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Supplemental Material

A Nested Case–Control Study of Serum Per- and Polyfluoroalkyl Substances and Testicular Germ Cell Tumors among U.S. Air Force Servicemen

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Supplementary Table 1. Quality control results for PFAS measurements (n=103) in study of active-duty U.S. Air Force servicemen.

Analyte	Detection Frequency (%)	Coefficient of Variation (%)	
		Within-batch	Total
PFOS	100.0	10.8	11.5
PFOA	100.0	7.9	10.5
PFHxS	100.0	9.5	13.9
MeFOSAA	97.8	13.3	27.2
PFNA	99.8	10.7	13.2
PFUnDA	89.4	13.5	13.5
PFDA	98.9	9.2	10.7

Abbreviations: PFAS, per- and polyfluoroalkyl substances; PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; MeFOSAA, 2-(N-methyl-perfluorooctane sulfonamido) acetic acid; PFNA, perfluorononanoic acid; PFDA, perfluorodecanoic acid; PFUnDA, perfluoroundecanoic acid.

Note: Limit of detection was 0.1 ng/mL for all PFAS.

Laboratory analyses of the study samples were conducted across a seven-month period (between June 2021 and February 2022). Method precision was confirmed by successful participation in three proficiency testing rounds of the Arctic Monitoring and Assessment Program (AMAP; <https://www.inspq.qc.ca/en/ctq/eqas/amap/description>) between June 2021 and January 2022.

Supplementary Table 2. Comparisons of geometric mean (GM) serum concentrations (ng/mL) for measured PFAS in Department of Defense Serum Repository Air Force study controls (first/only sample) vs. male participants aged 18-39 years in the National Health and Nutrition Examination Survey (NHANES) for samples collected in 1999-2000 (controls, n = 77; NHANES, n = 204), 2003-2004 (controls, n = 50; NHANES, n = 375), 2005-2006 (controls, n = 44; NHANES, n = 352), 2007-2008 (controls, n = 34; NHANES, n = 347) and 2009-2010 (controls, n = 25; NHANES, n = 360).

PFAS	Population	1999-2000 ^a			2003-2004			2005-2006			2007-2008			2009-2010		
		N	GM ^b (95% CI)	P	N	GM ^b (95% CI)	P	N	GM ^b (95% CI)	P	N	GM ^b (95% CI)	P	N	GM ^b (95% CI)	P
PFOS	Study Controls	77	34.8 (30.1, 40.2)	0.16	50	24.0 (20.6, 27.9)	0.06	44	23.4 (19.1, 28.7)	0.94	34	13.6 (11.5, 16.0)	0.99	25	6.4 (4.7, 10.5)	0.03
	NHANES	204	30.9 (27.4, 34.9)		375	21.3 (19.6, 23.2)		352	23.2 (20.1, 26.7)		347	13.5 (12.0, 15.2)		360	10.5 (8.7, 12.8)	
PFOA	Study Controls	77	6.4 (5.5, 7.4)	0.22	50	6.0 (5.3, 6.8)	<0.001	44	5.8 (5.0, 6.7)	0.22	34	4.5 (3.9, 5.1)	0.62	25	2.5 (2.0, 3.1)	0.008
	NHANES	204	5.8 (5.2, 6.5)		375	4.6 (4.2, 5.0)		352	5.0 (4.4, 5.7)		347	4.3 (4.0, 4.6)		360	3.6 (3.2, 4.2)	
PFHxS	Study Controls	77	4.2 (3.0, 5.9)	0.007	50	3.9 (3.0, 5.1)	<0.001	44	3.3 (2.3, 4.8)	0.28	34	2.9 (2.1, 4.0)	0.45	25	1.5 (0.9, 2.4)	0.03
	NHANES	204	2.7 (2.0, 3.5)		375	2.1 (1.8, 2.3)		352	2.5 (1.9, 3.2)		347	2.4 (2.0, 3.0)		360	2.9 (2.2, 3.9)	
MeFOSAA	Study Controls	77	2.1 (1.8, 2.5)	<0.001	50	0.8 (0.7, 0.9)	<0.001	44	0.5 (0.4, 0.6)	<0.001	34	0.3 (0.3, 0.4)	<0.001	25	0.2 (0.2, 0.3)	<0.001
	NHANES	204	1.0 (0.8, 1.2)		375	0.3 (0.3, 0.3)		352	0.1 (0.2, 0.1)		347	0.2 (0.1, 0.2)		360	0.1 (0.1, 0.1)	
PFNA	Study Controls	77	0.7 (0.6, 0.8)	0.05	50	1.1 (1.0, 1.3)	0.79	44	1.6 (1.4, 2.0)	0.001	34	1.5 (1.3, 1.9)	0.16	25	1.0 (1.1, 1.6)	0.28
	NHANES	204	0.6 (0.5, 0.7)		375	1.1 (1.0, 1.3)		352	1.1 (0.9, 1.3)		347	1.3 (1.1, 1.4)		360	1.3 (1.1, 1.6)	
PFDA	Study Controls	77	0.2 (0.2, 0.2)	0.01	50	0.4 (0.3, 0.4)	0.11	44	0.5 (0.4, 0.6)	0.003	34	0.5 (0.4, 0.6)	<0.001	25	0.3 (0.3, 0.4)	0.17
	NHANES	204	0.2 (0.2, 0.3)		375	0.3 (0.3, 0.3)		352	0.4 (0.3, 0.4)		347	0.3 (0.3, 0.3)		360	0.3 (0.2, 0.3)	
PFUnDA	Study Controls	77	0.1 (0.1, 0.2)	<0.001	50	0.2 (0.2, 0.2)	0.02	44	0.3 (0.2, 0.3)	0.24	34	0.3 (0.2, 0.4)	0.02	25	0.2 (0.1, 0.3)	0.61
	NHANES	204	0.2 (0.2, 0.2)		375	0.2 (0.2, 0.3)		352	0.2 (0.2, 0.3)		347	0.2 (0.2, 0.2)		360	0.2 (0.2, 0.2)	

