-02	-9.93e-01	-6.32e-01	7.32e-02	-1.26e-01	5.92e-05	4.74e-01
PFDA	-9.42e-03	5.10e-01	2.29e-02	7.42e-10	-1.29e-01	6.13e-01	-3.74e-02	1.60e-04	-6.13e-03	6.23e-01	-6.06e-03	1.89e-01	5.14e-02	1.24e-01	-6.37e-03	4.21e-01	-2.01e-01	-5.15e-01	-2.43e-01	5.38e-01	-6.31e-02	5.52e-02	7.44e-01
PFDS	-1.02e-01	3.06e-09	1.05e-02	1.73e-02	-1.41e-01	6.32e-01	-3.43e-02	3.72e-03	1.83e-03	9.03e-01	-4.62e-03	4.03e-01	-2.06e-02	6.06e-01	9.59e-04	9.20e-01	2.54e-03	-9.77e-01	4.31e-01	3.88e-01	1.90e-02	6.29e-01	2.22e-01
PFUnA	1.96e-02	2.22e-01	3.31e-02	2.60e-15	1.90e-01	7.02e-03	-5.33e-02	1.66e-06	8.58e-04	9.51e-01	-7.63e-03	1.41e-01	7.06e-02	5.97e-02	-1.69e-02	5.73e-02	-2.59e-01	-7.80e-01	-5.97e-01	1.68e-01	-7.95e-02	3.13e-02	6.75e-01
PFD6A	-2.07e-02	9.22e-02	2.74e-02	1.35e-17	2.57e-01	8.70e-04	-5.99e-02	2.23e-12	6.43e-03	5.48e-01	-1.23e-02	1.92e-03	5.60e-02	5.06e-02	-1.66e-02	1.45e-02	-9.88e-02	-9.05e-01	-4.44e-01	1.30e-01	-6.44e-02	2.27e-02	9.83e-01
PFT6DA	-5.01e-02	3.75e-02	5.89e-02	9.27e-21	3.56e-01	7.87e-03	-1.03e-01	7.16e-10	1.96e-02	3.52e-01	-2.50e-02	1.30e-03	1.34e-01	1.68e-02	-2.69e-02	4.40e-02	-2.41e-01	-2.45	1.60e-01	1.06e-01	-3.15e-02	5.70e-01	6.83e-01
8:2 FTS	-2.60e-01	7.94e-30	-5.28e-03	3.63e-01	4.03e-01	3.68e-03	-4.81e-02	1.96e-03	4.43e-02	2.39e-02	-9.85e-03	1.75e-01	6.70e-03	8.98e-01	-8.62e-04	9.45e-01	1.63e-01	-4.76e-01	-2.59e-01	8.47e-01	-3.65e-02	4.80e-01	4.50e-01
4-OH-CB187	-1.16e-01	9.07e-09	4.56e-02	3.50e-18	-3.91e-01	9.94e-03	-4.01e-02	3.78e-03	-1.12e-02	5.21e-01	-5.92e-03	3.60e-01	6.57e-02	1.61e-01	-5.09e-04	9.63e-01	-4.18e-01	-8.47e-01	-1.43	5.69e-03	1.63e-02	7.24e-01	8.29e-01
3-OH-CB153	-1.96e-01	4.84e-13	1.26e-01	1.71e-66	2.13e-01	3.96e-01	-6.90e-02	2.09e-04	6.94e-02	3.17e-03	-1.70e-02	5.09e-02	2.51e-02	6.89e-01	-2.09e-02	1.61e-01	-4.53e-02	1.60	-4.11e-01	4.90e-01	-1.47e-01	1.74e-02	2.79e-01
4-OH-CB107	-1.64e-01	5.97e-14	8.49e-02	1.45e-48	3.22e-01	2.17e-01	-7.25e-02	1.34e-06	8.09e-02	1.95e-05	2.10e-03	7.63e-01	3.16e-02	5.32e-01	-3.90e-03	7.45e-01	1.05e-01	-6.36e-01	-6.80e-01	4.68e-01	-7.32e-02	1.42e-01	5.31e-01

β beta (regression coefficient)

Supplementary Table S16. ANOVA F values and degrees of freedom for mixed-linear regression model used in the sensitivity analysis of the paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients (n = 907) and matched control (HC) subjects (n = 907), with the residential area criteria removed. The two-way ANOVA F value and degrees of freedom (Df) for respective covariates are presented in the table below.

	Sample collection year		Age		Sex (ref. male)		BMI at sample collection		BMI at the age of 20		Regular smoking (years)		Irregular smoking (years)		Passive smoking indoors (years)		Treatment (ref. no treatment)		Number of childbirth		Disease type * Sex	
	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df	F	Df
PFBS	2.11e-01	1	5.06	1	2.66	1	1.09e-01	1	1.65e-01	1	2.08	1	4.84	1	7.03e-03	1	1.46	3	1.36	1	6.64e-01	3
PFPeS	1.11e+01	1	5.13	1	9.56e-01	1	4.34e-01	1	6.88e-01	1	7.10e-01	1	1.15e-01	1	1.17	1	6.14e-01	3	3.32	1	1.79	3
PFHpA	2.77e+01	1	9.11	1	8.11	1	1.95	1	1.70	1	3.11e-01	1	9.05e-01	1	2.02	1	3.41e-01	3	6.72	1	1.24	3
PFHxS	1.93e+01	1	4.98e+01	1	3.41e+01	1	2.22	1	3.75e-07	1	1.37	1	2.20e-01	1	3.00e-01	1	2.06e-01	3	2.06e+01	1	1.23	3
PFHpS	3.39e+01	1	6.10e+01	1	4.49e+01	1	4.51e-01	1	9.08e-02	1	1.01e-01	1	2.33e-01	1	3.35e-01	1	1.17	3	2.45e+01	1	1.24	3
PFOA	4.48e+01	1	4.75e+01	1	7.58e-01	1	1.07	1	1.35e-01	1	1.35e-01	1	1.68e-02	1	5.09e-01	1	1.11	3	3.74e+01	1	1.15	3
PFOS	4.77e+01	1	6.02e+01	1	1.38e+01	1	1.02e+01	1	2.92e-02	1	3.19	1	6.22e-01	1	5.89	1	1.13	3	1.06e+01	1	9.73e-01	3
FOSA	1.63e+02	1	1.00e+02	1	9.81e-03	1	2.07e+01	1	7.43e-03	1	9.81	1	3.62	1	8.39	1	1.74	3	2.36e-02	1	9.37e-02	3
N-MeFOSAA	3.28e+02	1	3.98e+01	1	3.41e-01	1	1.34e+01	1	2.55	1	7.61	1	8.90e-01	1	1.15e-02	1	1.35	3	2.45e-02	1	1.85e-01	3
N-EtFOSAA	1.82e+02	1	1.07e+01	1	2.89e-02	1	2.96e-01	1	2.01	1	2.22	1	2.83	1	5.60e-02	1	4.32e-01	3	7.57e-01	1	3.52e-01	3
PFNA	8.05	1	3.43e+01	1	5.09e-02	1	3.90	1	4.58e-01	1	2.05	1	2.55	1	6.02e-01	1	2.32	3	1.62e+01	1	8.36e-01	3
PFDA	4.35e-01	1	3.84e+01	1	2.56e-01	1	1.43e+01	1	2.41e-01	1	1.73	1	2.37	1	6.47e-01	1	7.23e-01	3	3.68	1	4.13e-01	3
PFDS	3.56e+01	1	5.68	1	2.30e-01	1	8.44	1	1.50e-02	1	7.00e-01	1	2.66e-01	1	1.02e-02	1	1.01	3	2.33e-01	1	1.47	3
PFUnA	1.49	1	6.39e+01	1	7.29	1	2.31e+01	1	3.75e-03	1	2.17	1	3.55	1	3.62	1	1.69	3	4.65	1	5.10e-01	3
PFDoA	2.84	1	7.48e+01	1	1.11e+01	1	5.01e+01	1	3.61e-01	1	9.66	1	3.83	1	6.00	1	1.89	3	5.20	1	5.45e-02	3
PFTTrDA	4.33	1	9.00e+01	1	7.08	1	3.85e+01	1	8.67e-01	1	1.04e+01	1	5.73	1	4.06	1	2.04	3	3.23e-01	1	4.99e-01	3
8:2 FTS	1.34e+02	1	8.29e-01	1	8.46	1	9.62	1	5.12	1	1.84	1	1.63e-02	1	4.79e-03	1	2.69e-01	3	4.99e-01	1	8.82e-01	3
4-OH-CB187	3.34e+01	1	7.76e+01	1	6.66	1	8.41	1	4.13e-01	1	8.37e-01	1	1.97	1	2.11e-03	1	4.20	3	1.25e-01	1	2.95e-01	3
3-OH-CB153	5.32e+01	1	3.29e+02	1	7.20e-01	1	1.38e+01	1	8.74	1	3.82	1	1.60e-01	1	1.97	1	8.07e-01	3	5.67	1	1.28	3
4-OH-CB107	5.75e+01	1	2.31e+02	1	1.52	1	2.36e+01	1	1.84e+01	1	9.08e-02	1	3.91e-01	1	1.06e-01	1	8.47e-01	3	2.16	1	7.36e-01	3

Supplementary Table S17. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects, with the residential area criteria removed. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-3.50e-01	5.45e-01	-8.86e-02	8.30e-01	-4.81e-01	5.46e-01
PFPeS	-8.75e-01	6.16e-02	-3.69e-01	2.69e-01	-1.13	8.01e-02
PFHpA	-7.65e-01	7.01e-03	-3.10e-01	1.25e-01	-9.92e-01	1.11e-02
PFHxS	-7.60e-02	5.71e-01	-1.35e-01	1.58e-01	-4.63e-02	8.02e-01
PFHpS	9.47e-02	4.73e-01	2.82e-03	9.76e-01	1.41e-01	4.39e-01
PFOA	4.00e-02	6.95e-01	-5.38e-02	4.60e-01	8.69e-02	5.36e-01
PFOS	2.29e-02	8.59e-01	-1.99e-02	8.29e-01	4.43e-02	8.04e-01
FOSA	3.60e-02	7.29e-01	-2.12e-02	7.75e-01	6.46e-02	6.52e-01
N-MeFOSAA	-9.68e-02	4.27e-01	2.40e-03	9.78e-01	-1.46e-01	3.83e-01
N-EtFOSAA	-6.14e-02	6.31e-01	-5.85e-02	5.21e-01	-6.29e-02	7.21e-01
PFNA	3.93e-02	7.38e-01	-1.04e-02	9.02e-01	6.41e-02	6.92e-01
PFDA	-9.02e-03	9.42e-01	-6.23e-02	4.78e-01	1.76e-02	9.17e-01
PFDS	-2.78e-01	5.94e-02	-1.55e-01	1.40e-01	-3.40e-01	9.44e-02
PFUnA	-2.03e-02	8.83e-01	1.71e-02	8.62e-01	-3.90e-02	8.37e-01
PFDoA	-3.61e-02	7.33e-01	1.81e-02	8.11e-01	-6.31e-02	6.64e-01
PFTrDA	-1.77e-01	3.94e-01	1.64e-02	9.12e-01	-2.73e-01	3.38e-01
8:2 FTS	5.44e-02	7.79e-01	-1.31e-01	3.43e-01	1.47e-01	5.81e-01
4-OH-CB187	8.07e-02	6.40e-01	2.67e-01	3.01e-02	-1.25e-02	9.58e-01
3-OH-CB153	3.45e-01	1.37e-01	2.61e-01	1.15e-01	3.87e-01	2.25e-01
4-OH-CB107	-1.50e-01	4.20e-01	-4.95e-02	7.10e-01	-2.01e-01	4.34e-01

The model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, and number of childbirths, with the paring removed thus removing the residential area criteria.

Supplementary Table S18. Paired comparison of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) patients and matched control (HC) subjects divided in males and females, with the residential area criteria removed. Comparisons have been made between the entire MS group (n = 907) and HC subjects (n = 907), between patients with relapsing-remitting MS (RRMS) (n = 801) and HC subjects (n = 801), and between progressive MS (PMS) (n = 106) and HC subjects (n = 106). Log₂ fold changes (FC) were calculated using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons.

Compound	Males						Females					
	MS vs HC		RRMS vs HC		PMS vs HC		MS vs HC		RRMS vs HC		PMS vs HC	
	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value	Log ₂ FC	<i>P</i> value
PFBS	-1.03	2.56e-01	-6.58e-02	9.26e-01	-1.51	2.18e-01	3.31e-01	6.24e-01	-1.11e-01	7.81e-01	5.53e-01	5.62e-01
PFPeS	-1.84	1.24e-02	-4.38e-01	4.47e-01	-2.54	1.09e-02	8.76e-02	8.73e-01	-3.00e-01	3.55e-01	2.82e-01	7.15e-01
PFHpA	-1.27	4.33e-03	-3.94e-01	2.58e-01	-1.71	4.65e-03	-2.59e-01	4.33e-01	-2.26e-01	2.50e-01	-2.76e-01	5.55e-01
PFHxS	-3.20e-01	1.29e-01	-2.10e-01	2.03e-01	-3.75e-01	1.89e-01	1.68e-01	2.84e-01	-6.07e-02	5.14e-01	2.83e-01	2.02e-01
PFHpS	-1.48e-01	4.76e-01	-6.88e-02	6.72e-01	-1.87e-01	5.05e-01	3.37e-01	2.89e-02	7.44e-02	4.16e-01	4.69e-01	3.16e-02
PFOA	-1.23e-01	4.43e-01	-1.25e-01	3.17e-01	-1.21e-01	5.76e-01	2.03e-01	8.89e-02	1.78e-02	8.01e-01	2.95e-01	7.94e-02
PFOS	-1.78e-01	3.81e-01	-8.36e-02	5.99e-01	-2.25e-01	4.13e-01	2.24e-01	1.39e-01	4.38e-02	6.25e-01	3.13e-01	1.42e-01
FOSA	2.52e-02	8.77e-01	-5.24e-02	6.82e-01	6.40e-02	7.72e-01	4.68e-02	7.00e-01	9.89e-03	8.91e-01	6.52e-02	7.04e-01
N-MeFOSAA	-5.99e-02	7.54e-01	6.56e-02	6.61e-01	-1.23e-01	6.36e-01	-1.34e-01	3.47e-01	-6.08e-02	4.71e-01	-1.70e-01	3.97e-01
N-EtFOSAA	-1.53e-02	9.39e-01	-8.54e-02	5.87e-01	1.97e-02	9.42e-01	-1.07e-01	4.72e-01	-3.17e-02	7.21e-01	-1.45e-01	4.90e-01
PFNA	-2.44e-02	8.95e-01	-8.88e-02	5.39e-01	7.88e-03	9.75e-01	1.03e-01	4.54e-01	6.81e-02	4.03e-01	1.20e-01	5.35e-01
PFDA	-6.16e-02	7.50e-01	-1.56e-01	3.04e-01	-1.46e-02	9.55e-01	4.36e-02	7.62e-01	3.11e-02	7.16e-01	4.98e-02	8.06e-01
PFDS	-4.90e-01	3.44e-02	-3.59e-01	4.80e-02	-5.55e-01	7.68e-02	-6.65e-02	6.99e-01	4.85e-02	6.35e-01	-1.24e-01	6.10e-01
PFUnA	-9.18e-02	6.72e-01	-9.67e-02	5.69e-01	-8.93e-02	7.61e-01	5.11e-02	7.51e-01	1.31e-01	1.72e-01	1.13e-02	9.60e-01
PFDoA	-7.53e-02	6.50e-01	7.70e-03	9.53e-01	-1.17e-01	6.03e-01	3.20e-03	9.79e-01	2.84e-02	6.98e-01	-9.41e-03	9.57e-01
PFTrDA	-3.61e-01	2.67e-01	-2.78e-02	9.13e-01	-5.28e-01	2.31e-01	7.65e-03	9.75e-01	6.07e-02	6.73e-01	-1.89e-02	9.56e-01
8:2 FTS	1.89e-01	5.33e-01	-2.15e-01	3.65e-01	3.92e-01	3.42e-01	-8.05e-02	7.22e-01	-4.62e-02	7.31e-01	-9.76e-02	7.60e-01
4-OH-CB187	-6.76e-02	8.03e-01	2.48e-01	2.44e-01	-2.25e-01	5.40e-01	2.29e-01	2.56e-01	2.87e-01	1.67e-02	2.00e-01	4.82e-01
3-OH-CB153	1.94e-01	5.93e-01	3.86e-01	1.75e-01	9.82e-02	8.42e-01	4.96e-01	6.72e-02	1.35e-01	4.01e-01	6.76e-01	7.71e-02
4-OH-CB107	-5.87e-02	8.41e-01	1.17e-01	6.11e-01	-1.46e-01	7.12e-01	-2.42e-01	2.66e-01	-2.16e-01	9.56e-02	-2.56e-01	4.06e-01

The model was adjusted for age, sex, BMI at sample collection, BMI at the age of 20, the year the blood sample was taken, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), type of undergoing treatment, and number of childbirths, with the paring removed thus removing the residential area criteria.

Supplementary Table S19. Associations between single serum per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs), and the odds ratio of multiple sclerosis (MS) based on the Base model (n = 1,814). Analysis were performed using logistic regression. No adjustments were made for multiple comparisons.

Substance (ng/ml)	Males and Females		Males		Females	
	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
PFHxS	0.985 (0.923 - 1.051)	0.649	0.926 (0.820 - 1.043)	0.210	1.012 (0.938 - 1.092)	0.763
PFHpS	1.046 (0.979 - 1.119)	0.187	0.980 (0.872 - 1.101)	0.729	1.087 (1.004 - 1.178)	0.041
PFOA	1.039 (0.953 - 1.134)	0.381	0.945 (0.800 - 1.115)	0.504	1.088 (0.988 - 1.200)	0.088
PFOS	1.011 (0.945 - 1.083)	0.744	0.946 (0.837 - 1.068)	0.372	1.045 (0.965 - 1.133)	0.280
FOSA	1.035 (0.954 - 1.124)	0.410	1.007 (0.860 - 1.179)	0.931	1.038 (0.947 - 1.137)	0.427
N-MeFOSAA	1.026 (0.960 - 1.096)	0.458	1.032 (0.907 - 1.175)	0.634	1.028 (0.954 - 1.108)	0.463
N-EtFOSAA	1.040 (0.974 - 1.111)	0.238	1.030 (0.902 - 1.177)	0.657	1.043 (0.969 - 1.123)	0.262
PFNA	0.995 (0.921 - 1.074)	0.891	0.927 (0.805 - 1.065)	0.288	1.030 (0.943 - 1.124)	0.514
PFDA	0.982 (0.914 - 1.056)	0.628	0.938 (0.810 - 1.084)	0.385	1.002 (0.925 - 1.085)	0.963
PFDS	0.996 (0.941 - 1.058)	0.891	0.882 (0.776 - 0.999)	0.050	1.033 (0.967 - 1.104)	0.335
PFUnA	0.994 (0.933 - 1.060)	0.866	0.934 (0.827 - 1.052)	0.263	1.020 (0.949 - 1.098)	0.592
PFDoA	0.953 (0.876 - 1.036)	0.256	0.938 (0.799 - 1.100)	0.435	0.970 (0.883 - 1.065)	0.519
PFTTrDA	0.971 (0.930 - 1.014)	0.182	0.965 (0.889 - 1.047)	0.395	0.990 (0.943 - 1.039)	0.686
8:2 FTS	1.024 (0.979 - 1.070)	0.300	0.994 (0.910 - 1.084)	0.884	1.030 (0.980 - 1.082)	0.247
4-OH-CB187	1.078 (1.024 - 1.137)	0.005	1.047 (0.949 - 1.159)	0.363	1.072 (1.012 - 1.137)	0.018
3-OH-CB153	1.045 (1.005 - 1.086)	0.026	1.062 (0.987 - 1.145)	0.107	1.049 (1.004 - 1.096)	0.032
4-OH-CB107	0.988 (0.942 - 1.036)	0.616	1.002 (0.911 - 1.101)	0.971	0.988 (0.937 - 1.042)	0.651

Model adjusted for age, sex, BMI at sample collection, and BMI at age of 20. Sex was excluded as a covariate for the sex-specific models.
OR, odds ratio; *CI*, confidence interval

Supplementary Table S20. Coefficients for the logistic regression base model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females combined (n = 1,814). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Sex		Current BMI		BMI at age 20	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>
PFHxS	1.41e-03	7.72e-01	7.58e-02	5.31e-01	-1.94e-02	1.84e-01	4.77e-02	1.09e-02
PFHpS	8.98e-05	9.85e-01	1.29e-01	2.90e-01	-1.85e-02	2.04e-01	4.73e-02	1.15e-02
PFOA	5.47e-04	9.10e-01	9.95e-02	4.01e-01	-1.86e-02	2.02e-01	4.76e-02	1.09e-02
PFOS	8.33e-04	8.65e-01	9.34e-02	4.31e-01	-1.87e-02	2.02e-01	4.76e-02	1.10e-02
FOSA	1.52e-04	9.76e-01	8.72e-02	4.59e-01	-1.76e-02	2.30e-01	4.77e-02	1.08e-02
N-MeFOSAA	6.02e-04	9.02e-01	8.80e-02	4.55e-01	-1.81e-02	2.15e-01	4.73e-02	1.15e-02
N-EtFOSAA	6.64e-04	8.91e-01	8.77e-02	4.57e-01	-1.87e-02	2.01e-01	4.84e-02	9.80e-03
PFNA	1.16e-03	8.11e-01	8.77e-02	4.57e-01	-1.92e-02	1.89e-01	4.76e-02	1.11e-02
PFDA	1.43e-03	7.69e-01	8.70e-02	4.60e-01	-1.98e-02	1.77e-01	4.77e-02	1.09e-02
PFDS	1.12e-03	8.17e-01	8.91e-02	4.49e-01	-1.92e-02	1.88e-01	4.76e-02	1.11e-02
PFUnA	1.22e-03	8.03e-01	8.97e-02	4.47e-01	-1.94e-02	1.87e-01	4.77e-02	1.10e-02
PFDoA	2.20e-03	6.54e-01	1.01e-01	3.91e-01	-2.22e-02	1.36e-01	4.80e-02	1.05e-02
PFTTrDA	2.57e-03	6.04e-01	1.03e-01	3.86e-01	-2.24e-02	1.31e-01	4.82e-02	1.02e-02
8:2 FTS	1.32e-03	7.85e-01	8.10e-02	4.92e-01	-1.79e-02	2.21e-01	4.68e-02	1.25e-02
4-OH-CB187	-2.13e-03	6.68e-01	1.11e-01	3.48e-01	-1.56e-02	2.86e-01	4.70e-02	1.20e-02
3-OH-CB153	-4.44e-03	4.14e-01	8.86e-02	4.52e-01	-1.55e-02	2.89e-01	4.47e-02	1.72e-02
4-OH-CB107	2.11e-03	6.87e-01	8.96e-02	4.47e-01	-2.01e-02	1.73e-01	4.86e-02	9.92e-03

β beta (regression coefficient)

Supplementary Table S21. Coefficients for the logistic regression Base model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>
PFHxS	9.36e-03	3.07e-01	-1.28e-01	6.02e-04	1.07e-01	1.17e-02
PFHpS	8.30e-03	3.65e-01	-1.24e-01	8.86e-04	1.05e-01	1.29e-02
PFOA	8.54e-03	3.50e-01	-1.24e-01	8.19e-04	1.06e-01	1.29e-02
PFOS	9.10e-03	3.22e-01	-1.27e-01	6.89e-04	1.05e-01	1.33e-02
FOSA	7.61e-03	4.22e-01	-1.22e-01	1.14e-03	1.05e-01	1.31e-02
N-MeFOSAA	7.27e-03	4.27e-01	-1.20e-01	1.29e-03	1.04e-01	1.48e-02
N-EtFOSAA	7.02e-03	4.48e-01	-1.21e-01	1.13e-03	1.06e-01	1.26e-02
PFNA	9.09e-03	3.21e-01	-1.27e-01	6.84e-04	1.07e-01	1.23e-02
PFDA	9.23e-03	3.17e-01	-1.27e-01	6.97e-04	1.07e-01	1.20e-02
PFDS	8.33e-03	3.61e-01	-1.26e-01	7.14e-04	1.06e-01	1.29e-02
PFUnA	9.82e-03	2.89e-01	-1.28e-01	6.31e-04	1.06e-01	1.27e-02
PFDoA	9.44e-03	3.10e-01	-1.26e-01	7.28e-04	1.05e-01	1.31e-02
PFTTrDA	9.64e-03	3.01e-01	-1.27e-01	6.98e-04	1.08e-01	1.10e-02
8:2 FTS	7.81e-03	3.89e-01	-1.23e-01	9.55e-04	1.06e-01	1.26e-02
4-OH-CB187	6.06e-03	5.14e-01	-1.19e-01	1.38e-03	1.02e-01	1.58e-02
3-OH-CB153	3.67e-04	9.71e-01	-1.21e-01	1.18e-03	1.03e-01	1.58e-02
4-OH-CB107	7.71e-03	4.33e-01	-1.22e-01	1.08e-03	1.05e-01	1.34e-02

β beta (regression coefficient)