Abbreviations: PFAS, per- and polyfluoroalkyl substances; PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; MeFOSAA, 2-(N-methyl-perfluorooctane sulfonamido) acetic acid; PFNA, perfluorononanoic acid; PFDA, perfluorodecanoic acid; PFUnDA, perfluoroundecanoic acid; NHANES, National Health and Nutrition Examination Survey

^aSamples from 2001-2002 not included because PFAS quantitation of NHANES samples had been conducted on pooled samples, not individually.

^bLeast squares geometric means estimated from linear regression models adjusted for age and race/ethnicity and accounting for complex sampling design.

Supplementary Table 3. Matrix of Spearman rank correlation coefficients for PFAS concentrations among active-duty U.S. Air Force servicemen study controls from the first/only sample (n = 530) and summary of eigenvectors for first two principal components from principal component analysis of log-transformed PFAS.

	Spearman Rank Correlation (95% CI)							Eigenvectors ^a	
	PFOS	PFOA	PFHxS	MeFOSAA	PFNA	PFDA	PFUnDA	PC1 (Eigenvalue =2.7; 38.8% of variance)	PC2 (Eigenvalue=2.4; 34.8% of variance)
PFOS	-	0.67 (0.63, 0.72)	0.55 (0.49, 0.61)	0.67 (0.62, 0.71)	-0.08 (-0.17, 0.00)	-0.15 (-0.24, -0.07)	-0.03 (-0.11, 0.06)	0.5471	0.1585
PFOA		-	0.49 (0.43, 0.56)	0.46 (0.39, 0.53)	0.13 (0.05, 0.21)	0.06 (-0.02, 0.15)	0.06 (-0.02, 0.15)	0.4725	0.2654
PFHxS			-	0.29 (0.21, 0.36)	0.06 (-0.03, 0.14)	0.08 (-0.01, 0.16)	0.12 (0.04, 0.20)	0.3921	0.2486
MeFOSAA				-	-0.27 (-0.35, -0.19)	-0.39 (-0.46, -0.32)	-0.24 (-0.32, -0.16)	0.4904	-0.0961
PFNA					-	0.69 (0.64, 0.73)	0.52 (0.45, 0.58)	-0.1595	0.5138
PFDA							-	0.68 (0.64, 0.73)	-0.1910
PFUnDA								-	-0.1457

Abbreviations: PFAS, per- and polyfluoroalkyl substances; PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; MeFOSAA, 2-(N-methyl-perfluorooctane sulfonamido) acetic acid; PFNA, perfluorononanoic acid; PFDA, perfluorodecanoic acid; PFUnDA, perfluoroundecanoic acid; PC1, first principal component; PC2, second principal component; CI, confidence interval

^aEigenvectors for principal component analysis of natural log-transformed PFAS concentrations.

Supplementary Table 4: Cross-tabulation of active-duty U.S. Air Force servicemen based on history of service at a facility with elevated PFOA/PFOS in drinking water prior to sample collection vs. history of service at a facility with elevated PFOA/PFOS in groundwater prior to sample collection, for samples collected after the start of military service (first/only sample, N=830; second sample, N=362).

Sample	Stationed at facility with elevated PFOA/PFOS in drinking water prior to sample collection	Stationed at facility with elevated PFOA/PFOS in groundwater prior to sample collection	
		No N (%)	Yes N (%)
First/Only	No	222 (94.5)	582 (97.8)
	Yes	13 (5.5)	13 (2.2)
Second	No	49 (98.0)	293 (93.9)
	Yes	1 (2.0)	19 (6.1)

Supplementary Table 5: Least squares geometric mean (GM) concentrations of PFOS, PFOA and PFHxS (ng/mL) in relation to subject and sample characteristics restricted to samples collected from active-duty U.S. Air Force servicemen ≥0.3 years after start of military service (n = 553).

	First/Only Sample (n = 553)							Second Sample (n = 361)						
	N	PFOS		PFOA		PFHxS		N	PFOS		PFOA		PFHxS	
		GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P		GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P
Year serum collected														
<1996	28	49.5 (36.0-67.9)	0.48	7.2 (5.3-9.8)	0.12	5.2 (2.7-10.0)	0.0007	3	51.4 (27.9-94.8)	0.75	6.0 (3.6-9.9)	0.26	4.5 (1.7-11.6)	0.05
1996-1998	278	52.8 (40.3-69.1)	-	8.3 (6.4-10.7)	-	9.8 (5.6-17.2)	-	33	56.6 (41.6-76.9)	-	7.9 (6.1-10.1)	-	11.3 (7.0-18.3)	-
1999-2004	189	47.0 (35.6-62.0)	0.008	9.2 (7.1-12.0)	0.008	9.3 (5.3-16.6)	0.57	135	45.1 (34.2-59.5)	0.02	8.4 (6.7-10.6)	0.39	9.3 (6.0-14.3)	0.19
≥2005	58	21.4 (16.0-28.6)	<0.0001	5.8 (4.4-7.7)	<0.0001	6.9 (3.7-12.6)	0.02	190	20.0 (15.3-26.2)	<0.0001	5.4 (4.3-6.7)	<0.0001	6.0 (3.9-9.2)	<0.0001
Age at serum collection														
<20	32	29.7 (21.5-40.9)	0.004	6.2 (4.6-8.4)	0.02	5.0 (2.6-9.8)	0.25	14	35.0 (23.9-51.2)	0.76	5.5 (4.0-7.5)	0.11	7.3 (4.0-13.2)	0.56
20-24	199	37.9 (28.7-50.0)	-	7.5 (5.8-9.8)	-	6.2 (3.5-11.0)	-	114	36.7 (26.8-50.4)	-	6.7 (5.2-8.7)	-	6.3 (3.8-10.3)	-
25-29	129	42.4 (32.0-56.1)	0.07	7.8 (6.0-10.3)	0.50	7.9 (4.4-14.2)	0.05	109	39.7 (28.8-54.6)	0.36	7.5 (5.8-9.7)	0.10	6.9 (4.2-11.4)	0.48
30-34	123	46.9 (35.2-62.5)	0.005	8.4 (6.3-11.0)	0.16	9.8 (5.4-17.7)	0.004	87	40.3 (29.1-56.0)	0.36	7.1 (5.5-9.3)	0.42	6.8 (4.1-11.4)	0.61
≥35	70	47.2 (35.3-63.2)	0.01	7.9 (5.9-10.4)	0.61	10.3 (5.6-19.0)	0.005	37	51.4 (36.2-73.0)	0.005	7.4 (5.6-9.9)	0.28	9.5 (5.5-16.4)	0.03
Race / ethnicity														
Non-Hispanic White	469	40.5 (30.9-53.1)	-	7.9 (6.1-10.3)	-	8.0 (4.6-14.1)	-	282	43.3 (32.3-58.0)	-	7.5 (5.9-9.5)	-	8.6 (5.4-13.5)	-
Other	84	40.0 (30.2-53.0)	0.81	7.2 (5.5-9.4)	0.04	7.1 (4.0-12.8)	0.29	79	37.4 (27.4-51.2)	0.02	6.2 (4.8-8.0)	0.0003	6.2 (3.8-10.1)	0.0009
Education														
≤ High school	178	45.1 (35.5-57.3)	-	7.8 (6.2-9.8)	-	10.3 (6.2-16.9)	-	158	43.8 (31.5-60.8)	-	7.2 (5.5-9.5)	-	7.7 (4.6-12.8)	-
Some college	164	44.3 (34.9-56.2)	0.70	7.4 (5.9-9.4)	0.39	9.0 (5.5-14.8)	0.21	105	39.7 (28.5-55.5)	0.12	6.7 (5.1-8.7)	0.10	7.1 (4.2-12.0)	0.48
Bachelor's degree	97	39.0 (31.1-48.9)	0.09	6.5 (5.3-8.1)	0.04	7.6 (4.8-12.1)	0.09	35	40.3 (29.1-55.9)	0.50	6.9 (5.3-9.0)	0.66	7.3 (4.4-12.2)	0.81
Advanced degree	113	37.0 (29.4-46.7)	0.05	6.6 (5.3-8.3)	0.09	6.7 (4.1-10.8)	0.04	63	37.4 (27.3-51.3)	0.22	6.4 (4.9-8.3)	0.25	7.0 (4.3-11.5)	0.68
Grade														
E01-10 (Enlisted)	372	38.7 (29.4-51.0)	-	7.2 (5.5-9.4)	-	7.1 (4.0-12.6)	-	283	41.9 (30.8-57.0)	-	7.0 (5.5-9.1)	-	7.5 (4.6-12.1)	-
O1-O10 (Officer)	181	41.8 (31.1-56.2)	0.39	7.8 (5.9-10.4)	0.34	8.0 (4.3-14.9)	0.50	78	38.7 (27.9-53.7)	0.49	6.6 (5.0-8.6)	0.46	7.1 (4.3-11.8)	0.77
Years of service at serum collection														
<1	125	35.9 (27.0-47.8)	-	7.2 (5.5-9.5)	-	7.1 (3.9-12.8)	-	16	41.5 (27.9-61.5)	-	7.1 (5.1-9.8)	-	6.2 (3.3-11.5)	-
1-<5	172	39.5 (29.9-52.3)	0.09	7.5 (5.8-9.9)	0.40	6.7 (3.8-12.0)	0.64	137	39.3 (29.4-52.7)	0.72	6.9 (5.4-8.7)	0.80	7.5 (4.8-11.9)	0.38
≥5	256	45.8 (34.5-60.8)	0.002	7.9 (6.0-10.3)	0.25	9.1 (5.0-16.3)	0.14	208	40.0 (29.5-54.1)	0.82	6.5 (5.1-8.3)	0.51	8.3 (5.2-13.3)	0.25
Military occupation: fire protection														
No	548	27.3 (22.26-33.4)	-	5.7 (4.7-6.9)	-	4.2 (2.7-6.4)	-	356	27.2 (22.3-33.3)	-	5.3 (4.5-6.3)	-	4.4 (3.2-6.0)	-
Yes	5	59.3 (38.9-90.6)	<0.0001	9.9 (6.6-14.9)	0.003	13.7 (5.7-33.1)	0.003	5	59.5 (36.9-95.9)	0.0004	8.7 (5.9-12.8)	0.007	12.2 (5.8-25.6)	0.003
Stationed at facility with elevated PFAS in drinking water														
No	531	40.0 (30.8-52.1)	-	7.5 (5.8-9.6)	-	6.6 (3.8-11.5)	-	341	40.4 (30.7-53.1)	-	6.5 (5.2-8.1)	-	5.6 (3.6-8.5)	-
Yes	22	40.4 (29.7-55.1)	0.91	7.5 (5.6-10.2)	0.93	8.6 (4.5-16.4)	0.18	20	40.2 (28.1-57.3)	0.97	7.1 (5.3-9.5)	0.33	9.5 (5.5-16.6)	0.003
Stationed at facility with elevated PFAS in groundwater														
No	197	39.8 (30.2-52.5)	-	7.6 (5.8-9.9)	-	8.4 (4.7-14.9)	-	49	39.9 (29.1-54.8)	-	6.9 (5.4-9.0)	-	7.3 (4.5-12.0)	-
Yes	356	40.7 (30.9-53.5)	0.61	7.5 (5.7-9.7)	0.80	6.8 (3.8-12.0)	0.02	312	40.6 (30.1-54.7)	0.84	6.7 (5.2-8.5)	0.55	7.2 (4.5-11.5)	0.93