Supplementary Table S22. Coefficients for the logistic regression Base model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>
PFHxS	-8.32e-04	8.80e-01	-1.65e-03	9.13e-01	3.96e-02	4.61e-02
PFHpS	-2.64e-03	6.34e-01	-1.67e-03	9.12e-01	3.87e-02	5.17e-02
PFOA	-1.94e-03	7.25e-01	-1.04e-03	9.45e-01	3.96e-02	4.62e-02
PFOS	-1.69e-03	7.61e-01	-3.06e-04	9.84e-01	3.92e-02	4.82e-02
FOSA	-1.54e-03	7.83e-01	-4.10e-04	9.78e-01	4.00e-02	4.39e-02
N-MeFOSAA	-1.09e-03	8.42e-01	-9.99e-04	9.47e-01	3.95e-02	4.62e-02
N-EtFOSAA	-8.00e-04	8.83e-01	-1.52e-03	9.20e-01	4.06e-02	4.09e-02
PFNA	-9.72e-04	8.59e-01	-1.32e-03	9.30e-01	3.98e-02	4.50e-02
PFDA	-5.93e-04	9.14e-01	-1.68e-03	9.12e-01	3.96e-02	4.58e-02
PFDS	-8.15e-04	8.81e-01	-6.41e-04	9.66e-01	3.98e-02	4.49e-02
PFUnA	-1.06e-03	8.49e-01	-8.18e-04	9.57e-01	3.95e-02	4.66e-02
PFDoA	1.25e-04	9.82e-01	-3.61e-03	8.14e-01	3.99e-02	4.41e-02
PFTTrDA	-3.43e-05	9.95e-01	-2.81e-03	8.55e-01	3.97e-02	4.53e-02
8:2 FTS	-3.25e-04	9.52e-01	-3.31e-04	9.83e-01	3.86e-02	5.24e-02
4-OH-CB187	-3.71e-03	5.10e-01	6.73e-04	9.65e-01	4.06e-02	4.08e-02
3-OH-CB153	-6.46e-03	2.91e-01	2.26e-03	8.82e-01	3.63e-02	6.83e-02
4-OH-CB107	4.54e-04	9.38e-01	-2.68e-03	8.61e-01	4.07e-02	4.16e-02

β beta (regression coefficient)

Supplementary Table S23. Coefficients for the logistic regression for the fully adjusted model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females (n = 1,814). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Sex		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		Nr. childbirths		History of infectious mononucleosis		Sun exposure			Swedish born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	5.06e-03	3.83e-01	2.45e-01	1.25e-01	-1.76e-02	2.80e-01	4.57e-02	2.48e-02	7.82e-01	5.97e-05	2.55e-01	5.81e-01	-1.02e-01	6.96e-02	3.25e-01	1.75e-02	-2.36e-02	-3.77e-01	1.57e-02	2.45e-01	1.21e-01
PFHpS	2.58e-03	6.56e-01	2.88e-01	7.04e-02	-1.64e-02	3.11e-01	4.55e-02	2.54e-02	7.70e-01	7.56e-05	2.35e-01	6.11e-01	-8.56e-02	1.21e-01	3.25e-01	1.77e-02	-4.55e-02	-4.06e-01	1.01e-02	2.45e-01	1.21e-01
PFOA	3.03e-03	6.01e-01	2.60e-01	9.96e-02	-1.65e-02	3.08e-01	4.59e-02	2.39e-02	7.69e-01	7.71e-05	2.29e-01	6.21e-01	-8.66e-02	1.19e-01	3.25e-01	1.76e-02	-4.29e-02	-4.09e-01	9.66e-03	2.51e-01	1.12e-01
PFOS	2.89e-03	6.17e-01	2.72e-01	8.53e-02	-1.53e-02	3.48e-01	4.57e-02	2.46e-02	7.78e-01	6.29e-05	2.30e-01	6.19e-01	-9.04e-02	1.02e-01	3.25e-01	1.75e-02	-4.95e-02	-4.10e-01	9.87e-03	2.47e-01	1.18e-01
FOSA	2.30e-03	6.94e-01	2.59e-01	1.01e-01	-1.48e-02	3.62e-01	4.60e-02	2.37e-02	7.90e-01	5.12e-05	2.17e-01	6.39e-01	-9.53e-02	8.40e-02	3.31e-01	1.58e-02	-4.91e-02	-4.21e-01	8.01e-03	2.43e-01	1.24e-01
N-MeFOSAA	3.41e-03	5.52e-01	2.61e-01	9.84e-02	-1.60e-02	3.24e-01	4.53e-02	2.59e-02	7.77e-01	6.54e-05	2.52e-01	5.85e-01	-9.53e-02	8.39e-02	3.27e-01	1.69e-02	-3.68e-02	-4.08e-01	9.48e-03	2.47e-01	1.19e-01
N-EtFOSAA	3.80e-03	5.05e-01	2.60e-01	9.95e-02	-1.70e-02	2.94e-01	4.64e-02	2.28e-02	7.71e-01	7.34e-05	2.55e-01	5.81e-01	-9.50e-02	8.67e-02	3.28e-01	1.67e-02	-3.41e-02	-4.06e-01	9.89e-03	2.44e-01	1.23e-01
PFNA	3.74e-03	5.15e-01	2.59e-01	1.01e-01	-1.65e-02	3.10e-01	4.58e-02	2.43e-02	7.75e-01	6.73e-05	2.34e-01	6.12e-01	-9.34e-02	9.27e-02	3.27e-01	1.69e-02	-3.71e-02	-3.96e-01	1.18e-02	2.49e-01	1.15e-01
PFDA	4.49e-03	4.35e-01	2.60e-01	9.95e-02	-1.75e-02	2.82e-01	4.57e-02	2.48e-02	7.71e-01	7.37e-05	2.53e-01	5.84e-01	-9.77e-02	7.93e-02	3.26e-01	1.73e-02	-2.51e-02	-3.82e-01	1.42e-02	2.48e-01	1.17e-01
PFDS	4.13e-03	4.68e-01	2.60e-01	1.01e-01	-1.68e-02	3.01e-01	4.57e-02	2.48e-02	7.74e-01	6.87e-05	2.45e-01	5.96e-01	-9.65e-02	8.17e-02	3.25e-01	1.77e-02	-3.16e-02	-3.90e-01	1.28e-02	2.46e-01	1.19e-01
PFUnA	3.76e-03	5.17e-01	2.54e-01	1.09e-01	-1.61e-02	3.24e-01	4.55e-02	2.54e-02	7.76e-01	6.59e-05	2.36e-01	6.10e-01	-9.50e-02	8.69e-02	3.24e-01	1.79e-02	-3.51e-02	-3.92e-01	1.24e-02	2.46e-01	1.20e-01
PFDoA	3.72e-03	5.25e-01	2.55e-01	1.09e-01	-1.59e-02	3.35e-01	4.55e-02	2.54e-02	7.78e-01	6.52e-05	2.36e-01	6.10e-01	-9.52e-02	8.61e-02	3.24e-01	1.80e-02	-3.78e-02	-3.96e-01	1.21e-02	2.46e-01	1.19e-01
PFTTrDA	4.52e-03	4.41e-01	2.63e-01	9.73e-02	-1.76e-02	2.85e-01	4.58e-02	2.45e-02	7.71e-01	7.56e-05	2.49e-01	5.91e-01	-9.67e-02	8.13e-02	3.25e-01	1.77e-02	-2.47e-02	-3.82e-01	1.44e-02	2.49e-01	1.16e-01
8:2 FTS	4.34e-03	4.45e-01	2.50e-01	1.15e-01	-1.58e-02	3.29e-01	4.47e-02	2.82e-02	7.72e-01	7.13e-05	2.32e-01	6.16e-01	-9.47e-02	8.88e-02	3.31e-01	1.58e-02	-4.38e-02	-4.17e-01	8.60e-03	2.39e-01	1.31e-01
4-OH-CB187	6.71e-04	9.09e-01	2.88e-01	6.93e-02	-1.30e-02	4.24e-01	4.62e-02	2.33e-02	7.83e-01	5.91e-05	1.82e-01	6.94e-01	-9.60e-02	8.31e-02	3.38e-01	1.40e-02	-5.99e-02	-4.26e-01	7.47e-03	2.52e-01	1.12e-01
3-OH-CB153	-2.86e-03	6.53e-01	2.55e-01	1.08e-01	-1.27e-02	4.35e-01	4.20e-02	3.93e-02	7.91e-01	4.98e-05	2.27e-01	6.24e-01	-8.87e-02	1.11e-01	3.43e-01	1.27e-02	-5.30e-02	-4.26e-01	6.98e-03	2.45e-01	1.22e-01
4-OH-CB107	5.20e-03	4.00e-01	2.62e-01	9.80e-02	-1.78e-02	2.76e-01	4.65e-02	2.30e-02	7.77e-01	6.53e-05	2.43e-01	5.99e-01	-9.79e-02	7.90e-02	3.21e-01	1.91e-02	-2.54e-02	-3.81e-01	1.44e-02	2.45e-01	1.21e-01

β beta (regression coefficient)

Supplementary Table S24. Coefficients for the logistic regression for the fully adjusted model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		History of infectious mononucleosis		Sun exposure			Swedish born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	1.02e-04	9.87e-01	-8.19e-03	6.41e-01	4.28e-02	6.00e-02	6.75e-01	3.07e-03	1.22e-01	8.10e-01	4.93e-01	2.33e-03	-3.87e-02	-4.63e-01	7.31e-03	1.89e-01	2.97e-01
PFHpS	-2.34e-03	7.18e-01	-7.48e-03	6.70e-01	4.09e-02	7.24e-02	6.71e-01	3.29e-03	1.29e-01	7.98e-01	4.89e-01	2.59e-03	-6.82e-02	-4.95e-01	4.98e-03	1.86e-01	3.06e-01
PFOA	-1.82e-03	7.78e-01	-7.20e-03	6.81e-01	4.25e-02	6.17e-02	6.63e-01	3.65e-03	1.05e-01	8.35e-01	4.92e-01	2.43e-03	-6.73e-02	-5.10e-01	3.79e-03	1.98e-01	2.74e-01
PFOS	-1.89e-03	7.71e-01	-5.53e-03	7.53e-01	4.17e-02	6.66e-02	6.75e-01	3.05e-03	1.18e-01	8.16e-01	4.89e-01	2.59e-03	-7.59e-02	-5.01e-01	4.78e-03	1.89e-01	2.97e-01
FOSA	-2.57e-03	6.95e-01	-4.97e-03	7.78e-01	4.33e-02	5.75e-02	6.95e-01	2.35e-03	9.33e-02	8.54e-01	5.04e-01	1.95e-03	-6.72e-02	-5.09e-01	3.80e-03	1.80e-01	3.22e-01
N-MeFOSAA	-6.40e-04	9.20e-01	-7.18e-03	6.82e-01	4.27e-02	6.08e-02	6.80e-01	2.84e-03	1.42e-01	7.79e-01	4.98e-01	2.16e-03	-4.66e-02	-4.82e-01	5.52e-03	1.87e-01	3.01e-01
N-EtFOSAA	-6.05e-06	9.99e-01	-8.66e-03	6.21e-01	4.40e-02	5.37e-02	6.72e-01	3.19e-03	1.39e-01	7.84e-01	4.97e-01	2.17e-03	-4.48e-02	-4.89e-01	5.02e-03	1.87e-01	3.03e-01
PFNA	-9.24e-04	8.85e-01	-6.79e-03	6.99e-01	4.29e-02	5.93e-02	6.76e-01	3.01e-03	1.02e-01	8.41e-01	5.02e-01	1.99e-03	-6.20e-02	-4.87e-01	5.55e-03	1.95e-01	2.82e-01
PFDA	-4.23e-05	9.95e-01	-7.79e-03	6.58e-01	4.28e-02	6.01e-02	6.78e-01	2.92e-03	1.16e-01	8.19e-01	4.91e-01	2.46e-03	-4.20e-02	-4.66e-01	7.06e-03	1.87e-01	3.02e-01
PFDS	-4.48e-04	9.44e-01	-5.97e-03	7.34e-01	4.29e-02	5.96e-02	6.84e-01	2.68e-03	1.46e-01	7.73e-01	4.98e-01	2.15e-03	-6.05e-02	-4.88e-01	5.36e-03	1.78e-01	3.25e-01
PFUnA	-1.14e-03	8.60e-01	-5.32e-03	7.64e-01	4.17e-02	6.68e-02	6.85e-01	2.64e-03	9.94e-02	8.45e-01	4.90e-01	2.52e-03	-5.70e-02	-4.74e-01	6.79e-03	1.81e-01	3.18e-01
PFDoA	-7.04e-04	9.14e-01	-5.95e-03	7.40e-01	4.22e-02	6.39e-02	6.84e-01	2.72e-03	1.11e-01	8.27e-01	4.92e-01	2.40e-03	-5.44e-02	-4.80e-01	6.25e-03	1.86e-01	3.06e-01
PFTTrDA	-2.66e-04	9.68e-01	-7.41e-03	6.77e-01	4.27e-02	6.07e-02	6.78e-01	2.93e-03	1.17e-01	8.17e-01	4.91e-01	2.45e-03	-4.51e-02	-4.69e-01	7.06e-03	1.85e-01	3.09e-01
8:2 FTS	4.47e-04	9.44e-01	-6.42e-03	7.15e-01	4.09e-02	7.33e-02	6.77e-01	2.95e-03	1.19e-01	8.15e-01	5.09e-01	1.74e-03	-5.87e-02	-5.08e-01	3.85e-03	1.73e-01	3.40e-01
4-OH-CB187	-4.13e-03	5.31e-01	-3.75e-03	8.31e-01	4.37e-02	5.54e-02	6.68e-01	3.47e-03	5.62e-02	9.12e-01	5.07e-01	1.82e-03	-7.60e-02	-5.00e-01	4.76e-03	1.78e-01	3.27e-01
3-OH-CB153	-6.95e-03	3.31e-01	-3.06e-03	8.63e-01	3.84e-02	9.24e-02	6.87e-01	2.60e-03	1.07e-01	8.32e-01	5.15e-01	1.56e-03	-6.58e-02	-5.00e-01	4.39e-03	1.93e-01	2.87e-01
4-OH-CB107	2.00e-03	7.72e-01	-9.89e-03	5.77e-01	4.45e-02	5.21e-02	6.85e-01	2.67e-03	1.25e-01	8.05e-01	4.88e-01	2.62e-03	-2.82e-02	-4.50e-01	8.47e-03	1.85e-01	3.07e-01

β beta (regression coefficient)

Supplementary Table S25. Coefficients for the logistic regression for the fully adjusted model used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		Nr. childbirths		History of infectious mononucleosis		Sun exposure			Swedish born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	5.12e-03	4.66e-01	-7.49e-03	6.69e-01	4.17e-02	6.71e-02	6.71e-01	3.30e-03	1.52e-01	7.64e-01	-1.04e-01	7.59e-02	4.86e-01	2.75e-03	-3.61e-02	-4.55e-01	8.65e-03	2.10e-01	2.48e-01
PFHpS	1.77e-03	8.02e-01	-6.91e-03	6.93e-01	4.03e-02	7.72e-02	6.65e-01	3.59e-03	1.48e-01	7.69e-01	-8.28e-02	1.47e-01	4.84e-01	2.93e-03	-6.38e-02	-4.87e-01	5.75e-03	2.04e-01	2.62e-01
PFOA	2.29e-03	7.46e-01	-6.73e-03	7.01e-01	4.17e-02	6.73e-02	6.59e-01	3.89e-03	1.28e-01	7.99e-01	-8.26e-02	1.51e-01	4.86e-01	2.77e-03	-6.19e-02	-4.98e-01	4.78e-03	2.14e-01	2.38e-01
PFOS	2.49e-03	7.24e-01	-5.12e-03	7.71e-01	4.09e-02	7.31e-02	6.68e-01	3.41e-03	1.41e-01	7.80e-01	-9.13e-02	1.10e-01	4.83e-01	2.96e-03	-7.12e-02	-4.93e-01	5.56e-03	2.08e-01	2.52e-01
FOSA	1.97e-03	7.80e-01	-4.18e-03	8.13e-01	4.22e-02	6.46e-02	6.88e-01	2.67e-03	1.19e-01	8.14e-01	-9.98e-02	8.03e-02	4.97e-01	2.28e-03	-6.73e-02	-5.06e-01	4.21e-03	2.01e-01	2.68e-01
N-MeFOSAA	3.90e-03	5.73e-01	-6.39e-03	7.16e-01	4.15e-02	6.83e-02	6.73e-01	3.21e-03	1.66e-01	7.43e-01	-1.00e-01	8.02e-02	4.91e-01	2.54e-03	-4.67e-02	-4.78e-01	6.17e-03	2.09e-01	2.51e-01
N-EtFOSAA	4.53e-03	5.09e-01	-7.76e-03	6.58e-01	4.28e-02	6.11e-02	6.65e-01	3.60e-03	1.63e-01	7.47e-01	-1.01e-01	8.05e-02	4.90e-01	2.55e-03	-4.54e-02	-4.84e-01	5.66e-03	2.08e-01	2.52e-01
PFNA	3.50e-03	6.15e-01	-6.28e-03	7.20e-01	4.18e-02	6.64e-02	6.69e-01	3.38e-03	1.28e-01	8.00e-01	-9.34e-02	1.04e-01	4.94e-01	2.39e-03	-5.78e-02	-4.80e-01	6.43e-03	2.14e-01	2.39e-01
PFDA	4.64e-03	5.04e-01	-7.15e-03	6.85e-01	4.17e-02	6.76e-02	6.70e-01	3.35e-03	1.44e-01	7.75e-01	-1.01e-01	7.90e-02	4.86e-01	2.83e-03	-4.05e-02	-4.60e-01	7.99e-03	2.10e-01	2.49e-01
PFDS	4.09e-03	5.50e-01	-5.12e-03	7.71e-01	4.18e-02	6.71e-02	6.77e-01	3.04e-03	1.70e-01	7.36e-01	-1.01e-01	7.65e-02	4.91e-01	2.53e-03	-6.11e-02	-4.85e-01	5.87e-03	2.00e-01	2.71e-01
PFUnA	3.40e-03	6.27e-01	-4.92e-03	7.81e-01	4.08e-02	7.36e-02	6.77e-01	3.04e-03	1.27e-01	8.02e-01	-9.67e-02	9.15e-02	4.84e-01	2.91e-03	-5.46e-02	-4.69e-01	7.50e-03	2.03e-01	2.64e-01
PFDoA	3.98e-03	5.72e-01	-5.64e-03	7.53e-01	4.12e-02	7.08e-02	6.75e-01	3.16e-03	1.38e-01	7.84e-01	-9.94e-02	8.37e-02	4.86e-01	2.80e-03	-5.10e-02	-4.72e-01	7.24e-03	2.08e-01	2.53e-01
PFTrDA	4.35e-03	5.39e-01	-6.63e-03	7.10e-01	4.16e-02	6.84e-02	6.70e-01	3.32e-03	1.43e-01	7.77e-01	-1.01e-01	7.76e-02	4.85e-01	2.86e-03	-4.49e-02	-4.65e-01	7.85e-03	2.07e-01	2.56e-01
8:2 FTS	4.87e-03	4.77e-01	-5.65e-03	7.48e-01	3.99e-02	8.13e-02	6.70e-01	3.33e-03	1.44e-01	7.76e-01	-9.88e-02	8.71e-02	5.02e-01	2.08e-03	-5.85e-02	-5.03e-01	4.45e-03	1.95e-01	2.84e-01
4-OH-CB187	3.97e-04	9.55e-01	-2.97e-03	8.66e-01	4.26e-02	6.27e-02	6.60e-01	3.93e-03	8.12e-02	8.72e-01	-9.91e-02	8.39e-02	5.01e-01	2.13e-03	-7.65e-02	-4.97e-01	5.26e-03	1.99e-01	2.74e-01
3-OH-CB153	-2.33e-03	7.62e-01	-2.57e-03	8.85e-01	3.77e-02	9.99e-02	6.80e-01	2.94e-03	1.32e-01	7.94e-01	-9.34e-02	1.05e-01	5.08e-01	1.86e-03	-6.51e-02	-4.95e-01	4.94e-03	2.13e-01	2.41e-01
4-OH-CB107	7.00e-03	3.46e-01	-9.20e-03	6.04e-01	4.36e-02	5.76e-02	6.80e-01	2.96e-03	1.52e-01	7.63e-01	-1.05e-01	7.08e-02	4.80e-01	3.15e-03	-2.78e-02	-4.46e-01	9.50e-03	2.07e-01	2.54e-01

β beta (regression coefficient)

Supplementary Table S26. Coefficients for the logistic regression for the fully adjusted model including Nordic born status used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females (n = 1,814). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Sex		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		Nr. childbirths		History of infectious mononucleosis		Sun exposure			Born in a Nordic country (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	4.95e-03	3.93e-01	2.45e-01	1.25e-01	-1.78e-02	2.72e-01	4.60e-02	2.38e-02	7.79e-01	6.30e-05	2.68e-01	5.62e-01	-1.03e-01	6.87e-02	3.16e-01	2.13e-02	-2.30e-02	-3.71e-01	1.81e-02	3.79e-01	3.19e-02
PFHpS	2.53e-03	6.63e-01	2.87e-01	7.13e-02	-1.67e-02	3.02e-01	4.57e-02	2.44e-02	7.68e-01	7.82e-05	2.49e-01	5.91e-01	-8.64e-02	1.18e-01	3.15e-01	2.16e-02	-4.45e-02	-3.99e-01	1.19e-02	3.83e-01	2.99e-02
PFOA	2.94e-03	6.12e-01	2.59e-01	1.01e-01	-1.68e-02	2.99e-01	4.62e-02	2.28e-02	7.67e-01	8.05e-05	2.43e-01	6.00e-01	-8.70e-02	1.18e-01	3.15e-01	2.15e-02	-4.24e-02	-4.03e-01	1.13e-02	3.91e-01	2.71e-02
PFOS	2.84e-03	6.24e-01	2.71e-01	8.65e-02	-1.56e-02	3.38e-01	4.60e-02	2.36e-02	7.76e-01	6.52e-05	2.44e-01	5.98e-01	-9.11e-02	9.93e-02	3.15e-01	2.13e-02	-4.85e-02	-4.03e-01	1.16e-02	3.85e-01	2.94e-02
FOSA	2.19e-03	7.07e-01	2.58e-01	1.03e-01	-1.50e-02	3.55e-01	4.63e-02	2.28e-02	7.89e-01	5.23e-05	2.30e-01	6.20e-01	-9.62e-02	8.13e-02	3.21e-01	1.92e-02	-4.87e-02	-4.15e-01	9.34e-03	3.86e-01	2.91e-02
N-MeFOSAA	3.36e-03	5.57e-01	2.60e-01	9.99e-02	-1.63e-02	3.14e-01	4.56e-02	2.48e-02	7.75e-01	6.79e-05	2.66e-01	5.66e-01	-9.61e-02	8.16e-02	3.17e-01	2.06e-02	-3.57e-02	-4.00e-01	1.12e-02	3.83e-01	2.99e-02
N-EtFOSAA	3.76e-03	5.09e-01	2.60e-01	1.01e-01	-1.73e-02	2.85e-01	4.66e-02	2.19e-02	7.69e-01	7.61e-05	2.69e-01	5.62e-01	-9.58e-02	8.42e-02	3.18e-01	2.04e-02	-3.29e-02	-3.98e-01	1.18e-02	3.80e-01	3.13e-02
PFNA	3.68e-03	5.22e-01	2.58e-01	1.03e-01	-1.68e-02	3.00e-01	4.61e-02	2.33e-02	7.73e-01	6.99e-05	2.48e-01	5.92e-01	-9.41e-02	9.06e-02	3.17e-01	2.06e-02	-3.62e-02	-3.89e-01	1.39e-02	3.86e-01	2.90e-02
PFDA	4.46e-03	4.39e-01	2.60e-01	1.01e-01	-1.79e-02	2.73e-01	4.60e-02	2.38e-02	7.69e-01	7.70e-05	2.68e-01	5.64e-01	-9.86e-02	7.70e-02	3.16e-01	2.11e-02	-2.38e-02	-3.75e-01	1.67e-02	3.85e-01	2.94e-02
PFDS	4.07e-03	4.75e-01	2.59e-01	1.02e-01	-1.71e-02	2.93e-01	4.59e-02	2.38e-02	7.72e-01	7.14e-05	2.59e-01	5.75e-01	-9.73e-02	7.93e-02	3.15e-01	2.15e-02	-3.10e-02	-3.83e-01	1.49e-02	3.83e-01	2.99e-02
PFUnA	3.72e-03	5.21e-01	2.53e-01	1.11e-01	-1.65e-02	3.14e-01	4.58e-02	2.43e-02	7.74e-01	6.85e-05	2.50e-01	5.90e-01	-9.58e-02	8.44e-02	3.14e-01	2.17e-02	-3.39e-02	-3.85e-01	1.47e-02	3.83e-01	3.03e-02
PFDoA	3.69e-03	5.27e-01	2.54e-01	1.10e-01	-1.63e-02	3.24e-01	4.57e-02	2.43e-02	7.76e-01	6.81e-05	2.51e-01	5.89e-01	-9.61e-02	8.36e-02	3.14e-01	2.19e-02	-3.63e-02	-3.89e-01	1.44e-02	3.83e-01	3.02e-02
PFTTrDA	4.51e-03	4.41e-01	2.62e-01	9.84e-02	-1.80e-02	2.74e-01	4.61e-02	2.34e-02	7.68e-01	7.95e-05	2.64e-01	5.69e-01	-9.75e-02	7.90e-02	3.15e-01	2.15e-02	-2.30e-02	-3.74e-01	1.71e-02	3.86e-01	2.90e-02
8:2 FTS	4.29e-03	4.50e-01	2.50e-01	1.16e-01	-1.61e-02	3.20e-01	4.50e-02	2.71e-02	7.70e-01	7.37e-05	2.46e-01	5.95e-01	-9.55e-02	8.61e-02	3.21e-01	1.93e-02	-4.24e-02	-4.09e-01	1.03e-02	3.75e-01	3.40e-02
4-OH-CB187	6.21e-04	9.15e-01	2.87e-01	7.05e-02	-1.34e-02	4.11e-01	4.65e-02	2.22e-02	7.81e-01	6.10e-05	1.97e-01	6.72e-01	-9.67e-02	8.12e-02	3.28e-01	1.71e-02	-5.90e-02	-4.19e-01	8.90e-03	3.89e-01	2.79e-02
3-OH-CB153	-2.91e-03	6.48e-01	2.54e-01	1.09e-01	-1.30e-02	4.23e-01	4.23e-02	3.79e-02	7.89e-01	5.16e-05	2.41e-01	6.03e-01	-8.94e-02	1.08e-01	3.33e-01	1.55e-02	-5.18e-02	-4.19e-01	8.32e-03	3.82e-01	3.07e-02
4-OH-CB107	5.13e-03	4.07e-01	2.61e-01	9.95e-02	-1.81e-02	2.68e-01	4.68e-02	2.21e-02	7.75e-01	6.81e-05	2.57e-01	5.78e-01	-9.86e-02	7.68e-02	3.12e-01	2.31e-02	-2.44e-02	-3.75e-01	1.68e-02	3.82e-01	3.06e-02