Abbreviations: PFAS, per- and polyfluoroalkyl substances; PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexane sulfonic acid; CI, confidence interval.

^aLeast-squares geometric means computed from multiple linear regression models adjusting for all variables listed in the table and case-control status

Supplementary Table 6: Least squares geometric mean (GM) concentrations of PFOS, PFOA and PFHxS (ng/mL) in relation to subject and sample characteristics restricted to controls with serum collected from active-duty U.S. Air Force servicemen after start of military service (n = 415).

	First/Only Sample (n = 415)							Second Sample (n = 181)						
	N	PFOS GM ^a (95% CI)	P	PFOA GM ^a (95% CI)	P	PFHxS GM ^a (95% CI)	P	N	PFOS GM ^a (95% CI)	P	PFOA GM ^a (95% CI)	P	PFHxS GM ^a (95% CI)	P
Year serum collected														
<1996	16	56.8 (37.0-87.3)	0.10	7.3 (5.1-10.5)	0.07	6.1 (2.8-13.1)	0.02	1	50.5 (19.7-129.2)	0.42	6.1 (2.6-14.1)	0.19	3.4 (0.6-19.0)	0.19
1996-1998	157	72.1 (51.2-101.4)	-	9.1 (6.8-12.2)	-	10.8 (5.9-19.8)	-	17	71.7 (43.9-117.0)	-	10.2 (6.6-15.8)	-	9.6 (3.9-23.6)	-
1999-2004	132	65.0 (45.8-92.2)	0.12	10.3 (7.7-13.9)	0.03	11.2 (6.0-20.8)	0.78	69	57.5 (36.2-91.4)	0.05	10.5 (6.9-15.9)	0.76	10.4 (4.4-24.2)	0.73
≥2005	110	26.8 (18.8-38.1)	<0.0001	5.9 (4.4-8.0)	<0.0001	7.4 (3.9-13.9)	0.009	94	25.3 (15.7-40.8)	<0.0001	6.9 (4.5-10.5)	0.0001	5.9 (2.5-14.1)	0.02
Age at serum collection														
<20	84	43.7 (29.9-63.7)	0.86	7.1 (5.2-9.8)	0.22	5.1 (2.6-10.0)	0.04	6	36.3 (19.6-67.2)	0.20	6.8 (3.9-11.7)	0.41	8.2 (2.7-25.4)	0.26
20-24	160	44.3 (31.2-62.9)	-	7.7 (5.7-10.4)	-	6.8 (3.6-12.6)	-	59	47.7 (28.3-80.3)	-	7.9 (5.0-12.6)	-	5.3 (2.0-13.8)	-
25-29	73	53.8 (37.7-76.9)	0.03	8.6 (6.3-11.6)	0.17	9.8 (5.2-18.4)	0.02	55	45.8 (27.5-76.5)	0.69	8.5 (5.4-13.5)	0.39	5.5 (2.1-14.0)	0.86
30-34	64	58.5 (40.2-85.2)	0.02	8.2 (6.0-11.3)	0.49	10.3 (5.3-20.1)	0.04	42	49.7 (29.3-84.4)	0.73	8.5 (5.3-13.6)	0.52	5.6 (2.1-14.6)	0.83
≥35	34	60.5 (40.4-90.5)	0.03	8.5 (6.0-11.9)	0.44	13.5 (6.6-27.6)	0.007	19	63.9 (36.7-111.3)	0.04	9.5 (5.8-15.6)	0.14	10.0 (3.6-27.7)	0.02
Race / ethnicity														
Non-Hispanic White	329	52.8 (37.5-74.2)	-	8.4 (6.3-11.2)	-	9.4 (5.1-17.2)	-	142	50.5 (30.6-83.4)	-	9.1 (5.8-14.2)	-	8.1 (3.2-20.2)	-
Other	86	50.6 (35.4-72.3)	0.50	7.6 (5.7-10.3)	0.09	7.9 (4.2-14.9)	0.12	39	45.4 (27.1-76.2)	0.17	7.4 (4.6-11.7)	0.002	5.5 (2.1-14.3)	0.008
Education														
≤ High school	198	51.0 (37.3-69.7)	-	8.2 (6.3-10.7)	-	12.0 (6.9-21.0)	-	82	51.5 (30.0-88.3)	-	8.7 (5.4-14.1)	-	7.1 (2.7-19.2)	-
Some college	108	51.0 (37.2-69.9)	0.99	7.9 (6.0-10.2)	0.45	10.9 (6.2-19.2)	0.43	51	48.9 (28.7-83.4)	0.50	8.3 (5.2-13.4)	0.46	6.9 (2.6-18.3)	0.79
Bachelor's degree	49	39.2 (28.9-53.2)	0.03	6.7 (5.2-8.7)	0.05	8.1 (4.7-14.0)	0.07	17	48.1 (28.2-82.2)	0.61	9.3 (5.8-15.0)	0.61	6.9 (2.6-18.5)	0.91
Advanced degree	59	40.8 (30.0-55.6)	0.12	7.2 (5.5-9.3)	0.26	6.8 (4.0-11.9)	0.03	31	43.5 (26.0-72.6)	0.29	6.7 (4.2-10.5)	0.06	5.9 (2.3-15.0)	0.50
Grade														
E01-10 (Enlisted)	330	48.5 (34.4-68.4)	-	7.8 (5.8-10.4)	-	7.6 (4.1-14.0)	-	147	49.2 (29.5-82.2)	-	8.0 (5.1-12.7)	-	6.4 (2.5-16.3)	-
O1-O10 (Officer)	85	55.0 (37.4-81.0)	0.33	8.2 (5.9-11.4)	0.61	9.7 (4.9-19.3)	0.29	34	46.6 (27.3-79.6)	0.71	8.4 (5.2-13.5)	0.74	7.0 (2.6-18.7)	0.73
Years of service at serum collection														
<1	202	49.0 (34.1-70.6)	-	8.1 (5.9-11.0)	-	8.4 (4.4-16.0)	-	7	53.3 (29.1-97.4)	-	8.2 (4.8-14.0)	-	6.8 (2.2-20.5)	-
1-<5	87	51.5 (35.8-74.2)	0.54	8.0 (5.9-10.9)	0.90	7.5 (3.9-14.4)	0.46	70	44.9 (27.2-74.4)	0.40	8.6 (5.5-13.5)	0.77	6.1 (2.4-15.2)	0.76
≥5	126	54.6 (38.1-78.2)	0.37	7.9 (5.9-10.7)	0.85	10.0 (5.3-19.1)	0.39	104	45.9 (27.4-77.1)	0.50	7.8 (4.9-12.4)	0.81	7.3 (2.8-18.7)	0.86
Military occupation: fire protection														
No	410	34.6 (26.3-45.6)	-	6.1 (4.8-7.6)	-	4.8 (2.9-7.8)	-	180	28.3 (20.9-38.4)	-	6.0 (4.6-7.9)	-	4.9 (2.8-8.6)	-
Yes	5	77.1 (46.1-129.1)	0.0006	10.6 (6.8-16.3)	0.005	15.5 (6.2-38.8)	0.005	1	81.1 (34.3-191.4)	0.01	11.2 (5.2-24.1)	0.09	9.1 (1.9-43.9)	0.41
Stationed at facility with elevated PFAS in drinking water														
No	404	48.0 (34.8-66.3)	-	7.8 (6.0-10.3)	-	6.9 (3.9-12.3)	-	176	43.0 (26.9-68.7)	-	7.0 (4.6-10.7)	-	5.0 (2.1-11.7)	-
Yes	11	55.6 (36.2-85.4)	0.37	8.2 (5.7-11.8)	0.73	10.7 (5.0-22.9)	0.14	5	53.4 (29.3-97.3)	0.26	9.6 (5.6-16.3)	0.07	9.0 (3.0-26.9)	0.10
Stationed at facility with elevated PFAS in groundwater														
No	126	55.3 (39.1-78.3)	-	8.4 (6.3-11.3)	-	9.4 (5.1-17.5)	-	23	48.7 (29.5-80.5)	-	8.3 (5.2-13.3)	-	6.6 (2.5-17.2)	-
Yes	289	48.3 (34.0-68.5)	0.03	7.6 (5.7-10.2)	0.06	7.8 (4.2-14.6)	0.10	158	47.1 (27.9-79.7)	0.75	8.1 (5.1-12.6)	0.71	6.8 (2.7-17.1)	0.85

Abbreviations: PFAS, per- and polyfluoroalkyl substances; PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; CI, confidence interval.

^aLeast-squares geometric means computed from multiple linear regression models adjusting for all variables listed in the table.

Supplementary Table 7: Least squares geometric mean (GM) concentrations for MeFOSAA, PFNA, PFDA and PFUnDA (ng/mL) in relation to subject and sample characteristics for samples collected from active-duty U.S. Air Force servicemen after start of military service (n = 830).