β beta (regression coefficient)

Supplementary Table S27. Coefficients for the logistic regression for the fully adjusted model including Nordic born status used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		History of infectious mononucleosis		Sun exposure			Nordic born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	1.02e-04	9.87e-01	-8.19e-03	6.41e-01	4.28e-02	6.00e-02	6.75e-01	3.07e-03	1.22e-01	8.10e-01	4.93e-01	2.33e-03	-3.87e-02	-4.63e-01	7.31e-03	1.89e-01	2.97e-01
PFHpS	-2.34e-03	7.18e-01	-7.48e-03	6.70e-01	4.09e-02	7.24e-02	6.71e-01	3.29e-03	1.29e-01	7.98e-01	4.89e-01	2.59e-03	-6.82e-02	-4.95e-01	4.98e-03	1.86e-01	3.06e-01
PFOA	-1.82e-03	7.78e-01	-7.20e-03	6.81e-01	4.25e-02	6.17e-02	6.63e-01	3.65e-03	1.05e-01	8.35e-01	4.92e-01	2.43e-03	-6.73e-02	-5.10e-01	3.79e-03	1.98e-01	2.74e-01
PFOS	-1.89e-03	7.71e-01	-5.53e-03	7.53e-01	4.17e-02	6.66e-02	6.75e-01	3.05e-03	1.18e-01	8.16e-01	4.89e-01	2.59e-03	-7.59e-02	-5.01e-01	4.78e-03	1.89e-01	2.97e-01
FOSA	-2.57e-03	6.95e-01	-4.97e-03	7.78e-01	4.33e-02	5.75e-02	6.95e-01	2.35e-03	9.33e-02	8.54e-01	5.04e-01	1.95e-03	-6.72e-02	-5.09e-01	3.80e-03	1.80e-01	3.22e-01
N-MeFOSAA	-6.40e-04	9.20e-01	-7.18e-03	6.82e-01	4.27e-02	6.08e-02	6.80e-01	2.84e-03	1.42e-01	7.79e-01	4.98e-01	2.16e-03	-4.66e-02	-4.82e-01	5.52e-03	1.87e-01	3.01e-01
N-EtFOSAA	-6.05e-06	9.99e-01	-8.66e-03	6.21e-01	4.40e-02	5.37e-02	6.72e-01	3.19e-03	1.39e-01	7.84e-01	4.97e-01	2.17e-03	-4.48e-02	-4.89e-01	5.02e-03	1.87e-01	3.03e-01
PFNA	-9.24e-04	8.85e-01	-6.79e-03	6.99e-01	4.29e-02	5.93e-02	6.76e-01	3.01e-03	1.02e-01	8.41e-01	5.02e-01	1.99e-03	-6.20e-02	-4.87e-01	5.55e-03	1.95e-01	2.82e-01
PFDA	-4.23e-05	9.95e-01	-7.79e-03	6.58e-01	4.28e-02	6.01e-02	6.78e-01	2.92e-03	1.16e-01	8.19e-01	4.91e-01	2.46e-03	-4.20e-02	-4.66e-01	7.06e-03	1.87e-01	3.02e-01
PFDS	-4.48e-04	9.44e-01	-5.97e-03	7.34e-01	4.29e-02	5.96e-02	6.84e-01	2.68e-03	1.46e-01	7.73e-01	4.98e-01	2.15e-03	-6.05e-02	-4.88e-01	5.36e-03	1.78e-01	3.25e-01
PFUnA	-1.14e-03	8.60e-01	-5.32e-03	7.64e-01	4.17e-02	6.68e-02	6.85e-01	2.64e-03	9.94e-02	8.45e-01	4.90e-01	2.52e-03	-5.70e-02	-4.74e-01	6.79e-03	1.81e-01	3.18e-01
PFDoA	-7.04e-04	9.14e-01	-5.95e-03	7.40e-01	4.22e-02	6.39e-02	6.84e-01	2.72e-03	1.11e-01	8.27e-01	4.92e-01	2.40e-03	-5.44e-02	-4.80e-01	6.25e-03	1.86e-01	3.06e-01
PFTTrDA	-2.66e-04	9.68e-01	-7.41e-03	6.77e-01	4.27e-02	6.07e-02	6.78e-01	2.93e-03	1.17e-01	8.17e-01	4.91e-01	2.45e-03	-4.51e-02	-4.69e-01	7.06e-03	1.85e-01	3.09e-01
8:2 FTS	4.47e-04	9.44e-01	-6.42e-03	7.15e-01	4.09e-02	7.33e-02	6.77e-01	2.95e-03	1.19e-01	8.15e-01	5.09e-01	1.74e-03	-5.87e-02	-5.08e-01	3.85e-03	1.73e-01	3.40e-01
4-OH-CB187	-4.13e-03	5.31e-01	-3.75e-03	8.31e-01	4.37e-02	5.54e-02	6.68e-01	3.47e-03	5.62e-02	9.12e-01	5.07e-01	1.82e-03	-7.60e-02	-5.00e-01	4.76e-03	1.78e-01	3.27e-01
3-OH-CB153	-6.95e-03	3.31e-01	-3.06e-03	8.63e-01	3.84e-02	9.24e-02	6.87e-01	2.60e-03	1.07e-01	8.32e-01	5.15e-01	1.56e-03	-6.58e-02	-5.00e-01	4.39e-03	1.93e-01	2.87e-01
4-OH-CB107	2.00e-03	7.72e-01	-9.89e-03	5.77e-01	4.45e-02	5.21e-02	6.85e-01	2.67e-03	1.25e-01	8.05e-01	4.88e-01	2.62e-03	-2.82e-02	-4.50e-01	8.47e-03	1.85e-01	3.07e-01

β beta (regression coefficient)

Supplementary Table S28. Coefficients for the logistic regression for the fully adjusted model including Nordic born used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		Nr. childbirths		History of infectious mononucleosis		Sun exposure			Born in a Nordic (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	5.12e-03	4.66e-01	-7.49e-03	6.69e-01	4.17e-02	6.71e-02	6.71e-01	3.30e-03	1.52e-01	7.64e-01	-1.04e-01	7.59e-02	4.86e-01	2.75e-03	-3.61e-02	-4.55e-01	8.65e-03	2.10e-01	2.48e-01
PFHpS	1.77e-03	8.02e-01	-6.91e-03	6.93e-01	4.03e-02	7.72e-02	6.65e-01	3.59e-03	1.48e-01	7.69e-01	-8.28e-02	1.47e-01	4.84e-01	2.93e-03	-6.38e-02	-4.87e-01	5.75e-03	2.04e-01	2.62e-01
PFOA	2.29e-03	7.46e-01	-6.73e-03	7.01e-01	4.17e-02	6.73e-02	6.59e-01	3.89e-03	1.28e-01	7.99e-01	-8.26e-02	1.51e-01	4.86e-01	2.77e-03	-6.19e-02	-4.98e-01	4.78e-03	2.14e-01	2.38e-01
PFOS	2.49e-03	7.24e-01	-5.12e-03	7.71e-01	4.09e-02	7.31e-02	6.68e-01	3.41e-03	1.41e-01	7.80e-01	-9.13e-02	1.10e-01	4.83e-01	2.96e-03	-7.12e-02	-4.93e-01	5.56e-03	2.08e-01	2.52e-01
FOSA	1.97e-03	7.80e-01	-4.18e-03	8.13e-01	4.22e-02	6.46e-02	6.88e-01	2.67e-03	1.19e-01	8.14e-01	-9.98e-02	8.03e-02	4.97e-01	2.28e-03	-6.73e-02	-5.06e-01	4.21e-03	2.01e-01	2.68e-01
N-MeFOSAA	3.90e-03	5.73e-01	-6.39e-03	7.16e-01	4.15e-02	6.83e-02	6.73e-01	3.21e-03	1.66e-01	7.43e-01	-1.00e-01	8.02e-02	4.91e-01	2.54e-03	-4.67e-02	-4.78e-01	6.17e-03	2.09e-01	2.51e-01
N-EtFOSAA	4.53e-03	5.09e-01	-7.76e-03	6.58e-01	4.28e-02	6.11e-02	6.65e-01	3.60e-03	1.63e-01	7.47e-01	-1.01e-01	8.05e-02	4.90e-01	2.55e-03	-4.54e-02	-4.84e-01	5.66e-03	2.08e-01	2.52e-01
PFNA	3.50e-03	6.15e-01	-6.28e-03	7.20e-01	4.18e-02	6.64e-02	6.69e-01	3.38e-03	1.28e-01	8.00e-01	-9.34e-02	1.04e-01	4.94e-01	2.39e-03	-5.78e-02	-4.80e-01	6.43e-03	2.14e-01	2.39e-01
PFDA	4.64e-03	5.04e-01	-7.15e-03	6.85e-01	4.17e-02	6.76e-02	6.70e-01	3.35e-03	1.44e-01	7.75e-01	-1.01e-01	7.90e-02	4.86e-01	2.83e-03	-4.05e-02	-4.60e-01	7.99e-03	2.10e-01	2.49e-01
PFDS	4.09e-03	5.50e-01	-5.12e-03	7.71e-01	4.18e-02	6.71e-02	6.77e-01	3.04e-03	1.70e-01	7.36e-01	-1.01e-01	7.65e-02	4.91e-01	2.53e-03	-6.11e-02	-4.85e-01	5.87e-03	2.00e-01	2.71e-01
PFUnA	3.40e-03	6.27e-01	-4.92e-03	7.81e-01	4.08e-02	7.36e-02	6.77e-01	3.04e-03	1.27e-01	8.02e-01	-9.67e-02	9.15e-02	4.84e-01	2.91e-03	-5.46e-02	-4.69e-01	7.50e-03	2.03e-01	2.64e-01
PFDoA	3.98e-03	5.72e-01	-5.64e-03	7.53e-01	4.12e-02	7.08e-02	6.75e-01	3.16e-03	1.38e-01	7.84e-01	-9.94e-02	8.37e-02	4.86e-01	2.80e-03	-5.10e-02	-4.72e-01	7.24e-03	2.08e-01	2.53e-01
PFTTrDA	4.35e-03	5.39e-01	-6.63e-03	7.10e-01	4.16e-02	6.84e-02	6.70e-01	3.32e-03	1.43e-01	7.77e-01	-1.01e-01	7.76e-02	4.85e-01	2.86e-03	-4.49e-02	-4.65e-01	7.85e-03	2.07e-01	2.56e-01
8:2 FTS	4.87e-03	4.77e-01	-5.65e-03	7.48e-01	3.99e-02	8.13e-02	6.70e-01	3.33e-03	1.44e-01	7.76e-01	-9.88e-02	8.71e-02	5.02e-01	2.08e-03	-5.85e-02	-5.03e-01	4.45e-03	1.95e-01	2.84e-01
4-OH-CB187	3.97e-04	9.55e-01	-2.97e-03	8.66e-01	4.26e-02	6.27e-02	6.60e-01	3.93e-03	8.12e-02	8.72e-01	-9.91e-02	8.39e-02	5.01e-01	2.13e-03	-7.65e-02	-4.97e-01	5.26e-03	1.99e-01	2.74e-01
3-OH-CB153	-2.33e-03	7.62e-01	-2.57e-03	8.85e-01	3.77e-02	9.99e-02	6.80e-01	2.94e-03	1.32e-01	7.94e-01	-9.34e-02	1.05e-01	5.08e-01	1.86e-03	-6.51e-02	-4.95e-01	4.94e-03	2.13e-01	2.41e-01
4-OH-CB107	7.00e-03	3.46e-01	-9.20e-03	6.04e-01	4.36e-02	5.76e-02	6.80e-01	2.96e-03	1.52e-01	7.63e-01	-1.05e-01	7.08e-02	4.80e-01	3.15e-03	-2.78e-02	-4.46e-01	9.50e-03	2.07e-01	2.54e-01

β beta (regression coefficient)

Supplementary Table S29. Associations between single serum per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs), and the odds ratio of multiple sclerosis (MS) (n = 1,814). Logistic regression analysis was used to calculate the odds ratios per doubling of substance serum concentrations. Calculations based on the fully adjusted model including Nordic born status. No adjustments were made for multiple comparisons.

Substance (ng/ml)	Males and Females		Males		Females	
	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
PFHxS	0.973 (0.903 - 1.049)	0.479	1.006 (0.919 - 1.101)	0.897	0.992 (0.905 - 1.087)	0.862
PFHpS	1.051 (0.976 - 1.133)	0.189	1.097 (0.998 - 1.206)	0.054	1.082 (0.983 - 1.191)	0.106
PFOA	1.052 (0.953 - 1.161)	0.314	1.112 (0.990 - 1.249)	0.075	1.090 (0.967 - 1.228)	0.157
PFOS	1.044 (0.968 - 1.127)	0.266	1.079 (0.982 - 1.186)	0.115	1.068 (0.971 - 1.175)	0.174
FOSA	1.068 (0.973 - 1.173)	0.166	1.101 (0.989 - 1.226)	0.078	1.100 (0.988 - 1.225)	0.082
N-MeFOSAA	1.038 (0.962 - 1.120)	0.341	1.041 (0.954 - 1.136)	0.371	1.039 (0.952 - 1.134)	0.396
N-EtFOSAA	1.030 (0.956 - 1.110)	0.438	1.043 (0.957 - 1.136)	0.341	1.041 (0.955 - 1.134)	0.366
PFNA	1.022 (0.937 - 1.113)	0.628	1.066 (0.962 - 1.182)	0.222	1.053 (0.949 - 1.169)	0.330
PFDA	0.986 (0.908 - 1.070)	0.732	1.010 (0.919 - 1.110)	0.830	1.004 (0.913 - 1.104)	0.935
PFDS	1.006 (0.940 - 1.075)	0.871	1.062 (0.985 - 1.146)	0.119	1.062 (0.985 - 1.146)	0.118
PFUnA	1.013 (0.942 - 1.090)	0.726	1.047 (0.959 - 1.144)	0.302	1.040 (0.952 - 1.136)	0.383
PFDnA	1.016 (0.922 - 1.119)	0.750	1.034 (0.924 - 1.157)	0.561	1.025 (0.916 - 1.148)	0.665
PFTTrDA	0.993 (0.946 - 1.044)	0.796	1.006 (0.950 - 1.066)	0.831	1.005 (0.949 - 1.065)	0.859
8:2 FTS	1.027 (0.976 - 1.081)	0.307	1.041 (0.982 - 1.104)	0.175	1.039 (0.980 - 1.102)	0.204
4-OH-CB187	1.082 (1.019 - 1.148)	0.010	1.092 (1.019 - 1.171)	0.013	1.091 (1.018 - 1.17)	0.014
3-OH-CB153	1.055 (1.011 - 1.101)	0.015	1.057 (1.006 - 1.111)	0.030	1.053 (1.002 - 1.107)	0.041
4-OH-CB107	0.989 (0.937 - 1.043)	0.685	0.922 (0.922 - 1.042)	0.519	0.977 (0.918 - 1.039)	0.451

Model was adjusted for age, sex, BM at sample collection, BMI at the age of 20, number of childbirths, regular smoking, irregular smoking, history of infectious mononucleosis, sun exposure, born in a Nordic country, and residential area (as a random effect). Sex was excluded as a covariate from the sex-specific models.

OR, odds ratio; CI, confidence interval

Supplementary Table S30. Coefficients for the logistic regression for the fully adjusted model, residential area not taken into account, used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), males and females (n = 1,814). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Sex		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		Nr. childbirths		History of infectious mononucleosis		Sun exposure			Swedish born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	5.46e-03	3.34e-01	2.45e-01	1.12e-01	-2.17e-02	1.69e-01	4.81e-02	1.31e-02	7.87e-01	2.27e-05	2.55e-01	5.81e-01	-1.11e-01	3.83e-02	3.31e-01	1.19e-02	-2.49e-02	-4.08e-01	5.31e-03	2.52e-01	9.86e-02
PFHpS	2.70e-03	6.34e-01	2.93e-01	5.69e-02	-2.08e-02	1.87e-01	4.77e-02	1.36e-02	7.77e-01	2.88e-05	2.35e-01	6.11e-01	-9.29e-02	7.72e-02	3.31e-01	1.21e-02	-4.59e-02	-4.37e-01	3.16e-03	2.51e-01	1.01e-01
PFOA	3.15e-03	5.76e-01	2.57e-01	9.13e-02	-2.07e-02	1.88e-01	4.83e-02	1.25e-02	7.74e-01	3.10e-05	2.27e-01	6.23e-01	-9.27e-02	7.96e-02	3.31e-01	1.21e-02	-4.60e-02	-4.45e-01	2.76e-03	2.58e-01	9.10e-02
PFOS	3.08e-03	5.86e-01	2.73e-01	7.38e-02	-1.93e-02	2.23e-01	4.78e-02	1.34e-02	7.87e-01	2.24e-05	2.29e-01	6.19e-01	-9.87e-02	6.04e-02	3.32e-01	1.18e-02	-5.08e-02	-4.41e-01	3.05e-03	2.53e-01	9.74e-02
FOSA	2.67e-03	6.40e-01	2.58e-01	9.01e-02	-1.90e-02	2.29e-01	4.84e-02	1.25e-02	7.99e-01	1.76e-05	2.18e-01	6.37e-01	-1.05e-01	4.61e-02	3.35e-01	1.12e-02	-4.94e-02	-4.52e-01	2.44e-03	2.46e-01	1.08e-01
N-MeFOSAA	3.77e-03	4.99e-01	2.59e-01	8.92e-02	-2.01e-02	2.03e-01	4.75e-02	1.42e-02	7.87e-01	2.27e-05	2.57e-01	5.77e-01	-1.04e-01	4.63e-02	3.34e-01	1.13e-02	-3.79e-02	-4.40e-01	2.80e-03	2.51e-01	1.01e-01
N-EtFOSAA	4.27e-03	4.41e-01	2.56e-01	9.28e-02	-2.14e-02	1.75e-01	4.89e-02	1.16e-02	7.79e-01	2.71e-05	2.61e-01	5.73e-01	-1.04e-01	4.86e-02	3.34e-01	1.13e-02	-3.36e-02	-4.38e-01	2.96e-03	2.48e-01	1.04e-01
PFNA	4.11e-03	4.62e-01	2.55e-01	9.38e-02	-2.07e-02	1.91e-01	4.82e-02	1.27e-02	7.84e-01	2.40e-05	2.33e-01	6.14e-01	-1.01e-01	5.46e-02	3.34e-01	1.13e-02	-3.93e-02	-4.27e-01	3.84e-03	2.56e-01	9.33e-02
PFDA	5.01e-03	3.71e-01	2.57e-01	9.24e-02	-2.17e-02	1.71e-01	4.80e-02	1.31e-02	7.80e-01	2.63e-05	2.53e-01	5.85e-01	-1.07e-01	4.29e-02	3.32e-01	1.19e-02	-2.60e-02	-4.11e-01	4.80e-03	2.54e-01	9.62e-02
PFDS	4.70e-03	3.95e-01	2.56e-01	9.28e-02	-2.11e-02	1.82e-01	4.81e-02	1.30e-02	7.82e-01	2.53e-05	2.48e-01	5.91e-01	-1.06e-01	4.38e-02	3.31e-01	1.20e-02	-3.15e-02	-4.18e-01	4.36e-03	2.52e-01	9.84e-02
PFUnA	4.28e-03	4.49e-01	2.51e-01	1.01e-01	-2.04e-02	1.98e-01	4.79e-02	1.32e-02	7.84e-01	2.40e-05	2.37e-01	6.08e-01	-1.05e-01	4.72e-02	3.30e-01	1.22e-02	-3.42e-02	-4.19e-01	4.34e-03	2.52e-01	9.86e-02
PFDoA	4.11e-03	4.69e-01	2.49e-01	1.03e-01	-1.98e-02	2.18e-01	4.78e-02	1.36e-02	7.88e-01	2.27e-05	2.35e-01	6.10e-01	-1.04e-01	4.79e-02	3.30e-01	1.23e-02	-3.94e-02	-4.27e-01	3.96e-03	2.52e-01	9.86e-02
PFTTrDA	4.33e-03	4.47e-01	2.53e-01	9.77e-02	-2.05e-02	1.99e-01	4.79e-02	1.34e-02	7.86e-01	2.40e-05	2.39e-01	6.04e-01	-1.06e-01	4.44e-02	3.30e-01	1.22e-02	-3.53e-02	-4.22e-01	4.24e-03	2.51e-01	1.01e-01
8:2 FTS	4.86e-03	3.78e-01	2.47e-01	1.07e-01	-2.01e-02	2.04e-01	4.69e-02	1.56e-02	7.79e-01	2.71e-05	2.36e-01	6.09e-01	-1.05e-01	4.81e-02	3.37e-01	1.07e-02	-4.21e-02	-4.42e-01	2.96e-03	2.45e-01	1.10e-01
4-OH-CB187	1.71e-03	7.64e-01	2.83e-01	6.43e-02	-1.85e-02	2.41e-01	4.89e-02	1.15e-02	7.84e-01	2.43e-05	1.90e-01	6.80e-01	-1.06e-01	4.37e-02	3.43e-01	9.49e-03	-5.77e-02	-4.49e-01	2.66e-03	2.60e-01	8.86e-02
3-OH-CB153	-2.98e-03	6.30e-01	2.49e-01	1.03e-01	-1.71e-02	2.82e-01	4.40e-02	2.36e-02	8.01e-01	1.66e-05	2.26e-01	6.24e-01	-9.60e-02	7.00e-02	3.52e-01	7.94e-03	-5.62e-02	-4.62e-01	1.87e-03	2.47e-01	1.06e-01
4-OH-CB107	5.68e-03	3.42e-01	2.59e-01	8.98e-02	-2.21e-02	1.64e-01	4.89e-02	1.21e-02	7.85e-01	2.39e-05	2.46e-01	5.94e-01	-1.08e-01	4.21e-02	3.28e-01	1.29e-02	-2.55e-02	-4.09e-01	5.09e-03	2.52e-01	9.84e-02

β , beta (regression coefficient)

Supplementary Table S31. Coefficients for the logistic regression for the fully adjusted model, residential area not taken into account, used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in males (n = 458). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		History of infectious mononucleosis		Sun exposure			Swedish born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	-5.83e-04	9.26e-01	-1.10e-02	5.17e-01	4.38e-02	4.20e-02	6.82e-01	1.76e-03	1.22e-01	8.10e-01	4.81e-01	1.98e-03	-2.63e-02	-4.95e-01	1.95e-03	2.10e-01	2.31e-01
PFHpS	-3.30e-03	6.00e-01	-1.06e-02	5.33e-01	4.17e-02	5.31e-02	6.81e-01	1.82e-03	1.32e-01	7.93e-01	4.77e-01	2.23e-03	-5.28e-02	-5.26e-01	1.25e-03	2.04e-01	2.46e-01
PFOA	-2.74e-03	6.61e-01	-9.99e-03	5.57e-01	4.33e-02	4.41e-02	6.68e-01	2.21e-03	1.06e-01	8.33e-01	4.79e-01	2.12e-03	-5.74e-02	-5.50e-01	7.76e-04	2.17e-01	2.17e-01
PFOS	-2.71e-03	6.67e-01	-8.30e-03	6.27e-01	4.24e-02	4.92e-02	6.86e-01	1.66e-03	1.21e-01	8.11e-01	4.77e-01	2.18e-03	-6.06e-02	-5.32e-01	1.22e-03	2.08e-01	2.36e-01
FOSA	-2.78e-03	6.61e-01	-8.36e-03	6.25e-01	4.45e-02	3.90e-02	7.02e-01	1.30e-03	9.87e-02	8.46e-01	4.87e-01	1.78e-03	-4.73e-02	-5.34e-01	1.02e-03	1.98e-01	2.60e-01
N-MeFOSAA	-1.23e-03	8.42e-01	-9.93e-03	5.60e-01	4.36e-02	4.30e-02	6.93e-01	1.49e-03	1.52e-01	7.65e-01	4.87e-01	1.77e-03	-3.34e-02	-5.17e-01	1.32e-03	2.05e-01	2.42e-01
N-EtFOSAA	-4.75e-04	9.38e-01	-1.16e-02	4.94e-01	4.51e-02	3.67e-02	6.83e-01	1.74e-03	1.46e-01	7.73e-01	4.85e-01	1.86e-03	-3.03e-02	-5.23e-01	1.19e-03	2.04e-01	2.45e-01
PFNA	-1.50e-03	8.08e-01	-9.69e-03	5.70e-01	4.39e-02	4.12e-02	6.89e-01	1.58e-03	1.03e-01	8.39e-01	4.89e-01	1.68e-03	-5.12e-02	-5.20e-01	1.43e-03	2.15e-01	2.20e-01
PFDA	-4.46e-04	9.43e-01	-1.08e-02	5.29e-01	4.39e-02	4.13e-02	6.88e-01	1.60e-03	1.19e-01	8.15e-01	4.79e-01	2.09e-03	-2.71e-02	-4.94e-01	1.99e-03	2.07e-01	2.38e-01
PFDS	-8.26e-04	8.93e-01	-9.31e-03	5.85e-01	4.40e-02	4.12e-02	6.92e-01	1.49e-03	1.47e-01	7.72e-01	4.87e-01	1.77e-03	-4.21e-02	-5.14e-01	1.49e-03	1.99e-01	2.57e-01
PFUnA	-1.45e-03	8.17e-01	-8.90e-03	6.04e-01	4.33e-02	4.40e-02	6.93e-01	1.47e-03	1.05e-01	8.37e-01	4.79e-01	2.09e-03	-3.75e-02	-4.98e-01	2.01e-03	2.02e-01	2.49e-01
PFDoA	-1.07e-03	8.65e-01	-8.99e-03	6.05e-01	4.33e-02	4.46e-02	6.93e-01	1.48e-03	1.15e-01	8.21e-01	4.80e-01	2.02e-03	-3.82e-02	-5.07e-01	1.74e-03	2.05e-01	2.42e-01
PFTTrDA	-1.14e-03	8.57e-01	-9.53e-03	5.81e-01	4.36e-02	4.28e-02	6.91e-01	1.53e-03	1.16e-01	8.19e-01	4.78e-01	2.12e-03	-3.74e-02	-5.05e-01	1.79e-03	2.01e-01	2.53e-01
8:2 FTS	-6.26e-05	9.92e-01	-9.30e-03	5.86e-01	4.19e-02	5.27e-02	6.85e-01	1.65e-03	1.25e-01	8.05e-01	4.95e-01	1.52e-03	-4.09e-02	-5.30e-01	1.11e-03	1.93e-01	2.72e-01
4-OH-CB187	-4.01e-03	5.28e-01	-8.03e-03	6.38e-01	4.56e-02	3.46e-02	6.74e-01	2.03e-03	6.29e-02	9.01e-01	4.95e-01	1.54e-03	-6.12e-02	-5.25e-01	1.41e-03	2.04e-01	2.47e-01
3-OH-CB153	-8.01e-03	2.45e-01	-5.90e-03	7.31e-01	3.93e-02	6.98e-02	6.99e-01	1.37e-03	1.07e-01	8.32e-01	5.05e-01	1.24e-03	-5.65e-02	-5.36e-01	1.01e-03	2.08e-01	2.36e-01
4-OH-CB107	1.63e-03	8.06e-01	-1.29e-02	4.53e-01	4.57e-02	3.51e-02	6.95e-01	1.45e-03	1.29e-01	7.99e-01	4.77e-01	2.18e-03	-1.44e-02	-4.78e-01	2.52e-03	2.06e-01	2.40e-01

β , beta (regression coefficient)

Supplementary Table S32. Coefficients for the logistic regression for the fully adjusted model, residential area not taken into account, used for evaluating per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with odds of multiple sclerosis (MS), in females (n = 1,356). The coefficients and the two-way ANOVA *P* value for respective covariates are presented in the table below.