	First/Only ¹ (n = 830)								Second Sample (n = 362)							
	MeFOSAA		PFNA		PFDA		PFUnDA		MeFOSAA		PFNA		PFDA		PFUnDA	
	GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P	GM ^a (95% CI)	P
Year serum collected																
<1996	1.5 (0.9, 2.3)	<0.001	0.8 (0.6, 1.1)	0.34	0.2 (0.2, 0.3)	0.39	0.2 (0.2, 0.3)	0.03	1.0 (0.4, 2.9)	0.12	0.7 (0.4, 1.3)	0.62	0.2 (0.1, 0.3)	0.38	0.1 (0.1, 0.3)	0.71
1996-1998	3.1 (2.2, 4.6)	-	0.7 (0.5, 0.9)	-	0.2 (0.1, 0.3)	-	0.2 (0.1, 0.2)	-	2.3 (1.4, 3.8)	-	0.8 (0.6, 1.1)	-	0.2 (0.1, 0.3)	-	0.2 (0.1, 0.2)	-
1999-2004	2.1 (1.5, 3.2)	<0.001	0.8 (0.6, 1.0)	0.01	0.2 (0.2, 0.3)	<0.001	0.2 (0.1, 0.3)	0.01	1.3 (0.8, 2.1)	0.0005	0.9 (0.7, 1.2)	0.45	0.3 (0.2, 0.3)	<0.0001	0.2 (0.2, 0.3)	0.0001
>2004	0.4 (0.3, 0.7)	<0.0001	1.1 (0.8, 1.5)	<0.0001	0.3 (0.3, 0.4)	<0.0001	0.2 (0.2, 0.3)	<0.0001	0.2 (0.1, 0.3)	<0.0001	1.5 (1.1, 1.9)	<0.0001	0.4 (0.4, 0.6)	<0.0001	0.3 (0.2, 0.4)	<0.0001
Age at serum collection																
<20	1.7 (1.1, 2.6)	0.28	0.7 (0.6, 1.0)	0.002	0.2 (0.2, 0.3)	0.09	0.2 (0.1, 0.2)	0.008	1.0 (0.6, 1.9)	0.74	0.7 (0.5, 1.0)	0.06	0.2 (0.1, 0.2)	0.007	0.1 (0.1, 0.2)	0.06
20-24	1.6 (1.1, 2.3)	-	0.9 (0.7, 1.1)	-	0.3 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-	0.9 (0.6, 1.6)	-	0.9 (0.7, 1.2)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.2)	-
25-29	1.5 (1.0, 2.3)	0.66	0.9 (0.7, 1.1)	0.84	0.3 (0.2, 0.3)	0.46	0.2 (0.2, 0.3)	0.0004	0.8 (0.5, 1.3)	0.19	1.0 (0.8, 1.4)	0.09	0.3 (0.2, 0.3)	0.04	0.2 (0.1, 0.3)	0.34
30-34	1.4 (0.9, 2.0)	0.18	0.9 (0.7, 1.2)	0.85	0.2 (0.2, 0.3)	0.97	0.2 (0.2, 0.3)	0.11	0.8 (0.5, 1.4)	0.33	1.0 (0.7, 1.4)	0.19	0.3 (0.2, 0.4)	0.004	0.2 (0.2, 0.3)	0.007
≥35	1.1 (0.8, 1.7)	0.02	0.8 (0.6, 1.1)	0.55	0.2 (0.2, 0.3)	0.12	0.2 (0.2, 0.3)	0.15	1.0 (0.5, 1.7)	0.94	1.1 (0.8, 1.6)	0.07	0.3 (0.2, 0.4)	0.01	0.3 (0.2, 0.4)	0.0009
Race / ethnicity																
NH White	1.5 (1.1, 2.3)	-	0.8 (0.6, 1.1)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-	1.1 (0.7, 1.8)	-	1.0 (0.7, 1.3)	-	0.3 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-
Other	1.4 (0.9, 2.0)	0.03	0.8 (0.6, 1.1)	0.52	0.2 (0.2, 0.3)	0.85	0.2 (0.2, 0.3)	0.02	0.7 (0.4, 1.2)	0.0003	0.9 (0.7, 1.2)	0.35	0.2 (0.2, 0.3)	0.23	0.2 (0.1, 0.3)	0.31
Education																
≤ High school	1.2 (0.8, 1.7)	-	0.9 (0.7, 1.1)	-	0.2 (0.2, 0.3)	-	0.2 (0.2, 0.3)	-	0.9 (0.5, 1.6)	-	0.9 (0.7, 1.3)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-
Some college	1.2 (0.9, 1.8)	0.76	0.9 (0.7, 1.1)	0.44	0.2 (0.2, 0.3)	0.55	0.2 (0.2, 0.3)	0.99	0.8 (0.5, 1.4)	0.33	0.9 (0.7, 1.3)	0.78	0.2 (0.2, 0.3)	0.39	0.2 (0.1, 0.3)	0.79