	Age		Current BMI		BMI at age 20		Regular smoking		Irregular smoking		Nr. childbirths		History of infectious mononucleosis		Sun exposure			Swedish born (ref = 0)	
	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	β	<i>P</i>	Median β	High β	<i>P</i>	β	<i>P</i>
PFHxS	4.92e-03	4.73e-01	-1.02e-02	5.50e-01	4.24e-02	4.94e-02	6.81e-01	1.85e-03	1.55e-01	7.59e-01	-1.12e-01	4.32e-02	4.74e-01	2.40e-03	-2.37e-02	-4.88e-01	2.28e-03	2.30e-01	1.90e-01
PFHpS	1.24e-03	8.57e-01	-9.92e-03	5.60e-01	4.09e-02	5.85e-02	6.77e-01	1.96e-03	1.54e-01	7.60e-01	-8.99e-02	9.81e-02	4.71e-01	2.59e-03	-4.85e-02	-5.20e-01	1.43e-03	2.22e-01	2.07e-01
PFOA	1.68e-03	8.06e-01	-9.44e-03	5.80e-01	4.24e-02	4.97e-02	6.67e-01	2.30e-03	1.31e-01	7.95e-01	-8.77e-02	1.08e-01	4.73e-01	2.48e-03	-5.17e-02	-5.39e-01	1.00e-03	2.33e-01	1.86e-01
PFOS	2.15e-03	7.54e-01	-7.77e-03	6.49e-01	4.13e-02	5.61e-02	6.81e-01	1.83e-03	1.47e-01	7.71e-01	-9.98e-02	6.58e-02	4.71e-01	2.58e-03	-5.60e-02	-5.25e-01	1.40e-03	2.27e-01	1.97e-01
FOSA	2.27e-03	7.40e-01	-7.42e-03	6.65e-01	4.31e-02	4.63e-02	6.97e-01	1.46e-03	1.28e-01	8.00e-01	-1.10e-01	4.29e-02	4.79e-01	2.17e-03	-4.72e-02	-5.32e-01	1.11e-03	2.19e-01	2.13e-01
N-MeFOSAA	3.80e-03	5.71e-01	-9.00e-03	5.98e-01	4.22e-02	5.09e-02	6.88e-01	1.66e-03	1.78e-01	7.24e-01	-1.09e-01	4.33e-02	4.79e-01	2.17e-03	-3.33e-02	-5.14e-01	1.45e-03	2.26e-01	1.98e-01
N-EtFOSAA	4.56e-03	4.94e-01	-1.06e-02	5.34e-01	4.36e-02	4.41e-02	6.77e-01	1.95e-03	1.73e-01	7.31e-01	-1.10e-01	4.37e-02	4.77e-01	2.27e-03	-3.07e-02	-5.19e-01	1.33e-03	2.26e-01	2.00e-01
PFNA	3.38e-03	6.18e-01	-9.06e-03	5.95e-01	4.26e-02	4.83e-02	6.83e-01	1.77e-03	1.32e-01	7.93e-01	-1.02e-01	6.23e-02	4.81e-01	2.09e-03	-4.63e-02	-5.13e-01	1.65e-03	2.34e-01	1.84e-01
PFDA	4.77e-03	4.80e-01	-9.98e-03	5.60e-01	4.25e-02	4.93e-02	6.81e-01	1.81e-03	1.51e-01	7.65e-01	-1.11e-01	4.16e-02	4.73e-01	2.48e-03	-2.55e-02	-4.90e-01	2.20e-03	2.30e-01	1.92e-01
PFDS	4.23e-03	5.25e-01	-8.30e-03	6.27e-01	4.26e-02	4.89e-02	6.87e-01	1.67e-03	1.74e-01	7.30e-01	-1.11e-01	4.02e-02	4.79e-01	2.16e-03	-4.25e-02	-5.12e-01	1.59e-03	2.21e-01	2.10e-01
PFUnA	3.66e-03	5.91e-01	-8.30e-03	6.29e-01	4.20e-02	5.15e-02	6.87e-01	1.67e-03	1.35e-01	7.89e-01	-1.08e-01	4.79e-02	4.72e-01	2.51e-03	-3.55e-02	-4.96e-01	2.16e-03	2.24e-01	2.03e-01
PFDaA	4.15e-03	5.44e-01	-8.56e-03	6.23e-01	4.20e-02	5.19e-02	6.86e-01	1.70e-03	1.46e-01	7.73e-01	-1.09e-01	4.47e-02	4.73e-01	2.44e-03	-3.47e-02	-5.01e-01	1.99e-03	2.27e-01	1.96e-01
PFTTrDA	4.00e-03	5.61e-01	-8.65e-03	6.17e-01	4.22e-02	5.08e-02	6.85e-01	1.72e-03	1.45e-01	7.74e-01	-1.11e-01	4.16e-02	4.71e-01	2.56e-03	-3.67e-02	-5.02e-01	1.96e-03	2.23e-01	2.06e-01
8:2 FTS	4.90e-03	4.61e-01	-8.40e-03	6.23e-01	4.06e-02	6.12e-02	6.80e-01	1.84e-03	1.53e-01	7.62e-01	-1.09e-01	4.62e-02	4.86e-01	1.90e-03	-4.05e-02	-5.26e-01	1.27e-03	2.15e-01	2.23e-01
4-OH-CB187	1.05e-03	8.79e-01	-7.05e-03	6.80e-01	4.41e-02	4.15e-02	6.68e-01	2.27e-03	9.10e-02	8.57e-01	-1.10e-01	4.30e-02	4.87e-01	1.88e-03	-6.16e-02	-5.23e-01	1.52e-03	2.25e-01	2.02e-01
3-OH-CB153	-2.90e-03	6.97e-01	-5.32e-03	7.57e-01	3.83e-02	7.81e-02	6.93e-01	1.54e-03	1.35e-01	7.89e-01	-1.01e-01	6.51e-02	4.97e-01	1.53e-03	-5.52e-02	-5.33e-01	1.13e-03	2.28e-01	1.96e-01
4-OH-CB107	7.22e-03	3.16e-01	-1.21e-02	4.82e-01	4.45e-02	4.07e-02	6.92e-01	1.57e-03	1.59e-01	7.52e-01	-1.15e-01	3.58e-02	4.68e-01	2.74e-03	-1.38e-02	-4.75e-01	2.79e-03	2.28e-01	1.95e-01

β , beta (regression coefficient)

Supplementary Table S33. Associations between single serum per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs), and the odds ratio of multiple sclerosis (MS) (n = 1,814). Odds ratios are calculated per doubling of substance serum concentrations, using logistic regression. Calculations based on the fully adjusted model where residential area is not taken into account. No adjustments were made for multiple comparisons.

Substance (ng/ml)	Males and Females		Males		Females	
	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
PFHxS	0.979 (0.910 - 1.053)	0.573	1.016 (0.930 - 1.109)	0.730	1.000 (0.915 - 1.094)	0.998
PFHpS	1.062 (0.988 - 1.143)	0.106	1.110 (1.014 - 1.219)	0.025	1.094 (0.998 - 1.203)	0.057
PFOA	1.067 (0.970 - 1.174)	0.183	1.133 (1.014 - 1.269)	0.029	1.110 (0.991 - 1.247)	0.074
PFOS	1.054 (0.979 - 1.136)	0.164	1.088 (0.994 - 1.195)	0.070	1.077 (0.983 - 1.183)	0.115
FOSA	1.070 (0.978 - 1.171)	0.141	1.090 (0.983 - 1.210)	0.104	1.088 (0.981 - 1.208)	0.112
N-MeFOSAA	1.048 (0.973 - 1.129)	0.220	1.052 (0.966 - 1.147)	0.244	1.050 (0.964 - 1.144)	0.266
N-EtFOSAA	1.039 (0.966 - 1.118)	0.306	1.051 (0.967 - 1.143)	0.241	1.049 (0.964 - 1.141)	0.267
PFNA	1.031 (0.948 - 1.121)	0.476	1.076 (0.975 - 1.190)	0.150	1.061 (0.961 - 1.175)	0.245
PFDA	0.991 (0.915 - 1.073)	0.820	1.013 (0.925 - 1.109)	0.786	1.006 (0.918 - 1.102)	0.900
PFDS	1.007 (0.944 - 1.075)	0.825	1.058 (0.983 - 1.139)	0.135	1.058 (0.983 - 1.140)	0.135
PFUnA	1.015 (0.946 - 1.090)	0.674	1.043 (0.959 - 1.135)	0.332	1.035 (0.952 - 1.128)	0.420
PFDoA	1.024 (0.933 - 1.125)	0.614	1.035 (0.929 - 1.153)	0.537	1.025 (0.920 - 1.143)	0.651
PFTrDA	1.008 (0.961 - 1.057)	0.746	1.016 (0.961 - 1.075)	0.570	1.015 (0.960 - 1.073)	0.606
8:2 FTS	1.026 (0.976 - 1.079)	0.310	1.038 (0.981 - 1.099)	0.198	1.035 (0.978 - 1.097)	0.233
4-OH-CB187	1.069 (1.010 - 1.132)	0.021	1.081 (1.012 - 1.155)	0.022	1.080 (1.011 - 1.155)	0.023
3-OH-CB153	1.061 (1.018 - 1.107)	0.005	1.064 (1.014 - 1.117)	0.012	1.060 (1.009 - 1.113)	0.020
4-OH-CB107	0.990 (0.940 - 1.042)	0.698	0.979 (0.922 - 1.039)	0.487	0.975 (0.918 - 1.035)	0.409

Model was adjusted for age, sex, BM at sample collection, BMI at the age of 20, number of childbirths, regular smoking, irregular smoking, history of infectious mononucleosis, sun exposure, and Swedish born. Sex was excluded as a covariate in the sex-specific models.
OR, odds ratio; *CI*, confidence interval

Supplementary Table S34. General and clinical characteristics for the 551 individuals included in the Cox proportional hazard analysis regards confirmed disability worsening (CDW).

Characteristic	RRMS	PMS
N (F/M)	375 (75.9%) / 119 (24.1%)	39 (68.4%) / 18 (31.6%)
Age: Mean $\pm$ SD, F / M	38.9 $\pm$ 10.3 / 37.3 $\pm$ 10.1	51.9 $\pm$ 8.7 / 48.9 $\pm$ 8.2
BMI at sample collection: Mean $\pm$ SD, F / M	25.1 $\pm$ 5.2 / 25.2 $\pm$ 4.3	25.4 $\pm$ 4.7 / 25.1 $\pm$ 2.8
BMI at age of 20: Mean $\pm$ SD, F / M	22.5 $\pm$ 4.1 / 23.4 $\pm$ 3.5	21.2 $\pm$ 4.1 / 23.0 $\pm$ 4.5
Disease duration		
Months: Mean $\pm$ SD, F / M	9.5 $\pm$ 20.5 / 9.3 $\pm$ 15.1	9.6 $\pm$ 11.5 / 10.0 $\pm$ 10.3
Number of hospital visits		
Mean $\pm$ SD, F / M	11.5 $\pm$ 5.6 / 12.3 $\pm$ 6.7	8.9 $\pm$ 4.7 / 8.9 $\pm$ 4.6
Median $\pm$ SD, F / M	11.0 $\pm$ 5.6 / 11.5 $\pm$ 6.7	8.0 $\pm$ 4.7 / 8.0 $\pm$ 4.6
Follow-up time (years)		
Mean $\pm$ SD, F / M	10.7 $\pm$ 3.5 / 10.2 $\pm$ 3.7	9.0 $\pm$ 4.1 / 9.0 $\pm$ 4.1
Median $\pm$ SD, F / M	10.9 $\pm$ 3.5 / 10.5 $\pm$ 3.7	9.7 $\pm$ 4.1 / 8.7 $\pm$ 4.1
EDSS		
Mean $\pm$ SD, F / M	1.5 $\pm$ 1.2 / 2.1 $\pm$ 1.6	3.8 $\pm$ 1.5 / 3.7 $\pm$ 1.6
Median $\pm$ SD, F / M	1.5 $\pm$ 1.2 / 2.0 $\pm$ 1.6	3.5 $\pm$ 1.5 / 3.5 $\pm$ 1.6
Treatment		
% undergoing treatment	8.3 %	15.8 %
Regular smoking		
% Yes / No / NA	23.8% / 68.5% / 7.7%	16.1% / 76.8% / 7.1%
Years: Mean $\pm$ SD, F / M	20.7 $\pm$ 9.4 / 20.3 $\pm$ 13.4	30 $\pm$ 7.8 / 32.5 $\pm$ 0.7
Irregular smoking		
% Yes / No / NA	4.1% / 95.9% / 0.0%	3.6% / 96.4% / 0.0%
Years: Mean $\pm$ SD, F / M	12.5 $\pm$ 11.6 / 9.7 $\pm$ 6.4	NA* / NA*
Passive smoking (indoors)		
% Yes / No / NA	3.1% / 89.0% / 7.9%	5.4% / 87.5% / 7.1%
Years: Mean $\pm$ SD, F / M	30.3 $\pm$ 12.8 / 26.3 $\pm$ 16.5	NA** / 24.3 $\pm$ 18.7
Swedish snuff		
% Yes / No / NA	8.1% / 78.5% / 13.4%	8.9% / 82.2% / 8.9%
Years: Mean $\pm$ SD, F / M	8.4 $\pm$ 6.9 / 11.7 $\pm$ 8.9	NA / 19.5 $\pm$ 19.8
Alcohol consumption***		
% Yes / No / NA	61.3% / 31.1% / 7.6%	64.3% / 28.6% / 7.1%
Volume (cl): Mean $\pm$ SD, F / M	0.9 $\pm$ 2.9 / 4.2 $\pm$ 9.6	0.6 $\pm$ 1.6 / 3.6 $\pm$ 5.7
Infectious mononucleosis		
% Yes / No / NA	22.2% / 69.6% / 8.3%	19.6% / 73.2% / 7.2%
Childbirths		
% Yes / Mean $\pm$ SD (number of childbirths)	59.9 % / 1.3 $\pm$ 1.2	71.8 % / 1.5 $\pm$ 1.3

* One female with PMS described that she smokes irregularly at the time of inclusion, however the duration was not specified. No males with PMS have smoked irregularly.

** Two females with PMS described that they had been exposed to passive smoking, however, the duration was not specified.

*** Alcohol consumption the week prior to sample collection has been recalculated into volume (cl) consumed 40% alcohol.

Supplementary Table S35. Cox proportional hazard analysis output from confirmed disability worsening analysis in males and females (n = 551). *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper	Sex (<i>P</i> value)
PFBS	0.102	0.978	-0.022	0.953	1.000	0.321
PFPeS	0.435	1.010	0.012	0.982	1.040	0.392
PFHpA	0.659	0.988	-0.012	0.938	1.040	0.367
PFHxS	0.433	0.960	-0.040	0.868	1.060	0.470
PFHpS	0.122	0.923	-0.080	0.834	1.020	0.586
PFOA	0.039	0.872	-0.137	0.766	0.993	0.389
PFOS	0.043	0.903	-0.102	0.818	0.997	0.555
FOSA	0.381	1.060	0.059	0.930	1.210	0.419
N-MeFOSAA	0.947	0.996	-0.004	0.898	1.110	0.398
N-EtFOSAA	0.858	0.991	-0.009	0.894	1.100	0.398
PFNA	0.137	0.909	-0.096	0.801	1.030	0.371
PFDA	0.044	0.896	-0.110	0.805	0.997	0.415
PFDS	0.927	1.000	0.005	0.912	1.110	0.395
PFUnA	0.120	0.922	-0.081	0.832	1.020	0.333
PFDoA	0.109	0.891	-0.115	0.774	1.030	0.301
PFTTrDA	0.909	1.000	0.004	0.934	1.080	0.404
8:2 FTS	0.883	0.995	-0.005	0.925	1.070	0.395
4-OH-CB187	0.405	0.966	-0.034	0.892	1.050	0.374
3-OH-CB153	0.477	0.980	-0.020	0.927	1.040	0.400
4-OH-CB107	0.187	0.951	-0.050	0.883	1.020	0.370

The model was adjusted for age, sex, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, and disease phenotype.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S36. Cox proportional hazard analysis output from confirmed disability worsening analysis in males (n = 137). *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.194	0.961	-0.040	0.904	1.020
PFPeS	0.866	0.995	-0.005	0.935	1.060
PFHpA	0.761	1.020	0.016	0.919	1.120
PFHxS	0.200	0.901	-0.104	0.768	1.060
PFHpS	2.23E-3	0.806	-0.215	0.702	0.926
PFOA	0.030	0.795	-0.229	0.647	0.977
PFOS	5.08E-4	0.772	-0.259	0.667	0.893
FOSA	0.872	0.975	-0.025	0.721	1.320
N-MeFOSAA	0.833	1.020	0.022	0.832	1.260
N-EtFOSAA	0.547	0.928	-0.074	0.729	1.180
PFNA	4.33E-4	0.747	-0.292	0.635	0.879
PFDA	0.178	0.880	-0.128	0.731	1.060
PFDS	0.317	0.889	-0.118	0.705	1.120
PFUnA	0.140	0.889	-0.118	0.760	1.040
PFDoA	0.336	0.883	-0.125	0.685	1.140
PFTTrDA	0.413	0.941	-0.061	0.813	1.090
8:2 FTS	0.428	1.070	0.063	0.911	1.250
4-OH-CB187	0.144	0.904	-0.101	0.790	1.030
3-OH-CB153	0.055	1.110	0.108	0.998	1.240
4-OH-CB107	0.914	1.010	0.008	0.868	1.170

The model was adjusted for age, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), and disease phenotype.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S37. Cox proportional hazard analysis output from confirmed disability worsening analysis in females (n = 414). *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.096	0.976	-0.025	0.948	1.000
PFPeS	0.247	1.020	0.020	0.986	1.060
PFHpA	0.443	0.977	-0.024	0.920	1.040
PFHxS	0.979	1.000	0.002	0.881	1.140
PFHpS	0.584	0.962	-0.039	0.837	1.110
PFOA	0.166	0.892	-0.115	0.758	1.050
PFOS	0.324	0.940	-0.062	0.832	1.060
FOSA	0.275	1.090	0.082	0.937	1.260
N-MeFOSAA	0.725	1.020	0.022	0.905	1.150
N-EtFOSAA	0.762	1.020	0.018	0.908	1.140
PFNA	0.812	0.980	-0.020	0.829	1.160
PFDA	0.118	0.905	-0.100	0.798	1.030
PFDS	0.393	1.050	0.047	0.941	1.170
PFUnA	0.173	0.916	-0.088	0.807	1.040
PFDoA	0.088	0.864	-0.146	0.730	1.020
PFTTrDA	0.567	1.020	0.024	0.943	1.110
8:2 FTS	0.625	0.980	-0.021	0.902	1.060
4-OH-CB187	0.346	0.955	-0.046	0.868	1.050
3-OH-CB153	0.246	0.963	-0.038	0.904	1.030
4-OH-CB107	0.040	0.914	-0.090	0.838	0.996

The model was adjusted for age, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, and disease phenotype.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S38. Cox proportional hazard analysis output from confirmed disability worsening analysis in males and females (n = 551), adjusting for treatment during the follow-up time. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper	Sex (<i>P</i> value)
PFBS	0.205	0.983	-0.017	0.958	1.010	0.547
PFPeS	0.095	1.030	0.026	0.996	1.060	0.676
PFHpA	0.842	0.995	-0.005	0.943	1.050	0.626
PFHxS	0.160	0.929	-0.074	0.837	1.030	0.796
PFHpS	0.071	0.910	-0.094	0.821	1.010	0.873
PFOA	0.035	0.867	-0.142	0.760	0.990	0.555
PFOS	0.053	0.906	-0.099	0.820	1.000	0.812
FOSA	0.691	1.030	0.027	0.898	1.180	0.669
N-MeFOSAA	0.592	0.971	-0.029	0.873	1.080	0.638
N-EtFOSAA	0.488	0.963	-0.037	0.867	1.070	0.638
PFNA	0.098	0.893	-0.113	0.782	1.020	0.581
PFDA	0.015	0.872	-0.137	0.781	0.974	0.632
PFDS	0.610	1.030	0.025	0.931	1.130	0.635
PFUnA	0.140	0.923	-0.080	0.830	1.030	0.549
PFDoA	0.225	0.913	-0.091	0.789	1.060	0.529
PFTTrDA	0.949	1.000	0.002	0.931	1.080	0.655
8:2 FTS	0.708	0.986	-0.014	0.917	1.060	0.633
4-OH-CB187	0.216	0.950	-0.051	0.876	1.030	0.599
3-OH-CB153	0.241	0.967	-0.034	0.913	1.020	0.634
4-OH-CB107	0.081	0.935	-0.067	0.867	1.010	0.556

The model was adjusted for age, sex, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, disease phenotype, and treatment during follow-up time.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S39. Cox proportional hazard analysis output from confirmed disability worsening analysis in males (n = 137), adjusting for treatment during the follow-up time. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.156	0.957	-0.044	0.900	1.020
PFPeS	0.647	1.010	0.014	0.955	1.080
PFHpA	0.281	1.060	0.054	0.957	1.160
PFHxS	0.205	0.903	-0.102	0.772	1.060
PFHpS	5.92e-03	0.824	-0.194	0.718	0.946
PFOA	0.092	0.834	-0.181	0.676	1.030
PFOS	2.23e-03	0.794	-0.231	0.685	0.921
FOSA	0.889	1.020	0.022	0.755	1.380
N-MeFOSAA	0.647	1.050	0.047	0.859	1.280
N-EtFOSAA	0.563	0.932	-0.071	0.733	1.180
PFNA	9.45e-04	0.760	-0.274	0.646	0.894
PFDA	0.240	0.893	-0.113	0.739	1.080
PFDS	0.471	0.919	-0.085	0.729	1.160
PFUnA	0.247	0.910	-0.094	0.776	1.070
PFDoA	0.779	0.963	-0.038	0.741	1.250
PFTTrDA	0.778	0.979	-0.022	0.843	1.140
8:2 FTS	0.319	1.080	0.081	0.925	1.270
4-OH-CB187	0.091	0.889	-0.118	0.775	1.020
3-OH-CB153	0.027	1.130	0.124	1.010	1.260
4-OH-CB107	0.672	1.030	0.032	0.891	1.200

The model was adjusted for age, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), disease phenotype, and treatment during follow-up time.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S40. Cox proportional hazard analysis output from confirmed disability worsening analysis in females (n = 414), adjusting for treatment during the follow-up time. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.181	0.980	-0.020	0.952	1.010
PFPeS	0.080	1.030	0.031	0.996	1.070
PFHpA	0.261	0.965	-0.035	0.908	1.030
PFHxS	0.293	0.930	-0.073	0.811	1.060
PFHpS	0.147	0.901	-0.104	0.783	1.040
PFOA	0.019	0.820	-0.199	0.695	0.967
PFOS	0.258	0.931	-0.071	0.824	1.050
FOSA	0.761	1.020	0.024	0.880	1.190
N-MeFOSAA	0.491	0.955	-0.046	0.838	1.090
N-EtFOSAA	0.590	0.968	-0.033	0.859	1.090
PFNA	0.309	0.911	-0.093	0.762	1.090
PFDA	0.019	0.855	-0.157	0.750	0.975
PFDS	0.287	1.060	0.059	0.951	1.180
PFUnA	0.111	0.901	-0.105	0.792	1.020
PFDnA	0.074	0.855	-0.157	0.720	1.020
PFTTrDA	0.868	1.010	0.0072	0.925	1.100
8:2 FTS	0.301	0.956	-0.045	0.879	1.040
4-OH-CB187	0.092	0.921	-0.082	0.837	1.010
3-OH-CB153	0.050	0.936	-0.066	0.876	1.000
4-OH-CB107	0.003	0.871	-0.139	0.796	0.953

The model was adjusted for age, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, disease phenotype, and treatment during follow-up time.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S41. Cox proportional hazard analysis for serum albumin concentrations association with confirmed disability worsening. Analysis were performed in males and females together (n = 551), as well as separately (males n = 137, females n = 414). *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI).