Bachelor	1.1 (0.8, 1.6)	0.62	0.8 (0.6, 1.0)	0.05	0.2 (0.2, 0.3)	0.16	0.2 (0.1, 0.2)	0.01	1.1 (0.6, 1.8)	0.38	1.0 (0.7, 1.3)	0.79	0.3 (0.2, 0.3)	0.87	0.2 (0.1, 0.3)	0.17
Advanced	1.2 (0.8, 1.7)	0.98	0.8 (0.6, 1.0)	0.15	0.2 (0.2, 0.3)	0.33	0.2 (0.1, 0.2)	0.13	0.8 (0.5, 1.4)	0.67	0.9 (0.7, 1.3)	0.94	0.2 (0.2, 0.3)	0.55	0.2 (0.1, 0.3)	0.21
Grade																
E01-E10	1.5 (1.0, 2.2)	-	0.8 (0.6, 1.0)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-	0.9 (0.5, 1.5)	-	1.0 (0.7, 1.3)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-
O1-O10	1.4 (0.9, 2.1)	0.46	0.9 (0.6, 1.2)	0.26	0.2 (0.2, 0.3)	0.58	0.2 (0.2, 0.3)	0.04	0.9 (0.5, 1.5)	0.88	0.9 (0.6, 1.2)	0.38	0.2 (0.2, 0.3)	0.62	0.2 (0.1, 0.3)	0.32
Number of service years at serum collection																
<1	1.2 (0.8, 1.8)	-	0.9 (0.7, 1.2)	-	0.3 (0.2, 0.3)	-	0.2 (0.2, 0.3)	-	0.7 (0.4, 1.3)	-	1.2 (0.8, 1.8)	-	0.3 (0.2, 0.4)	-	0.3 (0.2, 0.4)	-
1-<5	1.4 (1.0, 2.1)	0.04	0.8 (0.6, 1.0)	0.007	0.2 (0.2, 0.3)	0.01	0.2 (0.1, 0.3)	0.004	1.1 (0.7, 1.7)	0.08	0.9 (0.6, 1.1)	0.02	0.2 (0.2, 0.3)	0.009	0.2 (0.1, 0.2)	0.02
≥5	1.7 (1.1, 2.5)	0.003	0.8 (0.6, 1.1)	0.47	0.3 (0.2, 0.3)	0.81	0.2 (0.1, 0.3)	0.13	1.0 (0.6, 1.6)	0.18	0.8 (0.6, 1.1)	0.02	0.2 (0.2, 0.3)	0.0001	0.2 (0.1, 0.2)	0.003
Military occupation: fire protection																
No	1.2 (0.9, 1.5)	-	0.8 (0.7, 1.0)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.2)	-	0.9 (0.6, 1.2)	-	0.8 (0.7, 1.0)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.2)	-
Yes	1.8 (0.9, 3.4)	0.19	0.9 (0.5, 1.4)	0.74	0.2 (0.2, 0.4)	0.75	0.2 (0.1, 0.4)	0.16	0.9 (0.4, 2.1)	0.80	1.0 (0.6, 1.7)	0.30	0.2 (0.2, 0.4)	0.82	0.2 (0.1, 0.4)	0.19
Stationed at facility with elevated in drinking																
No	1.4 (1.0, 2.1)	-	0.9 (0.7, 1.1)	-	0.3 (0.2, 0.3)	-	0.2 (0.2, 0.3)	-	0.9 (0.6, 1.4)	-	0.9 (0.7, 1.2)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-
Yes	1.5 (0.9, 2.3)	0.94	0.8 (0.6, 1.1)	0.36	0.2 (0.2, 0.3)	0.21	0.2 (0.1, 0.3)	0.61	0.9 (0.5, 1.6)	0.98	0.9 (0.6, 1.3)	0.94	0.2 (0.2, 0.3)	0.89	0.2 (0.1, 0.3)	0.77
Stationed at facility with elevated PFAS in groundwater																
No	1.5 (1.0, 2.2)	-	0.8 (0.6, 1.1)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-	0.9 (0.5, 1.5)	-	0.9 (0.7, 1.2)	-	0.2 (0.2, 0.3)	-	0.2 (0.1, 0.3)	-
Yes	1.4 (1.0, 2.1)	0.53	0.8 (0.6, 1.1)	0.82	0.2 (0.2, 0.3)	0.41	0.2 (0.1, 0.3)	0.62	1.0 (0.6, 1.5)	0.59	1.0 (0.7, 1.3)	0.40	0.2 (0.2, 0.3)	0.87	0.2 (0.1, 0.3)	0.99