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
Males and Females	0.371	1.350	0.297	0.702	2.580
Males	0.413	1.920	0.651	0.404	9.120
Females	0.621	1.200	0.181	0.584	2.460

The model was adjusted for age, sex, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, and disease phenotype. Sex was excluded for the sex-specific models. In the male model, the number of childbirths was also excluded as a covariate.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S42. Cox proportional hazard analysis output from confirmed disability worsening analysis in males and females (n = 551), adjusting for serum albumin concentrations. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper	Sex (<i>P</i> value)
PFBS	0.073	0.976	-0.024	0.951	1.000	0.248
PFPeS	0.429	1.010	0.012	0.983	1.040	0.335
PFHpA	0.640	0.988	-0.012	0.938	1.040	0.310
PFHxS	0.418	0.959	-0.042	0.868	1.060	0.403
PFHpS	0.118	0.923	-0.080	0.835	1.020	0.508
PFOA	0.041	0.874	-0.135	0.768	0.994	0.333
PFOS	0.043	0.903	-0.101	0.819	0.997	0.482
FOSA	0.384	1.060	0.058	0.930	1.210	0.358
N-MeFOSAA	0.957	0.997	-0.003	0.900	1.110	0.338
N-EtFOSAA	0.851	0.990	-0.010	0.894	1.100	0.339
PFNA	0.143	0.911	-0.094	0.803	1.030	0.317
PFDA	0.047	0.897	-0.108	0.807	0.999	0.356
PFDS	0.867	1.010	0.008	0.916	1.110	0.333
PFUnA	0.125	0.923	-0.080	0.833	1.020	0.280
PFDoA	0.125	0.896	-0.110	0.778	1.030	0.262
PFTrDA	0.906	1.000	0.004	0.934	1.080	0.345
8:2 FTS	0.999	1.000	3.03e-05	0.93	1.080	0.338
4-OH-CB187	0.405	0.967	-0.034	0.892	1.050	0.317
3-OH-CB153	0.452	0.979	-0.021	0.926	1.030	0.337
4-OH-CB107	0.144	0.946	-0.056	0.878	1.020	0.298

The model was adjusted for age, sex, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, disease phenotype, and serum albumin concentrations.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S43. Cox proportional hazard analysis output from confirmed disability worsening analysis in males (n = 137), adjusting for serum albumin concentrations. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.151	0.957	-0.044	0.901	1.020
PFPeS	0.825	0.993	-0.007	0.934	1.060
PFHpA	0.834	1.010	0.011	0.915	1.120
PFHxS	0.219	0.905	-0.100	0.771	1.060
PFHpS	3.01e-03	0.812	-0.209	0.707	0.932
PFOA	0.0362	0.803	-0.220	0.654	0.986
PFOS	6.67e-04	0.776	-0.254	0.670	0.898
FOSA	0.830	0.968	-0.033	0.717	1.310
N-MeFOSAA	0.785	1.030	0.029	0.836	1.270
N-EtFOSAA	0.598	0.937	-0.065	0.737	1.190
PFNA	6.04e-04	0.752	-0.285	0.639	0.885
PFDA	0.191	0.883	-0.124	0.733	1.060
PFDS	0.368	0.899	-0.107	0.713	1.130
PFUnA	0.182	0.899	-0.106	0.770	1.050
PFDoA	0.377	0.893	-0.113	0.694	1.150
PFTTrDA	0.486	0.950	-0.052	0.821	1.100
8:2 FTS	0.294	1.090	0.083	0.930	1.270
4-OH-CB187	0.198	0.915	-0.089	0.800	1.050
3-OH-CB153	0.035	1.130	0.120	1.010	1.260
4-OH-CB107	0.910	1.010	0.009	0.868	1.170

The model was adjusted for age, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), disease phenotype, and serum albumin concentrations.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S44. Cox proportional hazard analysis output from confirmed disability worsening analysis in females (n = 414), adjusting for serum albumin concentrations. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.084	0.975	-0.026	0.947	1.000
PFPeS	0.249	1.020	0.020	0.986	1.060
PFHpA	0.448	0.977	-0.023	0.920	1.040
PFHxS	0.999	1.000	8.82e-05	0.879	1.140
PFHpS	0.560	0.960	-0.041	0.836	1.100
PFOA	0.164	0.892	-0.115	0.759	1.050
PFOS	0.315	0.939	-0.063	0.831	1.060
FOSA	0.275	1.090	0.082	0.937	1.260
N-MeFOSAA	0.738	1.020	0.021	0.904	1.150
N-EtFOSAA	0.777	1.020	0.017	0.907	1.140
PFNA	0.816	0.980	-0.020	0.829	1.160
PFDA	0.121	0.905	-0.100	0.798	1.030
PFDS	0.384	1.050	0.048	0.942	1.170
PFUnA	0.170	0.915	-0.089	0.806	1.040
PFDaA	0.095	0.866	-0.143	0.732	1.030
PFTTrDA	0.576	1.020	0.024	0.942	1.110
8:2 FTS	0.672	0.982	-0.018	0.903	1.070
4-OH-CB187	0.354	0.956	-0.045	0.868	1.050
3-OH-CB153	0.219	0.961	-0.040	0.901	1.020
4-OH-CB107	0.032	0.910	-0.095	0.834	0.992

The model was adjusted for age, time difference between diagnosis and sample time point, EDSS at time of sample collection, current BMI, undergoing treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoors), number of childbirths, disease phenotype, and serum albumin concentrations.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S45. Cox proportional hazard analysis output from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) transition analysis (n = 801). *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.808	0.995	-0.005	0.959	1.030
PFPeS	0.753	1.010	0.008	0.961	1.060
PFHpA	0.234	0.958	-0.043	0.893	1.030
PFHxS	0.683	1.030	0.034	0.879	1.220
PFHpS	0.222	1.120	0.115	0.933	1.350
PFOA	0.938	0.992	-0.009	0.800	1.230
PFOS	0.331	1.090	0.090	0.913	1.310
FOSA	0.300	0.905	-0.100	0.749	1.090
N-MeFOSAA	0.789	1.020	0.021	0.874	1.190
N-EtFOSAA	0.697	1.030	0.030	0.886	1.200
PFNA	0.610	0.951	-0.050	0.785	1.150
PFDA	0.712	0.967	-0.033	0.810	1.150
PFDS	0.515	0.951	-0.051	0.817	1.110
PFUnA	0.364	0.930	-0.073	0.795	1.090
PFDoA	0.051	0.813	-0.207	0.660	1.000
PFTTrDA	0.972	0.998	-0.002	0.899	1.110
8:2 FTS	0.622	1.030	0.027	0.923	1.140
4-OH-CB187	0.369	1.070	0.069	0.922	1.240
3-OH-CB153	0.523	0.975	-0.026	0.900	1.050
4-OH-CB107	0.850	0.990	-0.010	0.893	1.100

The model was adjusted for age, sex, time difference between diagnosis and sample time point, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of indoor passive smoking, and number of childbirths.
 β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S46. Cox proportional hazard analysis output from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) transition analysis (n = 801), adjusting for treatment during the follow-up time. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.625	1.010	0.009	0.972	1.050
PFPeS	0.588	1.010	0.013	0.967	1.060
PFHpA	0.319	0.963	-0.038	0.893	1.040
PFHxS	0.651	0.964	-0.037	0.820	1.130
PFHpS	0.384	1.090	0.082	0.903	1.300
PFOA	0.775	0.969	-0.032	0.780	1.200
PFOS	0.426	1.080	0.076	0.895	1.300
FOSA	0.475	0.929	-0.073	0.760	1.140
N-MeFOSAA	0.381	1.070	0.072	0.915	1.260
N-EtFOSAA	0.525	1.050	0.052	0.898	1.230
PFNA	0.536	0.937	-0.065	0.762	1.150
PFDA	0.704	0.965	-0.036	0.803	1.160
PFDS	0.435	0.939	-0.063	0.801	1.100
PFUnA	0.440	0.938	-0.065	0.796	1.100
PFDnA	0.092	0.818	-0.201	0.647	1.030
PFTTrDA	0.944	1.000	0.004	0.898	1.120
8:2 FTS	0.432	1.040	0.043	0.937	1.160
4-OH-CB187	0.270	1.090	0.089	0.933	1.280
3-OH-CB153	0.792	0.990	-0.010	0.916	1.070
4-OH-CB107	0.989	0.999	-7.49e-04	0.901	1.110

The model was adjusted for age, sex, time difference between diagnosis and sample time point, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of indoor passive smoking, number of childbirths, and treatment during the follow-up time.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S47. Cox proportional hazard analysis output from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) transition analysis (n = 801), adjusting for serum albumin concentrations. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound. No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.956	0.999	-0.001	0.962	1.040
PFPeS	0.722	1.010	0.009	0.962	1.060
PFHpA	0.217	0.956	-0.045	0.890	1.030
PFHxS	0.661	1.040	0.037	0.881	1.220
PFHpS	0.188	1.130	0.125	0.941	1.370
PFOA	0.987	0.998	-0.002	0.803	1.240
PFOS	0.285	1.100	0.099	0.921	1.320
FOSA	0.292	0.903	-0.102	0.746	1.090
N-MeFOSAA	0.768	1.020	0.024	0.875	1.200
N-EtFOSAA	0.630	1.040	0.037	0.892	1.210
PFNA	0.635	0.954	-0.047	0.786	1.160
PFDA	0.723	0.968	-0.032	0.811	1.160
PFDS	0.484	0.947	-0.054	0.814	1.100
PFUnA	0.365	0.930	-0.072	0.796	1.090
PFDnA	0.048	0.809	-0.212	0.655	0.999
PFTTrDA	0.970	0.998	-0.002	0.900	1.110
8:2 FTS	0.723	1.020	0.020	0.916	1.140
4-OH-CB187	0.381	1.070	0.068	0.919	1.250
3-OH-CB153	0.607	0.979	-0.021	0.905	1.060
4-OH-CB107	0.904	0.994	-0.006	0.895	1.100

The model was adjusted for age, sex, time difference between diagnosis and sample time point, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of indoor passive smoking, number of childbirths, and serum albumin concentrations.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S48. Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) two-tailed Spearman rank correlation test with 25(OH)D3.
P values and correlation coefficients (r) for each correlation.

	Males and females		Males and females				Females				Males			
	HC and MS		HC		MS		HC		MS		HC		MS	
	<i>P</i> value	r	<i>P</i> value	r	<i>P</i> value	r	<i>P</i> value	r	<i>P</i> value	r	<i>P</i> value	r	<i>P</i> value	r
PFBS	0.005	-0.070	0.079	-0.062	0.029	-0.078	0.244	-0.047	0.016	-0.099	0.074	-0.127	0.073	-0.126
PFPeS	1.36e-21	-0.235	1.60e-14	-0.265	3.20e-09	-0.209	5.40e-12	-0.273	9.25e-11	-0.263	8.98e-05	-0.274	0.144	-0.103
PFHpA	3.85e-05	0.103	5.41e-04	0.121	0.026	0.079	2.10e-04	0.149	0.030	0.090	0.450	0.054	0.749	0.023
PFHxS	0.231	-0.030	0.578	-0.020	0.281	-0.038	0.799	0.010	0.970	0.002	0.499	0.048	0.624	0.035
PFHpS	0.537	-0.015	0.748	-0.011	0.683	-0.015	0.398	0.0341	0.300	0.043	0.554	0.042	0.226	0.085
PFOA	0.029	0.055	0.046	0.070	0.211	0.045	0.010	0.104	0.120	0.064	0.336	0.069	0.385	0.061
PFOS	0.021	-0.058	0.076	-0.062	0.183	-0.047	0.262	-0.045	0.574	-0.023	0.534	-0.044	0.952	-0.004
FOSA	0.771	0.007	0.999	-3.22e-05	0.654	0.016	0.801	-0.010	0.364	0.038	0.491	0.049	0.910	-0.008
N-MeFOSAA	0.370	0.022	0.665	0.015	0.357	0.033	0.959	-0.002	0.575	0.023	0.271	0.079	0.425	0.056
N-EtFOSAA	0.008	-0.066	0.016	-0.085	0.180	-0.048	0.007	-0.109	0.224	-0.050	0.634	-0.034	1.88e-01	-0.093
PFNA	1.09e-08	0.142	2.51e-05	0.147	8.28e-05	0.139	4.09e-05	0.165	1.85e-04	0.154	0.044	0.143	0.231	0.085
PFDA	4.35e-04	0.088	0.071	0.063	0.001	0.116	0.158	0.057	0.004	0.119	0.098	0.118	0.088	0.120
PFDS	0.775	-0.007	0.808	-0.009	0.877	-0.006	0.581	-0.022	0.029	-0.090	0.823	-0.016	0.018	-0.095
PFUnA	0.011	0.063	0.582	0.019	0.002	0.110	0.483	0.028	0.008	0.110	0.616	0.036	0.448	0.054
PFDoA	4.86e-04	0.087	0.237	0.042	1.50e-04	0.134	0.323	0.040	0.007	0.112	0.511	0.047	0.004	0.199
PFTrDA	0.261	-0.028	0.106	-0.057	0.995	-2.11e-04	0.083	-0.070	0.980	-0.001	0.745	-0.023	0.592	-0.038
8:2 FTS	8.55e-11	-0.161	1.76e-06	-0.167	1.71e-05	-0.152	3.75e-05	-0.165	4.86e-04	-0.143	0.029	-0.155	1.87e-04	-0.259
4-OH-CB187	2.85e-08	-0.138	0.001	-0.112	8.40e-06	-0.158	0.005	-0.113	5.34e-06	-0.186	0.709	-0.027	0.026	-0.157
3-OH-CB153	0.382	-0.022	0.683	0.014	0.015	-0.051	0.348	0.038	0.484	-0.029	0.077	0.126	0.348	0.066
4-OH-CB107	8.43e-07	-0.123	5.46e-04	-0.121	4.09e-04	-0.125	0.002	-0.124	0.003	-0.120	0.922	0.007	0.335	-0.068

Supplementary Table S49. Cox proportional hazard analysis for 25(OH)D3 serum levels association with confirmed disability worsening. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI). Analysis were performed in males and females together (*n* = 551), as well as separately (males *n* = 137, females *n* = 414).

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
Males and Females	0.040	0.880	-0.128	0.779	0.994
Males	0.878	0.979	-0.021	0.747	1.280
Females	0.045	0.873	-0.135	0.765	0.997

The model was adjusted for age, sex, the time difference between diagnosis and sample time point, EDSS at the time of sample collection, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoor), number of childbirths, and the month blood samples were collected. Sex was excluded for the sex-specific models. In the male model, the number of childbirths was also excluded as a covariate.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S50. Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening adjusting for 25(OH)D3 levels (*n* = 551). Analysis based on the entire group. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI). No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.039	0.971	-0.030	0.944	0.999
PFPeS	0.859	1.003	0.003	0.971	1.036
PFHpA	0.679	0.988	-0.012	0.935	1.045
PFHxS	0.350	0.947	-0.055	0.845	1.062
PFHpS	0.128	0.918	-0.086	0.822	1.025
PFOA	0.022	0.848	-0.165	0.736	0.976
PFOS	0.024	0.881	-0.127	0.789	0.983
FOSA	0.794	1.019	0.019	0.883	1.177
N-MeFOSAA	0.851	0.989	-0.011	0.883	1.108
N-EtFOSAA	0.829	0.988	-0.012	0.883	1.105
PFNA	0.047	0.864	-0.146	0.748	0.998
PFDA	0.041	0.886	-0.121	0.789	0.995
PFDS	0.625	0.973	-0.027	0.873	1.085
PFUnA	0.077	0.908	-0.096	0.817	1.010
PFDoA	0.023	0.847	-0.166	0.734	0.977
PFTTrDA	0.419	0.968	-0.032	0.895	1.047
8:2 FTS	0.579	0.979	-0.022	0.906	1.056
4-OH-CB187	0.605	0.977	-0.023	0.894	1.068
3-OH-CB153	0.330	0.970	-0.030	0.913	1.031
4-OH-CB107	0.093	0.934	-0.068	0.863	1.011

The model was adjusted for age, sex, the time difference between diagnosis and sample time point, EDSS at the time of sample collection, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoor), number of childbirths, the month blood samples were collected, and 25(OH)D3 levels.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S51. Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening in males (n = 137), adjusting for 25(OH)D3 levels. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI). No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.130	0.951	-0.050	0.892	1.015
PFPeS	0.612	0.983	-0.018	0.918	1.052
PFHpA	0.324	0.949	-0.053	0.855	1.053
PFHxS	0.160	0.879	-0.129	0.734	1.052
PFHpS	0.012	0.832	-0.183	0.721	0.961
PFOA	0.014	0.777	-0.252	0.635	0.951
PFOS	0.024	0.832	-0.184	0.709	0.976
FOSA	0.918	0.983	-0.017	0.710	1.360
N-MeFOSAA	0.848	1.021	0.021	0.823	1.267
N-EtFOSAA	0.934	1.011	0.011	0.777	1.317
PFNA	0.019	0.811	-0.210	0.680	0.967
PFDA	0.215	0.879	-0.128	0.718	1.077
PFDS	0.091	0.817	-0.202	0.646	1.033
PFUnA	0.089	0.876	-0.132	0.752	1.021
PFDnA	0.257	0.869	-0.140	0.682	1.107
PFTTrDA	0.158	0.896	-0.110	0.769	1.043
8:2 FTS	0.711	1.031	0.031	0.875	1.215
4-OH-CB187	0.724	0.973	-0.027	0.838	1.131
3-OH-CB153	0.036	1.142	0.132	1.009	1.292
4-OH-CB107	0.774	0.975	-0.025	0.823	1.156

The model was adjusted for age, the time difference between diagnosis and sample time point, EDSS at the time of sample collection, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoor), the month blood samples were collected, and 25(OH)D3 levels.

β , beta; *HR*, hazard ratio; *CI*, confidence interval

Supplementary Table S52. Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening in females (n = 414), adjusting for 25(OH)D3 levels. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI). No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.050	0.969	-0.031	0.939	1.000
PFPeS	0.702	1.007	0.007	0.970	1.046
PFHpA	0.759	0.990	-0.010	0.929	1.056
PFHxS	0.867	0.988	-0.012	0.859	1.136
PFHpS	0.635	0.964	-0.037	0.827	1.123
PFOA	0.113	0.867	-0.143	0.726	1.035
PFOS	0.101	0.892	-0.114	0.779	1.022
FOSA	0.715	1.030	0.030	0.878	1.208
N-MeFOSAA	0.839	1.014	0.014	0.885	1.162
N-EtFOSAA	0.977	1.002	0.002	0.884	1.135
PFNA	0.225	0.884	-0.124	0.724	1.079
PFDA	0.127	0.901	-0.104	0.789	1.030
PFDS	0.893	1.009	0.009	0.891	1.142
PFUnA	0.162	0.911	-0.093	0.799	1.038
PFDnA	0.014	0.811	-0.210	0.685	0.959
PFTTrDA	0.728	0.984	-0.016	0.900	1.076
8:2 FTS	0.467	0.968	-0.032	0.887	1.056
4-OH-CB187	0.466	0.961	-0.040	0.864	1.070
3-OH-CB153	0.137	0.949	-0.052	0.887	1.017
4-OH-CB107	0.010	0.887	-0.120	0.810	0.972

The model was adjusted for age, the time difference between diagnosis and sample time point, EDSS at the time of sample collection, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoor), number of childbirths, the month blood samples were collected, and 25(OH)D3 levels.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S53. Cox proportional hazard analysis for 25(OH)D3 serum levels association with the transition from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) (n = 801). *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI).

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
Males and Females	0.221	0.898	-0.107	0.757	1.070

The model was adjusted for age, sex, the time difference between diagnosis and sample time point, EDSS at the time of sample collection, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoor), number of childbirths, and the month blood samples were collected.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S54. Cox proportional hazard analysis for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with the transition from relapsing-remitting multiple sclerosis (RRMS) to secondary-progressive multiple sclerosis (SPMS) (n = 801), adjusting for 25(OH)D3 levels. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI). No adjustments were made for multiple comparisons.

	<i>P</i> value	HR	β	HR CI (95%) lower	HR CI (95%) upper
PFBS	0.327	0.979	-0.021	0.939	1.021
PFPeS	0.761	1.008	0.008	0.957	1.061
PFHpA	0.212	0.951	-0.050	0.879	1.029
PFHxS	0.547	1.057	0.055	0.883	1.266
PFHpS	0.143	1.175	0.161	0.947	1.458
PFOA	0.762	1.038	0.037	0.816	1.320
PFOS	0.366	1.097	0.093	0.897	1.341
FOSA	0.882	0.984	-0.016	0.800	1.211
N-MeFOSAA	0.733	1.030	0.029	0.870	1.219
N-EtFOSAA	0.559	1.050	0.049	0.891	1.237
PFNA	0.88	1.018	0.018	0.810	1.279
PFDA	0.533	1.068	0.066	0.868	1.314
PFDS	0.409	0.933	-0.069	0.791	1.100
PFUnA	0.464	0.939	-0.063	0.793	1.111
PFDoA	0.076	0.817	-0.202	0.654	1.022
PFTTrDA	0.784	1.017	0.017	0.903	1.145
8:2 FTS	0.724	0.980	-0.020	0.874	1.098
4-OH-CB187	0.356	1.086	0.083	0.912	1.294
3-OH-CB153	0.826	1.010	0.010	0.926	1.101
4-OH-CB107	0.822	1.013	0.013	0.906	1.133

The model was adjusted for age, sex, the time difference between diagnosis and sample time point, EDSS at the time of sample collection, current BMI, treatment at sample collection, years of regular smoking, years of irregular smoking, years of passive smoking (indoor), number of childbirths, the month blood samples were collected, and 25(OH)D3 levels.

β , beta; HR, hazard ratio; CI, confidence interval

Supplementary Table S55. *P* values for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) correlations. Two-tailed Spearman's rank correlation test analysis on controls and persons with MS.

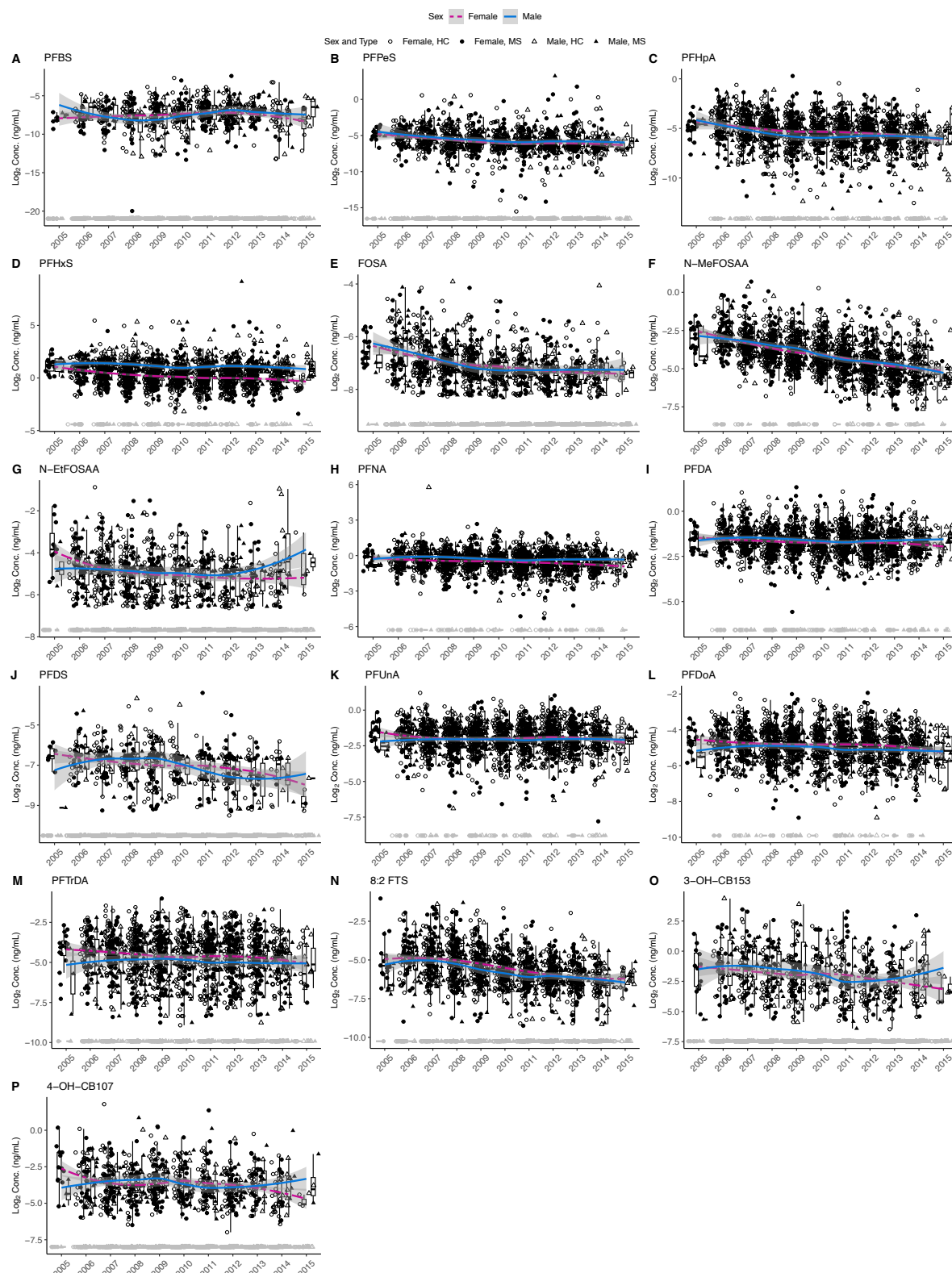
	PFBS	PFPeS	PFHpA	PFHxS	PFHpS	PFOA	PFOS	FOSA	N-MeFOSA A	N-EtFOSA A	PFNA	PFDA	PFDS	PFUnA	PFDoA	PFTTrDA	8:2 FTS	4-OH- CB187	3-OH- CB153	4-OH- CB107
PFBS	-	1.21e-10	6.94e-10	4.81e-02	5.21e-01	1.09e-01	9.79e-01	2.00e-02	9.48e-01	5.24e-03	2.74e-01	2.33e-01	7.11e-02	2.47e-01	2.76e-01	3.83e-03	5.91e-01	3.63e-01	7.40e-06	5.67e-03
PFPeS	1.21e-10	-	4.40e-82	5.61e-91	6.63e-26	4.35e-56	1.77e-26	1.38e-03	2.68e-07	1.47e-04	1.15e-29	3.94e-22	2.76e-06	7.42e-18	5.38e-17	4.44e-16	1.59e-05	4.65e-10	4.15e-03	6.99e-09
PFHpA	6.94e-10	4.40e-82	-	1.36e-35	2.67e-23	3.82e-110	1.08e-33	3.42e-21	2.22e-16	9.42e-12	1.98e-58	9.71e-53	5.05e-04	1.54e-34	5.72e-42	2.24e-26	4.58e-18	2.00e-15	2.03e-06	2.01e-11
PFHxS	4.81e-02	5.61e-91	1.36e-35	-	0.00	3.69e-201	1.11e-235	4.54e-36	3.90e-30	7.59e-14	8.36e-122	7.86e-127	8.93e-07	6.71e-66	4.67e-42	6.06e-32	8.88e-15	2.01e-64	6.21e-18	3.82e-27
PFHpS	5.21e-01	6.63e-26	2.67e-23	0.00	-	6.66e-272	0.00	3.19e-46	1.75e-57	1.87e-21	3.30e-159	5.67e-129	1.08e-06	3.13e-59	7.04e-46	4.12e-26	9.08e-18	8.41e-92	2.98e-23	1.48e-29
PFOA	1.09e-01	4.35e-56	3.82e-110	3.69e-201	6.66e-272	-	3.09e-249	1.45e-42	3.65e-57	9.24e-32	1.04e-242	3.97e-180	3.23e-04	1.10e-81	2.91e-77	3.72e-49	1.81e-36	5.58e-84	2.28e-27	1.62e-38
PFOS	9.79e-01	1.77e-26	1.08e-33	1.11e-235	0.00	3.09e-249	-	2.65e-78	4.31e-91	1.84e-34	2.09e-281	4.51e-275	2.22e-16	7.43e-192	2.82e-154	4.60e-120	1.20e-35	9.55e-131	9.21e-44	6.76e-60
FOSA	2.00e-02	1.38e-03	3.42e-21	4.54e-36	3.19e-46	1.45e-42	2.65e-78	-	8.38e-101	1.43e-55	6.60e-42	3.37e-72	2.89e-09	2.80e-67	1.78e-64	7.14e-54	3.82e-31	6.26e-41	1.28e-32	1.67e-31
N-MeFOSA	9.48e-01	2.68e-07	2.22e-16	3.90e-30	1.75e-57	3.65e-57	4.31e-91	8.38e-101	-	2.06e-75	1.18e-42	2.36e-37	6.11e-11	1.01e-22	3.36e-29	8.55e-24	6.32e-40	3.76e-56	2.91e-19	1.59e-30
N-EtFOSA	5.24e-03	1.47e-04	9.42e-12	7.59e-14	1.87e-21	9.24e-32	1.84e-34	1.43e-55	2.06e-75	-	1.45e-13	1.23e-17	3.73e-07	3.38e-10	3.40e-10	3.26e-09	6.92e-27	2.22e-16	1.36e-08	1.03e-16
PFNA	2.74e-01	1.15e-29	1.98e-58	8.36e-122	3.30e-159	1.04e-242	2.09e-281	6.60e-42	1.18e-42	1.45e-13	-	0.00	5.14e-09	1.62e-235	1.86e-220	6.26e-151	7.64e-20	4.49e-99	2.94e-31	4.18e-52
PFDA	2.33e-01	3.94e-22	9.71e-53	7.86e-127	5.67e-129	3.97e-180	4.51e-275	3.37e-72	2.36e-37	1.23e-17	0.00	-	3.02e-19	0.00	0.00	2.84e-213	2.12e-49	3.08e-72	2.40e-31	1.76e-49
PFDS	7.11e-02	2.76e-06	5.05e-04	8.93e-07	1.08e-06	3.23e-04	2.22e-16	2.89e-09	6.11e-11	3.73e-07	5.14e-09	3.02e-19	-	1.91e-25	2.61e-36	1.32e-22	1.45e-06	2.05e-02	2.63e-01	5.10e-06
PFUnA	2.47e-01	7.42e-18	1.54e-34	6.71e-66	3.13e-59	1.10e-81	7.43e-192	2.80e-67	1.01e-22	3.38e-10	1.62e-235	0.00	1.91e-25	-	0.00	0.00	8.48e-25	5.73e-68	2.88e-45	2.34e-59
PFDoA	2.76e-01	5.38e-17	5.72e-42	4.67e-42	7.04e-46	2.91e-77	2.82e-154	1.78e-64	3.36e-29	3.40e-10	1.86e-220	0.00	2.61e-36	0.00	-	0.00	1.46e-29	5.85e-53	1.86e-29	8.74e-45
PFTTrDA	3.83e-03	4.44e-16	2.24e-26	6.06e-32	4.12e-26	3.72e-49	4.60e-120	7.14e-54	8.55e-24	3.26e-09	6.26e-151	2.84e-213	1.32e-22	0.00	0.00	-	1.29e-19	1.18e-58	5.34e-41	6.30e-52
8:2 FTS	5.91e-01	1.59e-05	4.58e-18	8.88e-15	9.08e-18	1.81e-36	1.20e-35	3.82e-31	6.32e-40	6.92e-27	7.64e-20	2.12e-49	1.45e-06	8.48e-25	1.46e-29	1.29e-19	-	4.31e-14	1.29e-06	6.33e-08
4-OH-CB187	3.63e-01	4.65e-10	2.00e-15	2.01e-64	8.41e-92	5.58e-84	9.55e-131	6.26e-41	3.76e-56	2.22e-16	4.49e-99	3.08e-72	2.05e-02	5.73e-68	5.85e-53	1.18e-58	4.31e-14	-	1.85e-128	2.93e-97
3-OH-CB153	7.40e-06	4.15e-03	2.03e-06	6.21e-18	2.98e-23	2.28e-27	9.21e-44	1.28e-32	2.91e-19	1.36e-08	2.94e-31	2.40e-31	2.63e-01	2.88e-45	1.86e-29	5.34e-41	1.29e-06	1.85e-128	-	1.12e-79
4-OH-CB107	5.67e-03	6.99e-09	2.01e-11	3.82e-27	1.48e-29	1.62e-38	6.76e-60	1.67e-31	1.59e-30	1.03e-16	4.18e-52	1.76e-49	5.10e-06	2.34e-59	8.74e-45	6.30e-52	6.33e-08	2.93e-97	1.12e-79	-

Supplementary Table S56. Correlation coefficient for per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) correlations. Two-tailed Spearman's rank correlation test analysis on both controls and persons with MS.

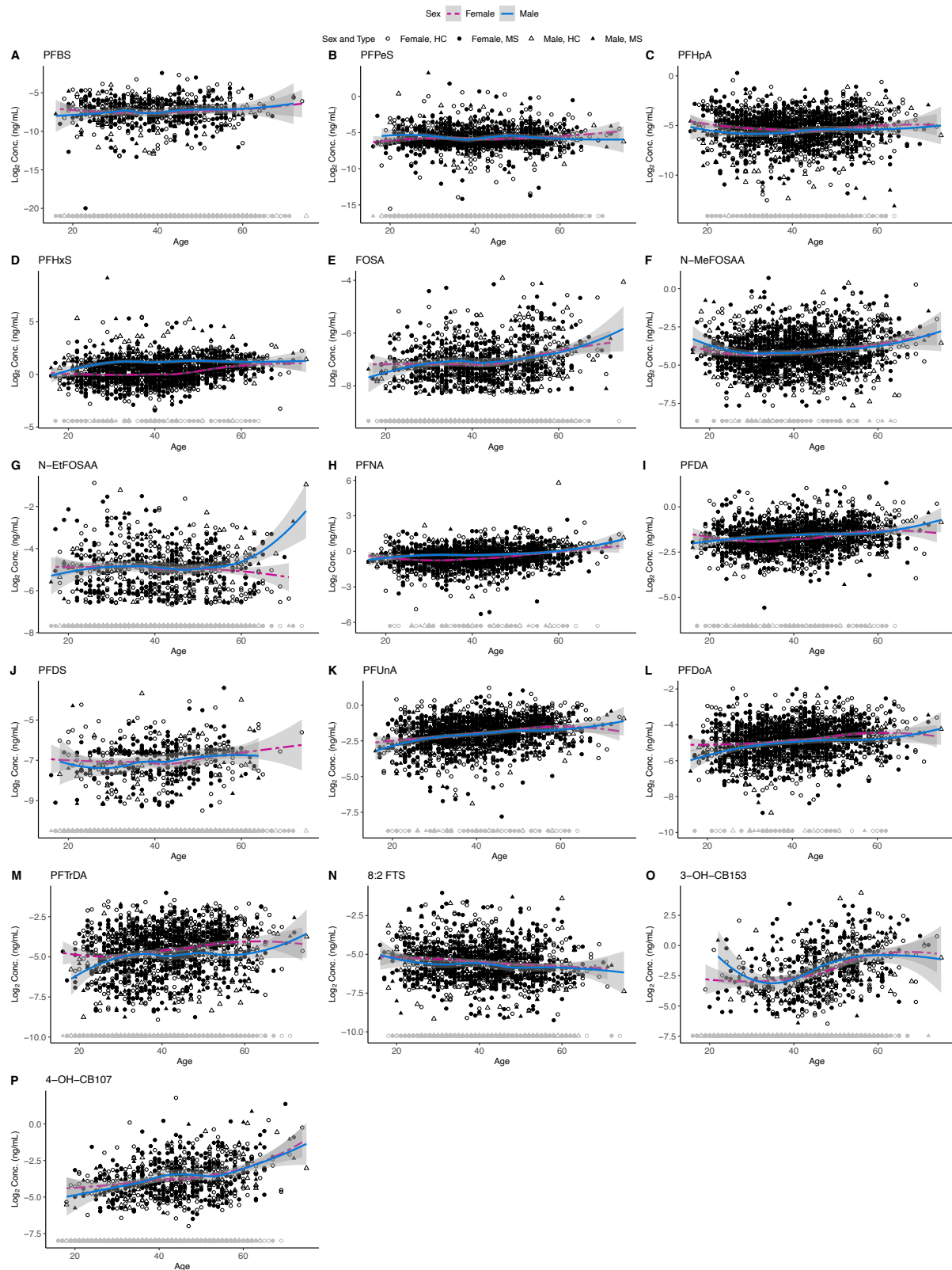
	PFBS	PFPeS	PFHpA	PFHxS	PFHpS	PFOA	PFOS	FOSA	N-MeFOSAA	N-EtFOSAA	PFNA	PFDA	PFDS	PFUnA	PFDoA	PFTTrDA	8:2 FTS	4-OH-CB187	3-OH-CB153	4-OH-CB107
PFBS	1	0.150	0.144	0.046	0.015	-0.038	-0.001	-0.055	-0.002	-0.066	0.026	0.028	0.042	-0.027	0.026	-0.068	-0.013	-0.021	-0.105	-0.065
PFPeS	0.150	1	0.429	0.450	0.244	0.358	0.246	0.075	0.120	0.089	0.261	0.224	0.110	0.200	0.195	0.189	0.101	0.146	0.067	0.135
PFHpA	0.144	0.429	1	0.286	0.230	0.490	0.279	0.219	0.191	0.159	0.365	0.348	0.082	0.282	0.311	0.246	0.201	0.185	0.111	0.157
PFHxS	0.046	0.45	0.286	1	0.809	0.630	0.669	0.288	0.263	0.174	0.512	0.521	0.115	0.387	0.311	0.271	0.181	0.383	0.201	0.250
PFHpS	0.015	0.244	0.230	0.809	1	0.704	0.829	0.326	0.363	0.221	0.574	0.525	0.114	0.368	0.325	0.245	0.200	0.451	0.230	0.261
PFOA	-0.038	0.358	0.490	0.630	0.704	1	0.683	0.313	0.362	0.270	0.676	0.603	0.084	0.428	0.417	0.336	0.29	0.433	0.251	0.298
PFOS	-0.001	0.246	0.279	0.669	0.829	0.683	1	0.420	0.450	0.282	0.713	0.707	0.192	0.618	0.566	0.509	0.287	0.528	0.317	0.370
FOSA	-0.055	0.075	0.219	0.288	0.326	0.313	0.420	1	0.471	0.357	0.311	0.404	0.139	0.391	0.383	0.351	0.268	0.307	0.274	0.269
N-MeFOSAA	-0.002	0.120	0.191	0.263	0.363	0.362	0.45	0.471	1	0.412	0.313	0.293	0.153	0.227	0.259	0.233	0.303	0.359	0.208	0.265
N-EtFOSAA	-0.066	0.089	0.159	0.174	0.221	0.270	0.282	0.357	0.412	1	0.172	0.199	0.119	0.147	0.147	0.138	0.248	0.191	0.133	0.193
PFNA	0.026	0.261	0.365	0.512	0.574	0.676	0.713	0.311	0.313	0.172	1	0.772	0.137	0.669	0.652	0.561	0.212	0.467	0.268	0.346
PFDA	0.028	0.224	0.348	0.521	0.525	0.603	0.707	0.404	0.293	0.199	0.772	1	0.208	0.812	0.787	0.644	0.337	0.404	0.269	0.337
PFDS	0.042	0.110	0.082	0.115	0.114	0.084	0.192	0.139	0.153	0.119	0.137	0.208	1	0.241	0.289	0.227	0.113	0.054	-0.026	0.107
PFUnA	-0.027	0.200	0.282	0.387	0.368	0.428	0.618	0.391	0.227	0.147	0.669	0.812	0.241	1	0.885	0.839	0.238	0.393	0.323	0.368
PFDoA	0.026	0.195	0.311	0.311	0.325	0.417	0.566	0.383	0.259	0.147	0.652	0.787	0.289	0.885	1	0.833	0.261	0.349	0.26	0.321
PFTTrDA	-0.068	0.189	0.246	0.271	0.245	0.336	0.509	0.351	0.233	0.138	0.561	0.644	0.227	0.839	0.833	1	0.211	0.366	0.307	0.345
8:2 FTS	-0.013	0.101	0.201	0.181	0.200	0.290	0.287	0.268	0.303	0.248	0.212	0.337	0.113	0.238	0.261	0.211	1	0.176	0.113	0.127
4-OH-CB187	-0.021	0.146	0.185	0.383	0.451	0.433	0.528	0.307	0.359	0.191	0.467	0.404	0.054	0.393	0.349	0.366	0.176	1	0.524	0.463
3-OH-CB153	-0.105	0.067	0.111	0.201	0.230	0.251	0.317	0.274	0.208	0.133	0.268	0.269	-0.026	0.323	0.260	0.307	0.113	0.524	1	0.423
4-OH-CB107	-0.065	0.135	0.157	0.250	0.261	0.298	0.370	0.269	0.265	0.193	0.346	0.337	0.107	0.368	0.321	0.345	0.127	0.463	0.423	1

Supplementary Table S57. Description of treatments included in each treatment category.

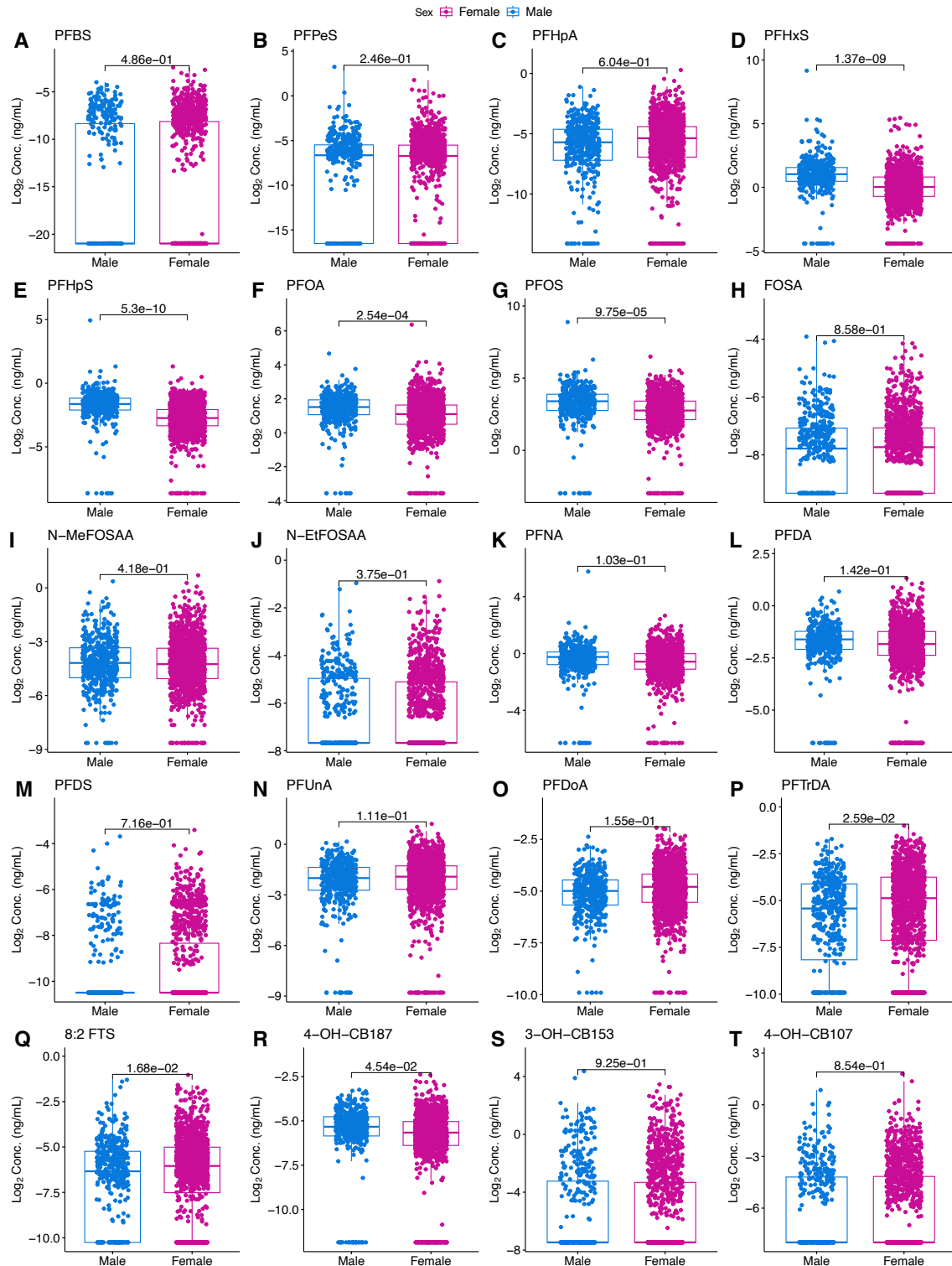
Treatment category	Treatment
First line DMT	Aubagio, Avonex, Betaferon, Copaxone, Dimethylfumarat, Extavia, IVIG, Plegridy, Rebif, Skilarence
Second line DMT	Fingolimod, HSCT/BEAM, HSCT/CYK, Kesimpta, Lemtrada, Mavenclad, Mitoxantrone, Ocrevus, rituximab, Tysabri, Zinbryta
Other treatments	Aimovig, Arzerra IV, Dimethylfumarat, Deltison (Medrol), Solu-Medrol



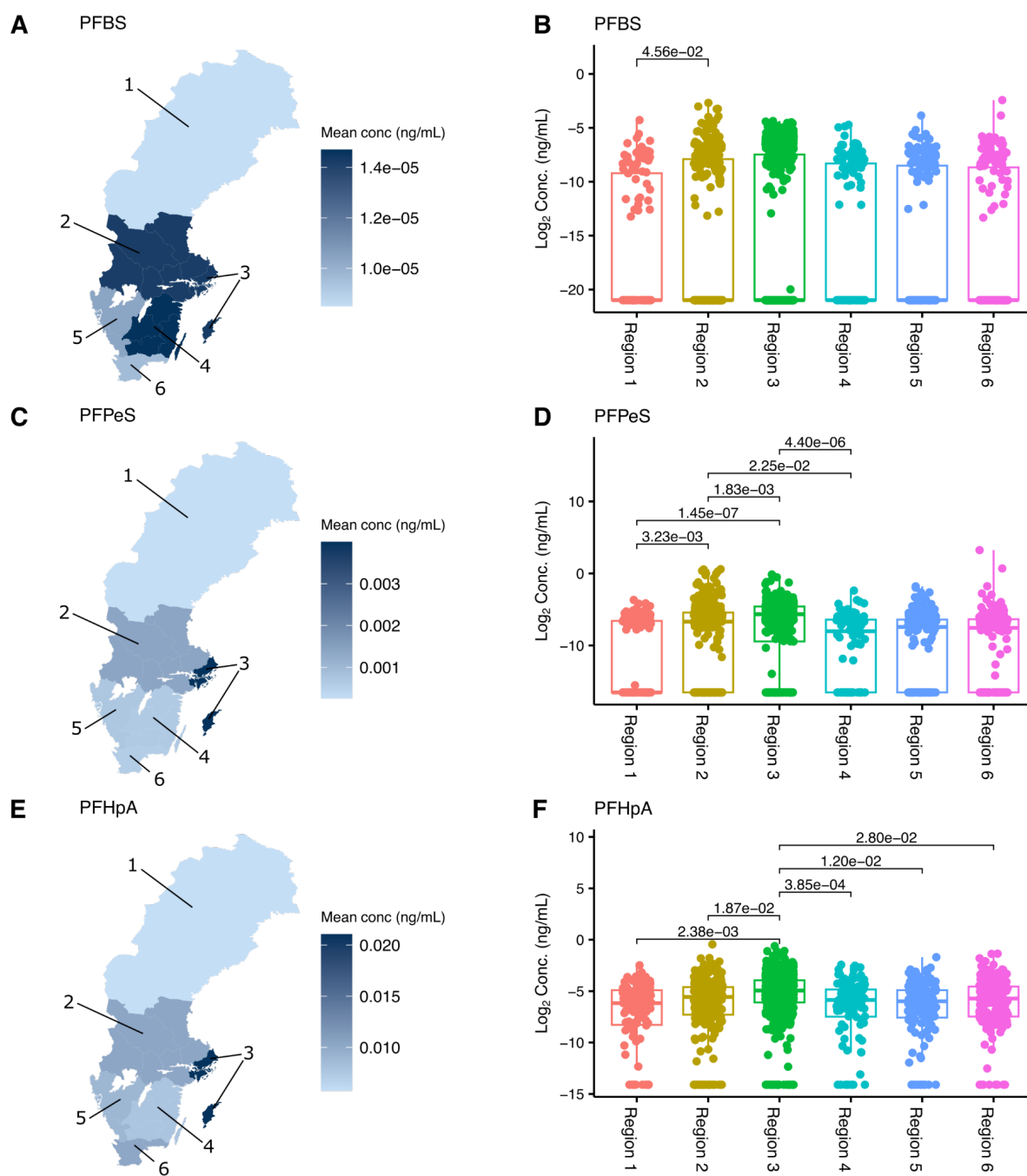
Supplementary Figure S1. Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCB) concentration ($\log_2$ ng/mL) versus sample collection year of persons with multiple sclerosis (MS) and matched controls (HC), separated by sex. (A) PFBS, (B) PFPeS, (C) PFHpA, (D) PFHxS, (E) FOSA, (F) N-MeFOSAA, (G) N-EtFOSAA, (H) PFNA, (I) PFDA, (J) PFDS, (K) PFUnA, (L) PFDoA, (M) PFTrDA, (N) 8:2 FTS, (O) 3-OH-CB153, and (P) 4-OH-CB107. Plots contain concentration distribution for individuals with MS (solid shape) ($n = 907$) and HC subjects (empty shape) ($n = 907$), where men are represented by triangles and females by circles. Imputed concentrations are shown in grey, and measured concentrations in black. The loess regression curve, including 95% confidence bands, has been fitted separately for males (blue solid line) and females (pink dashed line), excluding the imputed concentrations. The upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



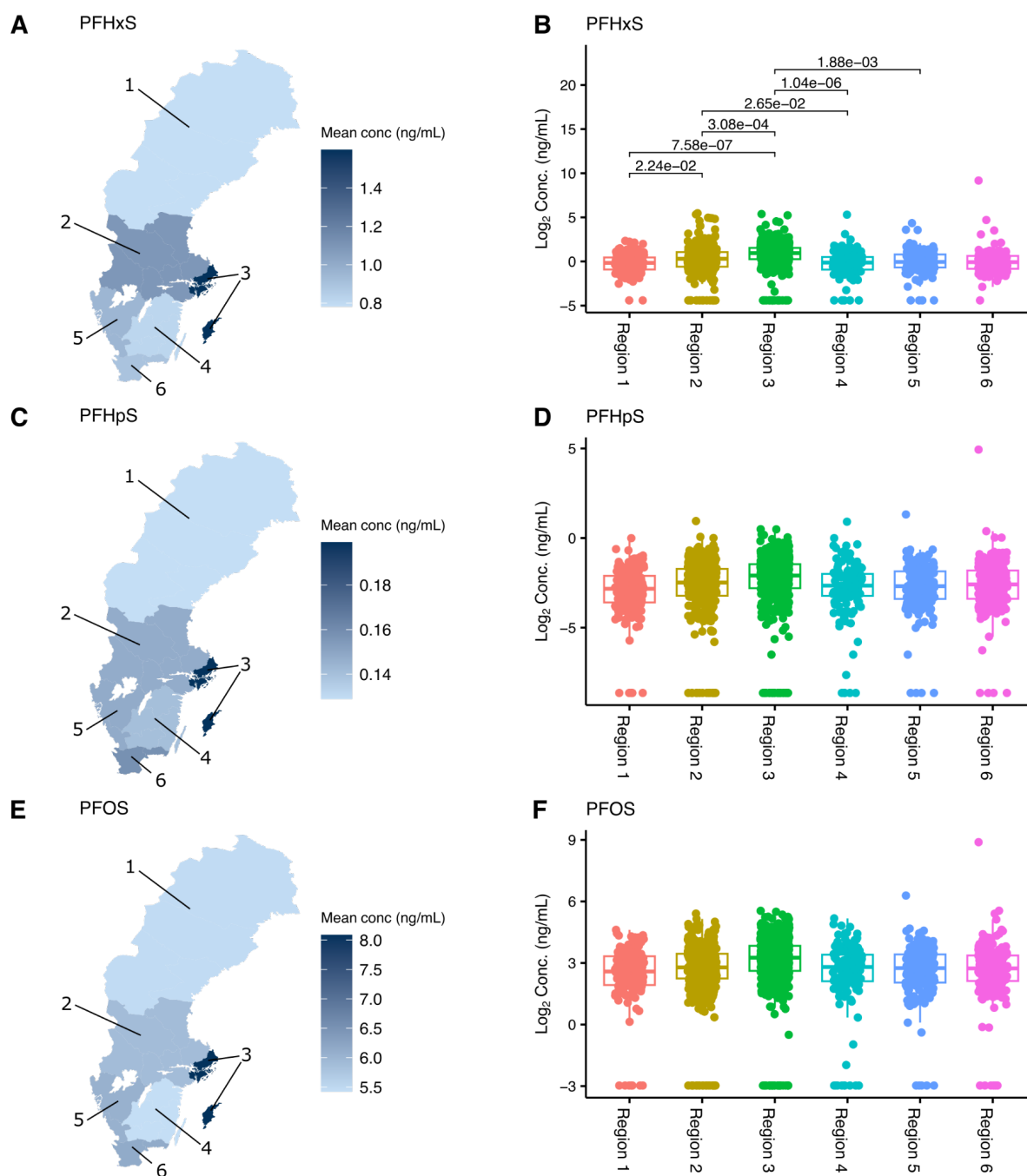
Supplementary Figure S2. Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCB) concentration ($\log_2$ ng/mL) versus age of persons with multiple sclerosis (MS) and matched controls (HC). (A) PFBS, (B) PFPeS, (C) PFHpA, (D) PFHxS, (E) FOSA, (F) N-MeFOSAA, (G) N-EtFOSAA, (H) PFNA, (I) PFDA, (J) PFDS, (K) PFUnA, (L) PFDaA, (M) PFTrDA, (N) 8:2 FTS, (O) 3-OH-CB153, and (P) 4-OH-CB107. Plots contain concentration distribution for individuals with MS (solid shapes) ($n = 907$) and HC subjects (empty shapes) ($n = 907$), where males are represented by triangles and females by circles. Imputed concentrations are shown in gray and measured concentrations in black. The loess regression curve, including 95% confidence band, has been fitted separately for males (blue solid line) and females (pink dashed line), excluding the imputed concentrations. Source data are provided as a Source Data file.



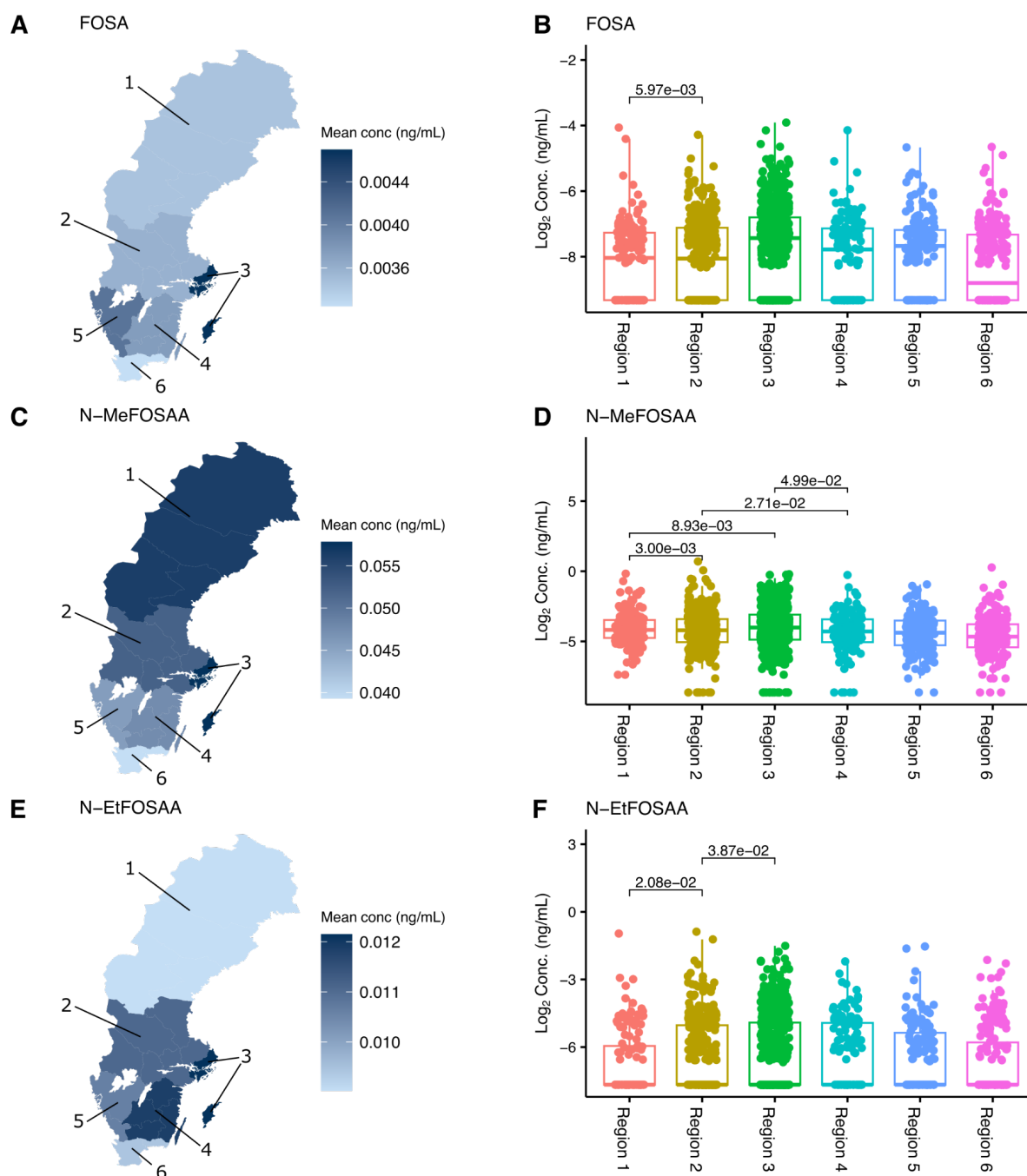
Supplementary Figure S3. Per- and polyfluorinated substance (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCB) concentration ($\log_2$ ng/mL) in males and females. (A) PFBS, (B) PFPeS, (C) PFHpA, (D) PFHxS, (E) PFHpS, (F) PFOA, (G) PFOS, (H) FOSA, (I) N-MeFOSAA, (J) N-EtFOSAA, (K) PFNA, (L) PFDA, (M) PFDS, (N) PFUnA, (O) PFDoA, (P) PFTrDA, (Q) 8:2 FTS, (R) 4-OH-CB187, (S) 3-OH-CB153, and (T) 4-OH-CB107. Individuals with multiple sclerosis (MS) ($n = 907$) and matched controls ($n = 907$) are included in the plot. The paired comparisons was calculated using estimated marginal means based on a linear mixed-effect regression model and P values, shown above each bar, for the two-sided tests were computed using Satterthwaite's degrees of freedom method. No adjustments were made for multiple comparisons. The model was adjusted for age, BMI at the age of 20, BMI at sample time point, year of sample collection, years of regular smoking, years of irregular smoking, years of indoor passive smoking, number of childbirths, and type of treatment. The upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



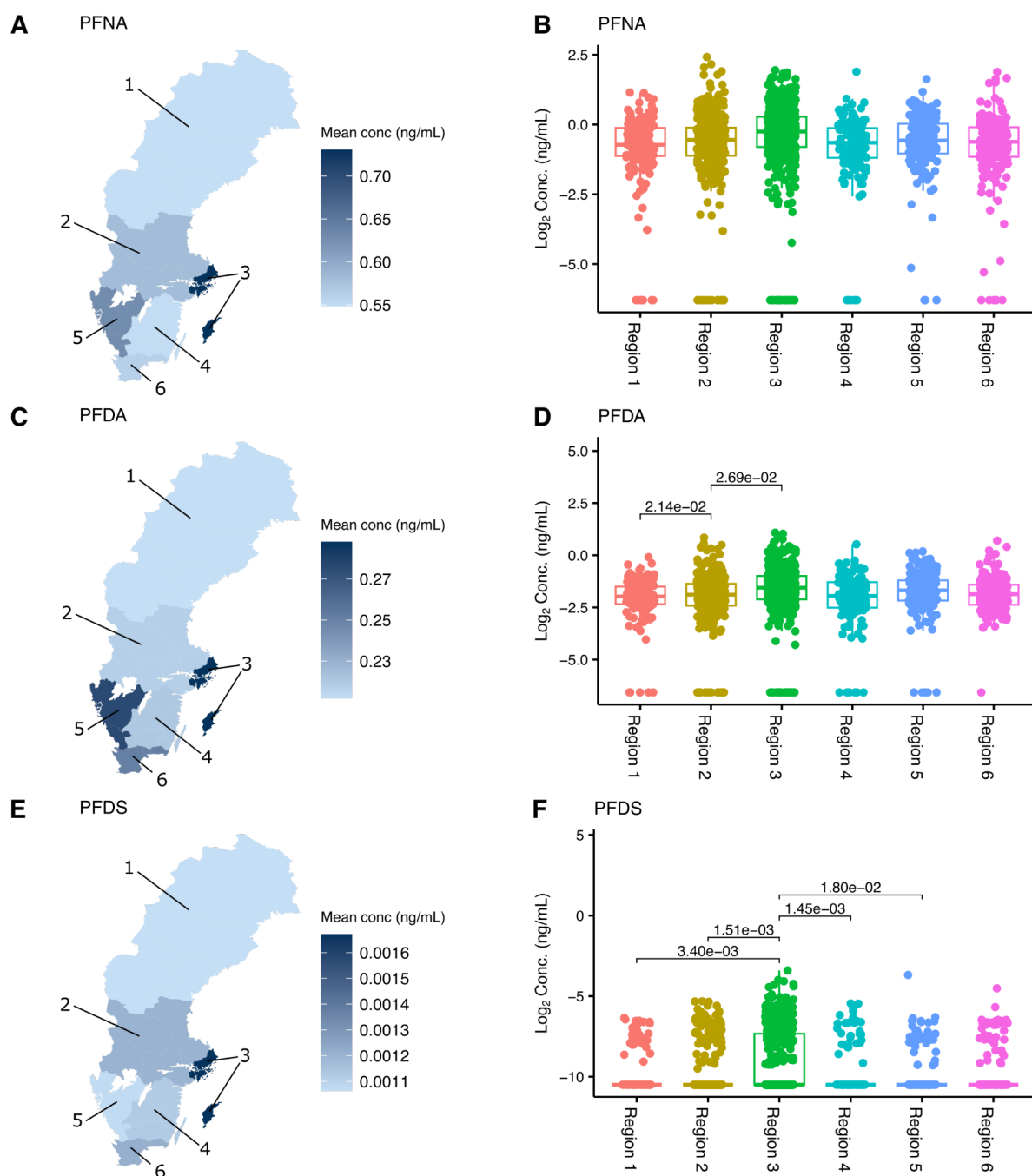
Supplementary Figure S4. Perfluorobutanesulfonic acid (PFBS), perfluoropentanesulfonic acid (PFPeS), and perfluoroheptanoic acid (PFHpA) concentration distribution across Sweden. (A, C, and E) Illustrates the mean concentration (ng/mL) for the six larger regions. (B, D, and F) Concentration distribution (log₂ ng/mL) and the *P* values region comparisons. Analysis was made on individuals with MS (*n* = 907) and matched controls (*n* = 907), and comparisons were made between all six regions using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. Only significant *P* values were included in the boxplot. The model was adjusted for age, sex, sample collection year, BMI at sample time point, BMI at the age of 20, undergoing treatment, years of regular smoking, years of irregular smoking, years of passive smoking (indoor environment), disease phenotype, and number of childbirths. Moreover, the upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



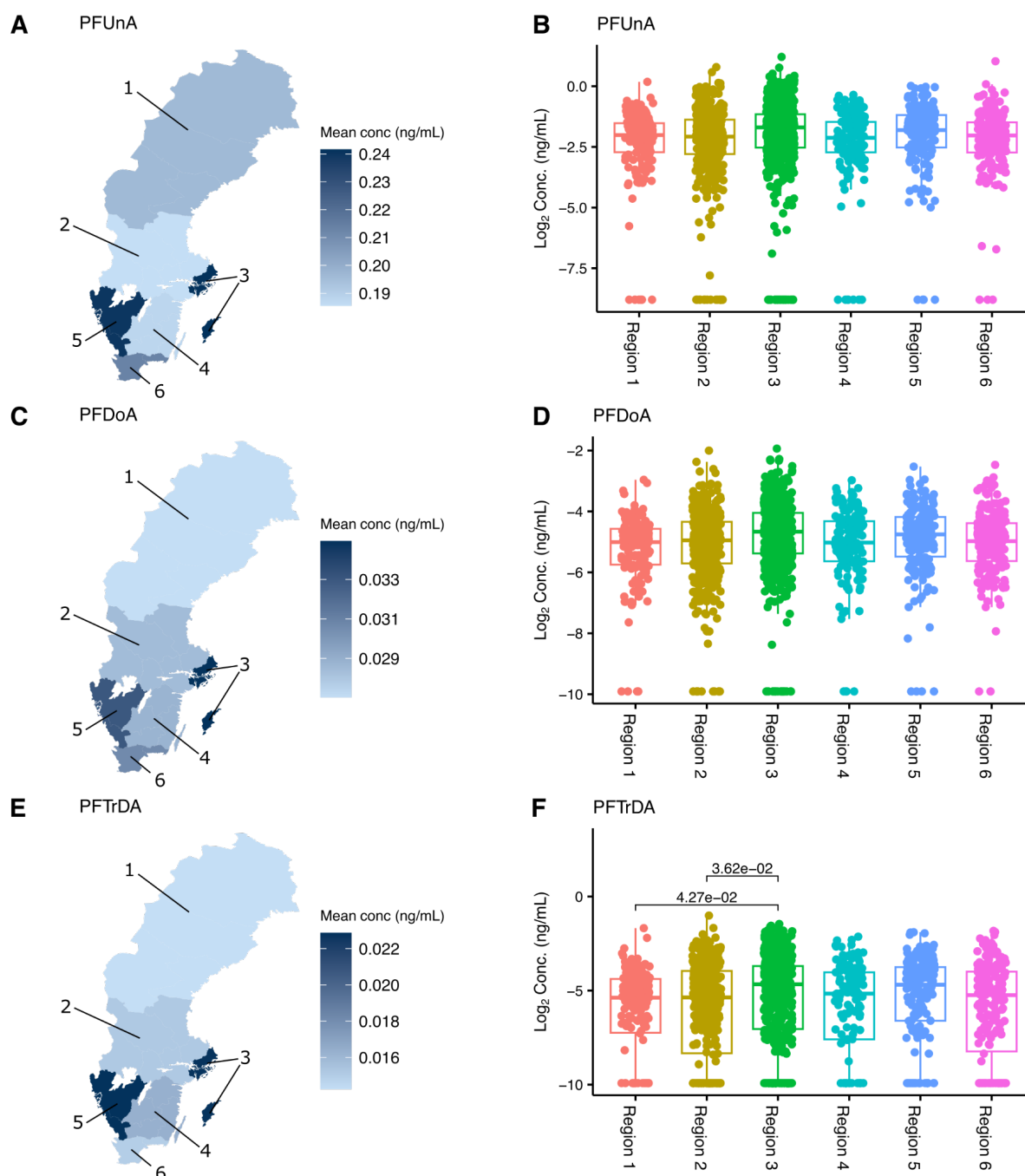
Supplementary Figure S5. Perfluorohexanesulfonic acid (PFHxS), perfluoroheptanesulfonic acid (PFHpS), and perfluorooctanesulfonic acid (PFOS) concentration distribution across Sweden. (A, C, and E) Illustrates the mean concentration (ng/mL) for the six larger regions. (B, D, and F) Concentration distribution (log₂ ng/mL) and the *P* values region comparisons. Analysis was made on individuals with MS (*n* = 907) and matched controls (*n* = 907), and comparisons were made between all six regions using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. Only significant *P* values were included in the boxplot. The model was adjusted for age, sex, sample collection year, BMI at sample time point, BMI at the age of 20, undergoing treatment, years of regular smoking, years of irregular smoking, years of passive smoking (indoor environment), disease phenotype, and number of childbirths. Moreover, the upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



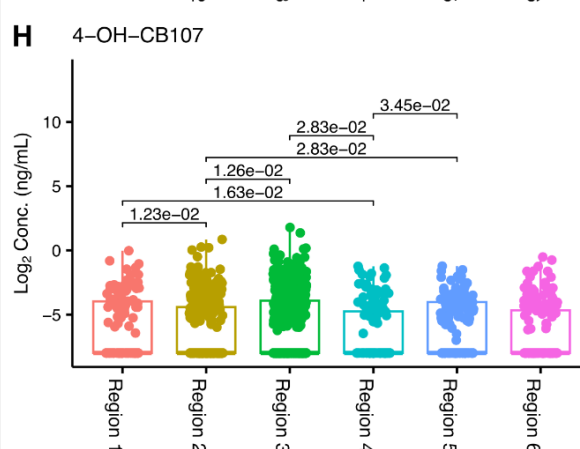
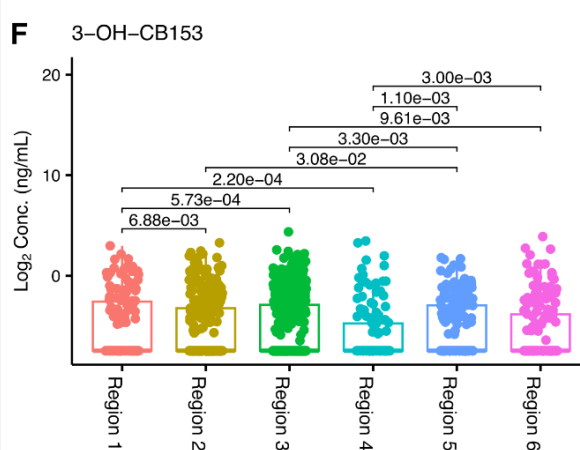
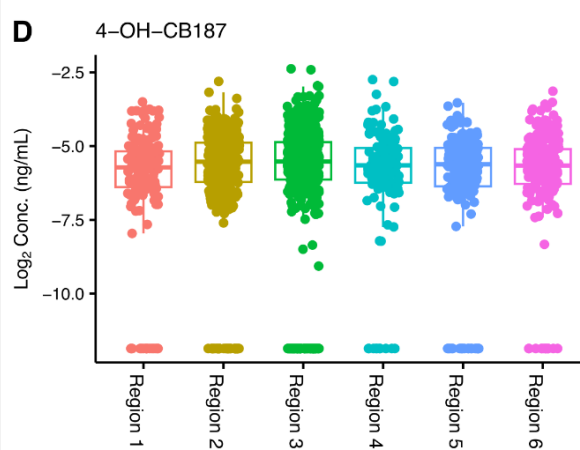
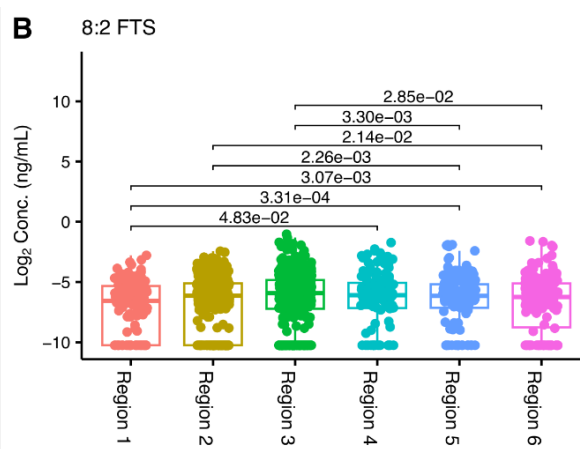
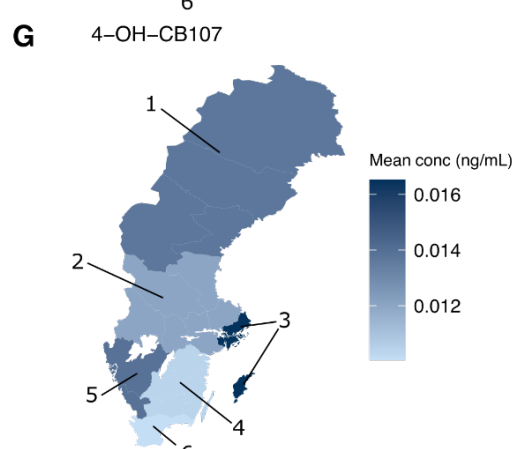
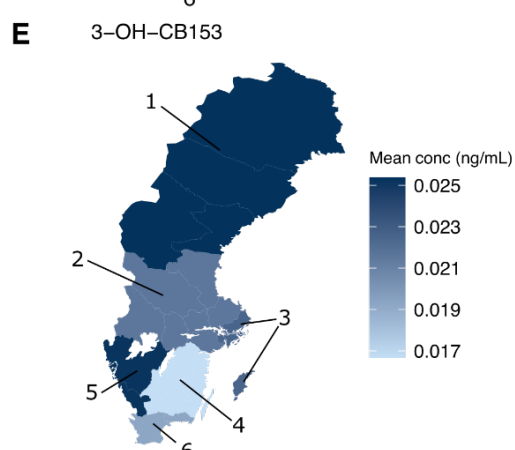
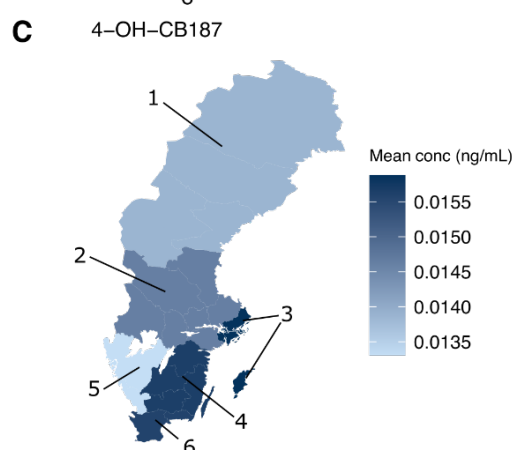
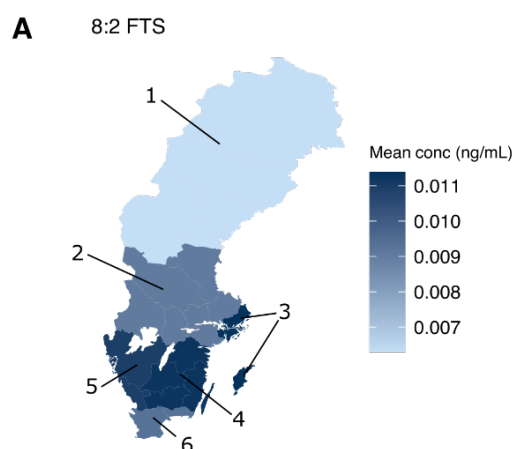
Supplementary Figure S6. Perfluoro-1-octanesulfonamide (FOSA), N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA), and N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) concentration distribution across Sweden. (A, C, and E) Illustrates the mean concentration (ng/mL) for the six larger regions. (B, D, and F) Concentration distribution (log₂ ng/mL) and the *P* values region comparisons. Analysis was made on individuals with MS (*n* = 907) and matched controls (*n* = 907), and comparisons were made between all six regions using estimated marginal means based on a linear mixed-effect regression model and *P* values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. Only significant *P* values were included in the boxplot. The model was adjusted for age, sex, sample collection year, BMI at sample time point, BMI at the age of 20, undergoing treatment, years of regular smoking, years of irregular smoking, years of passive smoking (indoor environment), disease phenotype, and number of childbirths. Moreover, the upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



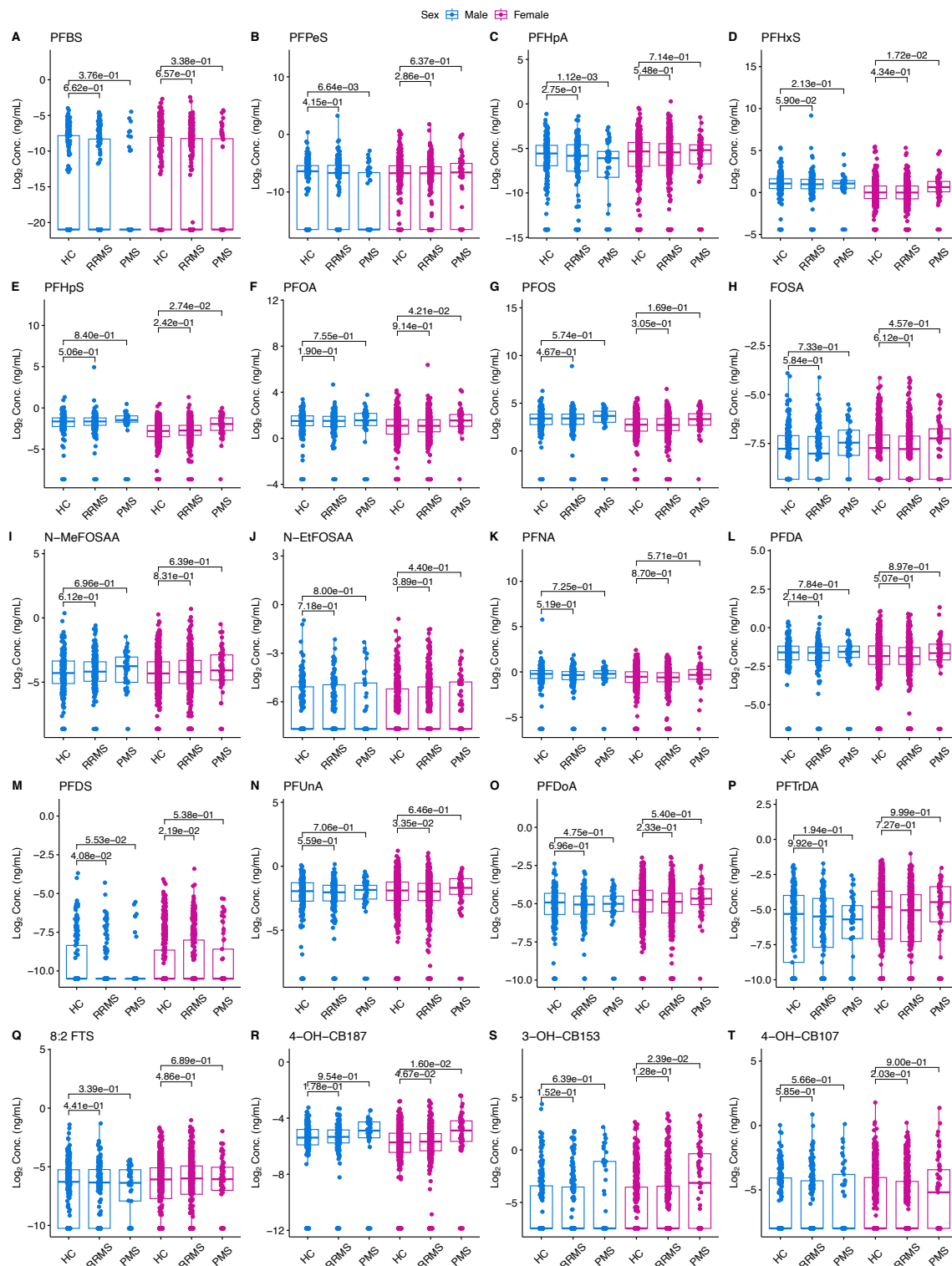
Supplementary Figure S7. Perfluorononanoic acid (PFNA), perfluorodecanoic acid (PFDA), and perfluorodecane sulfonic acid (PFDS) concentration distribution across Sweden. (A, C, and E) Illustrates the mean concentration (ng/mL) for the six larger regions. (B, D, and F) Concentration distribution ($\log_2$ ng/mL) and the P values region comparisons. Analysis was made on individuals with MS ($n = 907$) and matched controls ($n = 907$), and comparisons were made between all six regions using estimated marginal means based on a linear mixed-effect regression model and P values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. Only significant P values were included in the boxplot. The model was adjusted for age, sex, sample collection year, BMI at sample time point, BMI at the age of 20, undergoing treatment, years of regular smoking, years of irregular smoking, years of passive smoking (indoor environment), disease phenotype, and number of childbirths. Moreover, the upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



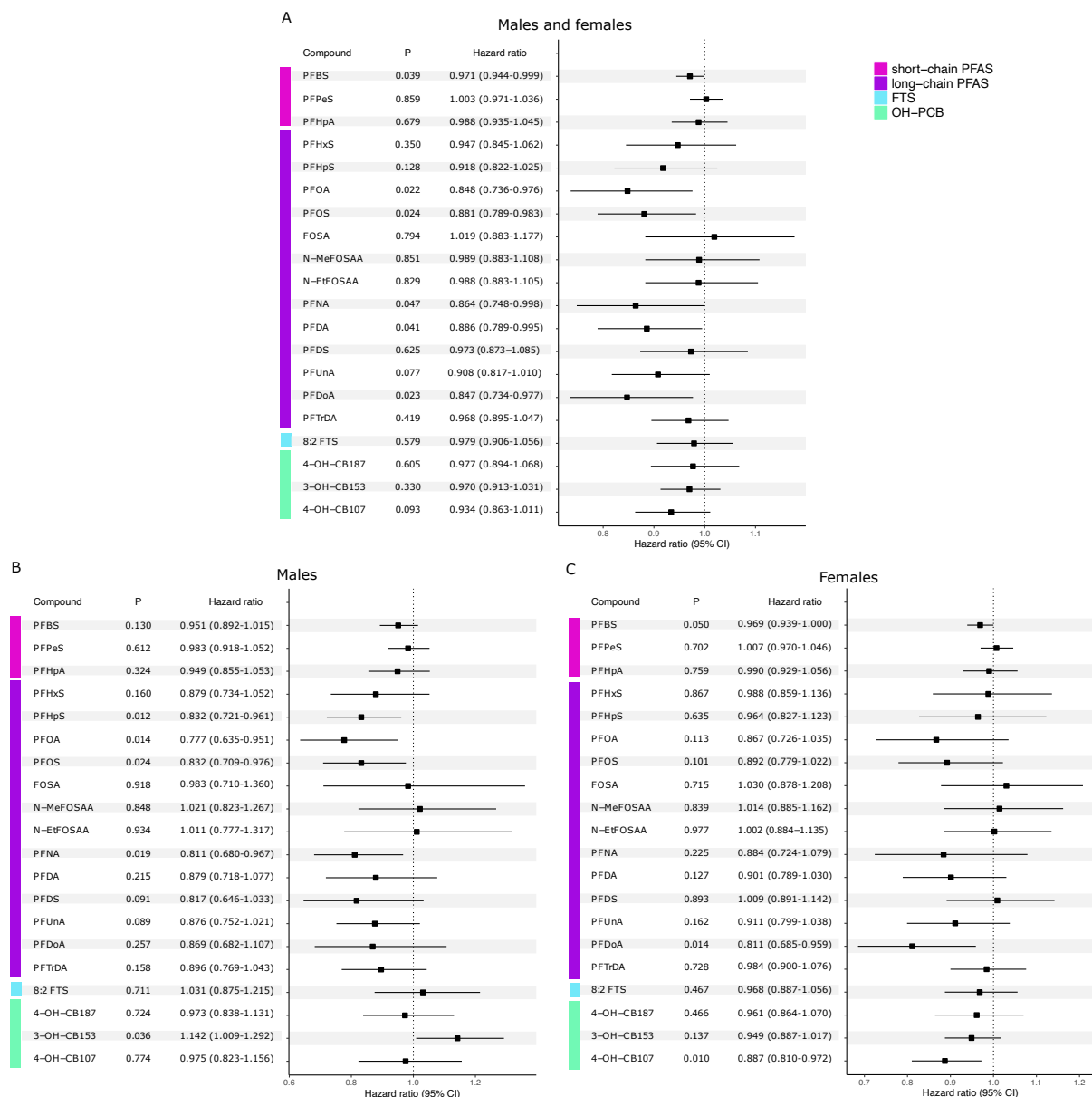
Supplementary Figure S8. Perfluoroundecanoic acid (PFUnA), perfluorododecanoic acid (PFDoA), and perfluorotridecanoic acid (PFTrDA) concentration distribution across Sweden. (A, C, and E) Illustrates the mean concentration (ng/mL) for the six larger regions. (B, D, and F) Concentration distribution ($\log_2$ ng/mL) and the P values region comparisons. Analysis was made on individuals with MS ($n = 907$) and matched controls ($n = 907$), and comparisons were made between all six regions using estimated marginal means based on a linear mixed-effect regression model and P values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. Only significant P values were included in the boxplot. The model was adjusted for age, sex, sample collection year, BMI at sample time point, BMI at the age of 20, undergoing treatment, years of regular smoking, years of irregular smoking, years of passive smoking (indoor environment), disease phenotype, and number of childbirths. Moreover, the upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



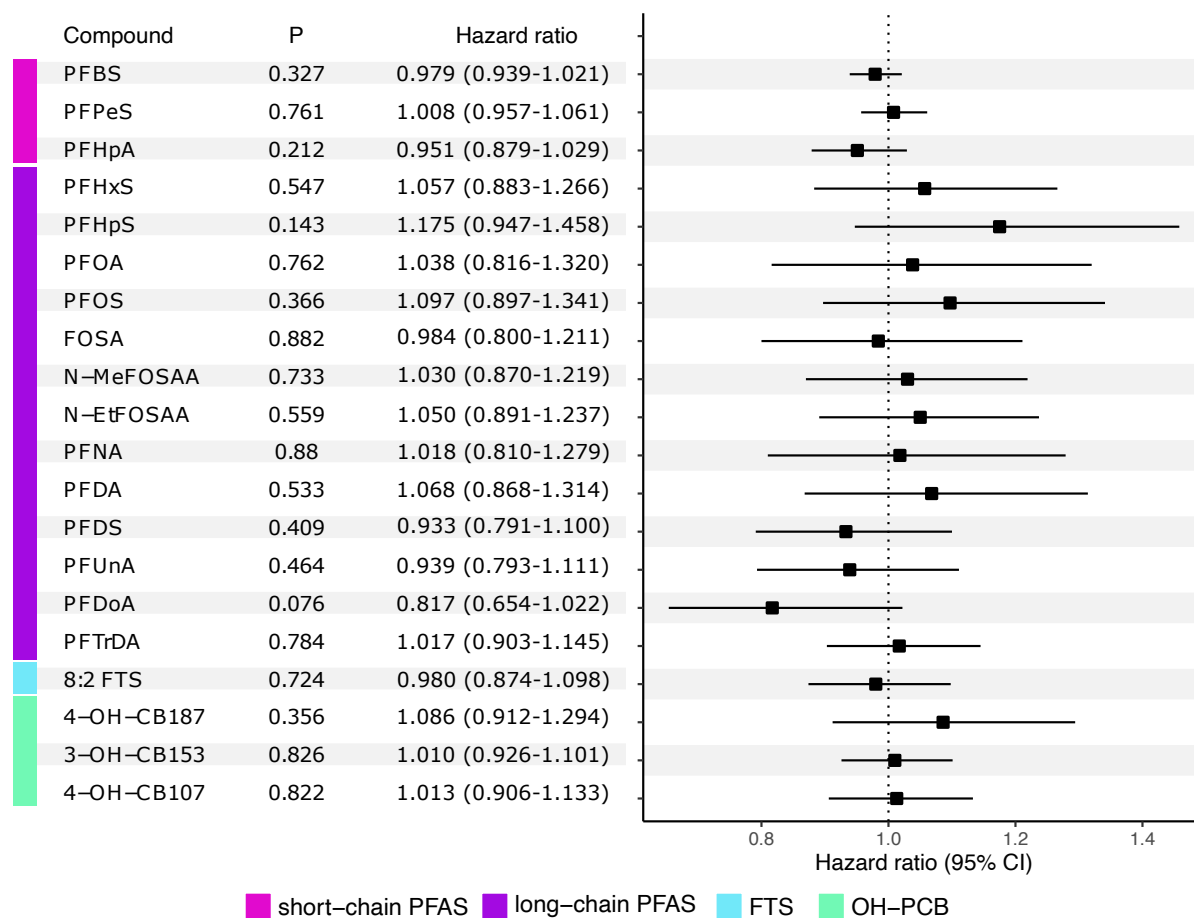
Supplementary Figure S9. 1h,1h,2h,2h-perfluoro-1-decanesulfonic acid (8:2) (8:2 FTS), 2,2',3,4',5,5',6-heptachloro-4-biphenylol (4-OH-CB187), 2,2',4,4',5,5',-Hexachloro-3-biphenylol (3-OH-CB153), and 2,3,3',4',5-Pentachloro-4-biphenylol (4-OH-CB107) concentration distribution across Sweden. (A, C, E, and G) Illustrates the mean concentration (ng/mL) for the six larger regions. (B, D, F, and H) Concentration distribution ($\log_2$ ng/mL) and the P values region comparisons. Analysis was made on individuals with MS ($n = 907$) and matched controls ($n = 907$), and comparisons were made between all six regions using estimated marginal means based on a linear mixed-effect regression model and P values for the two-sided tests were computed using Satterthwaite's degrees of freedom method. Only significant P values were included in the boxplot. The model was adjusted for age, sex, sample collection year, BMI at sample time point, BMI at the age of 20, undergoing treatment, years of regular smoking, years of irregular smoking, years of passive smoking (indoor environment), disease phenotype, and number of childbirths. Moreover, the upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



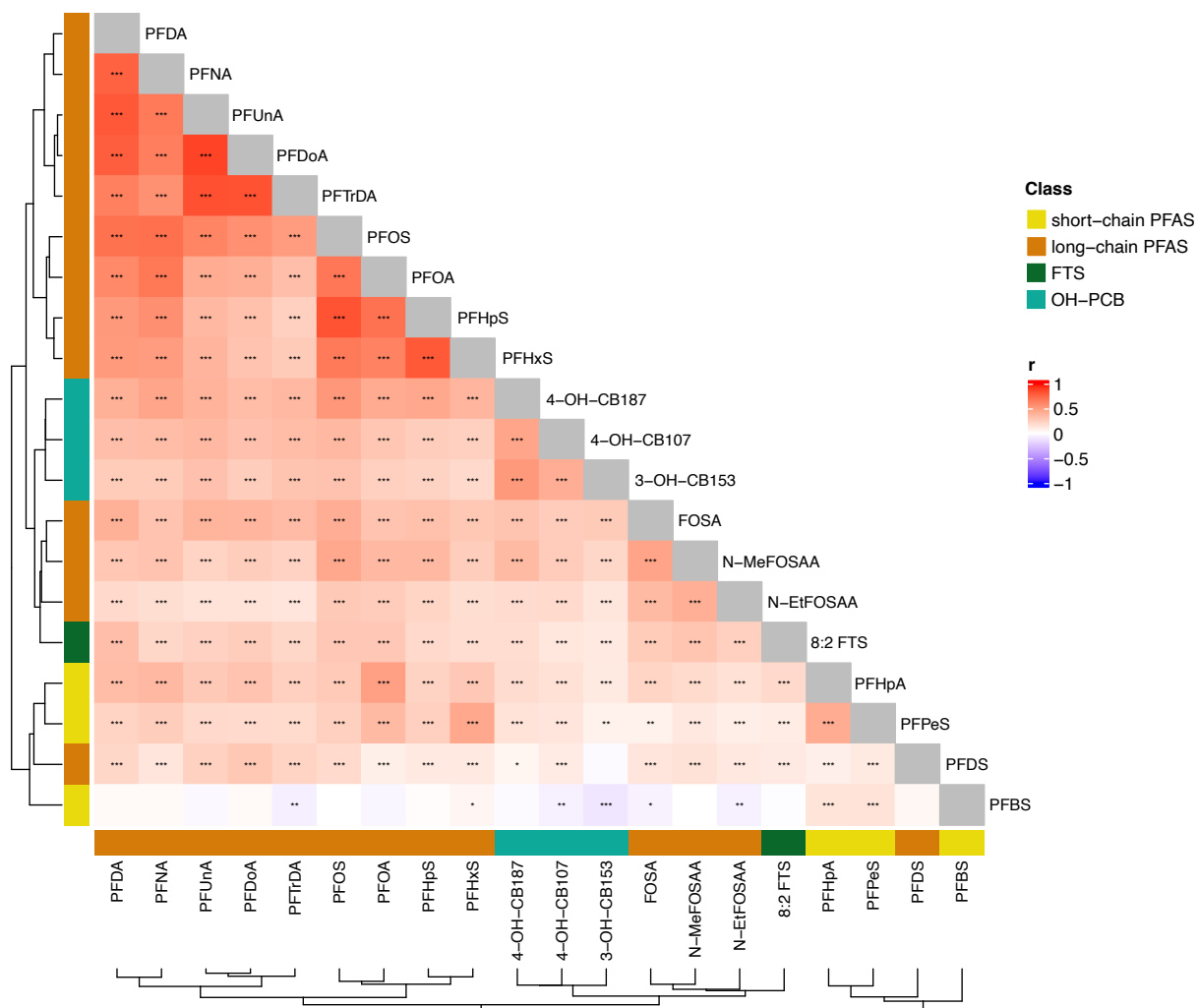
Supplementary Figure S10. Concentration distribution of per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) in multiple sclerosis (MS) subjects and matched control (HC) divided by sex. (A) PFBS, (B) PFPeS, (C) PFHpA, (D) PFHxS, (E) PFHpS, (F) PFOA, (G) PFOS, (H) FOSA, (I) N-MeFOSAA, (J) N-EtFOSAA, (K) PFNA, (L) PFDA, (M) PFDS, (N) PFUnA, (O) PFDaA, (P) PFTrDA, (Q) 8:2 FTS, (R) 4-OH-CB187, (S) 3-OH-CB153, and (T) 4-OH-CB107. Relapsing-remitting MS (RRMS) ($n = 801$) and progressive MS (PMS) ($n = 106$) are compared with HC subjects ($n = 907$). Blue represents male subjects and pink female subjects. The paired comparisons was calculated using estimated marginal means based on a linear mixed-effect regression model and P values, shown above each bar, for the two-sided tests were computed using Satterthwaite's degrees of freedom method. The model was adjusted for age, sex, BMI at the age of 20, BMI at sample time point, year of sample collection, years of regular smoking, years of irregular smoking, years of indoor passive smoking, number of childbirths, and type of treatment. No adjustments were made for multiple comparisons. The upper and lower whiskers indicate 1.5 times the interquartile range from above the upper quartile and below the lower quartile, respectively. Source data are provided as a Source Data file.



Supplementary Figure S11. Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with confirmed disability worsening adjusting for 25(OH)D3 levels. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound were estimated using Cox proportional hazard analysis. No adjustments were made for multiple comparisons. The hazard ratio value is represented by the square and error bars represent its 95% CI. Analysis based on (A) the entire group (*n* = 551), (B) males only (*n* = 137), and (C) females only (*n* = 414). PFAS compounds have been grouped into three groups: short-chain PFAS (pink), long-chain PFAS (purple), and FTS (blue), while OH-PCBs (green) are listed separately. Source data are provided as a Source Data file.

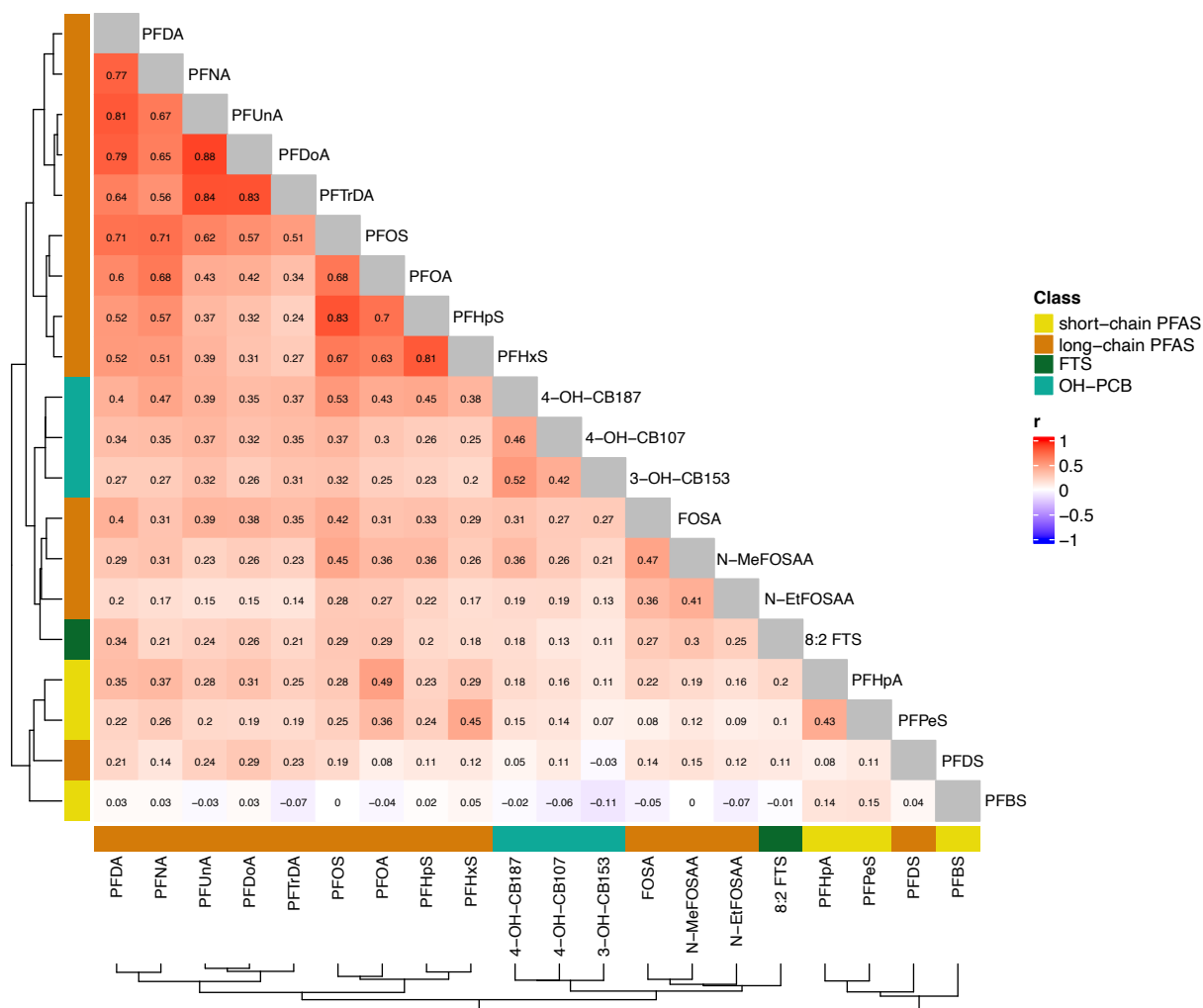


Supplementary Figure S12. Per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs) association with the transition from relapsing-remitting multiple sclerosis (RRMS) to secondary progressive multiple sclerosis (SPMS) (n = 801) adjusted for 25(OH)D3 levels. *P* values, coefficients, hazard ratios (HR), and the 95% confidence interval (CI) for each compound were estimated using Cox proportional hazard analysis. No adjustments were made for multiple comparisons. The hazard ratio value is represented by the square and error bars represent its 95% CI. PFAS compounds have been grouped into three groups: short-chain PFAS (pink), long-chain PFAS (purple), and FTS (blue), while OH-PCBs (green) are listed separately. Source data are provided as a Source Data file.



Supplementary Figure S13. Spearman's rank correlation test between per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs). Correlation analysis was made both on controls (n = 907) and persons with multiple sclerosis (MS) (n = 907). The intensity of colours represents the regression coefficient. PFAS compounds have been grouped into three groups: short-chain PFAS (yellow), long-chain PFAS (orange), and FTS (green), while OH-PCBs (turquoise) are listed separately. Source data are provided as a Source Data file.

* P value < 0.05; ** P value < 0.01; *** P value < 0.001



Supplementary Figure S14. Spearman's rank correlation test between per- and polyfluorinated substances (PFAS) and hydroxyl polychlorinated biphenyls (OH-PCBs). Correlation analysis was made both on controls (n = 907) and persons with multiple sclerosis (MS) (n = 907). Values in each cell represent the correlation coefficient r. The intensity of colours represents the regression coefficient. PFAS compounds have been grouped into three groups: short-chain PFAS (yellow), long-chain PFAS (orange), and FTS (green), while OH-PCBs (turquoise) are listed separately. Source data are provided as a Source Data file.