Abbreviations: MeFOSAA, 2-(N-methyl-perfluorooctane sulfonamido) acetic acid; PFNA, perfluorononanoic acid; PFDA, perfluorodecanoic acid; PFUnDA, perfluoroundecanoic acid; CI, confidence interval.

^aLeast-squares geometric means computed from multiple linear regression models adjusting for all variables listed in the table and case-control status.

Supplementary Table 8: Least squares arithmetic means of first and second principal components (PC1 and PC2) from principal component analysis of measured per- and polyfluoroalkyl substances in relation to subject and sample characteristics for samples collected from active-duty U.S. Air Force servicemen after start of military service (n = 830).

	First/Only Sample (n = 830)					Second Sample (n = 362)				
	N	PC1		PC2		N	PC1		PC2	
		Mean ^a (95% CI)	P	Mean ^a (95% CI)	P		Mean ^a (95% CI)	P	Mean ^a (95% CI)	P
Year serum collected										
<1996	33	4.5 (3.9, 5.0)	<0.0001	-0.3 (-0.9, 0.4)	0.32	3	4.4 (3.4, 5.4)	0.11	-0.8 (-1.8, 0.2)	0.29
1996-1998	313	5.3 (4.8, 5.7)	-	-0.4 (-1.0, 0.1)	-	34	5.2 (4.7, 5.7)	-	-0.3 (-0.8, 0.2)	-
1999-2004	264	4.9 (4.4, 5.4)	<0.0001	-0.1 (-0.7, 0.4)	0.0001	136	4.6 (4.2, 5.1)	0.0003	0.1 (-0.3, 0.6)	0.009
≥2005	220	3.2 (2.7, 3.7)	<0.0001	0.1 (-1.0, 0.1)	<0.0001	189	2.7 (2.3, 3.1)	<0.0001	0.6 (0.2, 1.0)	<0.0001
Age at serum collection										
<20	173	4.3 (3.8, 4.8)	0.66	-0.6 (-1.1, 0.0)	0.0002	15	4.4 (3.8, 5.0)	0.27	-0.7 (-1.3, 0.1)	0.04
20-24	301	4.3 (3.8, 4.8)	-	-0.3 (-0.8, 0.3)	-	114	4.1 (3.6, 4.7)	-	-0.3 (-0.8, 0.3)	-
25-29	160	4.5 (4.0, 5.0)	0.15	0.0 (-0.6, 0.5)	0.01	109	4.1 (3.6, 4.6)	0.91	0.0 (-0.5, 0.5)	0.04
30-34	126	4.6 (4.1, 5.2)	0.02	0.0 (-0.5, 0.6)	0.03	87	4.1 (3.5, 4.6)	0.66	0.2 (-0.3, 0.7)	0.007
≥35	70	4.6 (4.1, 5.2)	0.13	-0.1 (-0.6, 0.5)	0.22	37	4.4 (3.8, 5.0)	0.19	0.4 (-0.2, 1.0)	0.0007
Race / ethnicity										
Non-Hispanic White	658	4.6 (4.1, 5.1)	-	-0.2 (-0.7, 0.4)	-	284	4.4 (3.9, 4.9)	-	0.0 (-0.5, 0.5)	-
Other	172	4.4 (3.9, 4.9)	0.006	-0.2 (-0.7, 0.4)	0.83	78	4.0 (3.5, 4.5)	<0.0001	-0.2 (-0.7, 0.3)	0.08
Education										
≤ High school	387	4.6 (4.1, 5.0)	-	0.1 (-0.4, 0.5)	-	159	4.3 (3.8, 4.9)	-	-0.1 (-0.6, 0.5)	-
Some college	200	4.5 (4.1, 4.9)	0.50	0.1 (-0.4, 0.5)	0.97	105	4.2 (3.6, 4.7)	0.13	-0.2 (-0.7, 0.4)	0.40
Bachelor's degree	117	4.4 (4.0, 4.8)	0.19	-0.3 (-0.7, 0.2)	0.01	35	4.3 (3.8, 4.8)	0.87	0.0 (-0.5, 0.5)	0.72
Advanced degree	124	4.4 (4.0, 4.8)	0.19	-0.2 (-0.7, 0.2)	0.07	63	4.1 (3.6, 4.6)	0.28	-0.1 (-0.6, 0.4)	0.95
Grade										
E01-10 (Enlisted)	633	4.5 (4.0, 5.0)	-	-0.3 (-0.8, 0.3)	-	284	4.3 (3.7, 4.8)	-	0.0 (-0.5, 0.5)	-
O1-O10 (Officer)	197	4.5 (3.9, 5.0)	0.93	-0.1 (-0.6, 0.5)	0.15	78	4.2 (3.6, 4.7)	0.74	-0.2 (-0.7, 0.4)	0.33
Years of service at serum collection										
<1	403	4.3 (3.8, 4.8)	-	-0.1 (-0.6, 0.5)	-	17	4.0 (3.4, 4.6)	-	0.3 (-0.3, 0.9)	-
1-<5	171	4.5 (4.0, 5.0)	0.02	-0.3 (-0.9, 0.2)	0.008	137	4.3 (3.8, 4.8)	0.13	-0.2 (-0.6, 0.3)	0.04
≥5	256	4.7 (4.2, 5.2)	0.0005	-0.1 (-0.7, 0.4)	0.90	208	4.4 (3.8, 4.9)	0.14	-0.3 (-0.8, 0.2)	0.01
Military occupation: fire protection										
No	825	3.8 (3.5, 4.2)	-	-0.6 (-1.0, -0.2)	-	357	3.7 (3.4, 4.1)	-	-0.5 (-0.8, -0.2)	-
Yes	5	5.1 (4.3, 5.9)	0.0004	0.3 (-0.6, 1.1)	0.03	5	4.7 (3.9, 5.5)	0.006	0.3 (-0.4, 1.1)	0.02
Stationed at facility with elevated PFAS in drinking water										
No	804	4.4 (3.9, 4.8)	-	-0.1 (-0.7, 0.4)	-	342	4.1 (3.6, 4.6)	-	-0.2 (-0.6, 0.3)	-
Yes	26	4.6 (4.0, 5.1)	0.21	-0.2 (-0.8, 0.4)	0.72	20	4.3 (3.8, 4.9)	0.20	0.0 (-0.6, 0.6)	0.38
Stationed at facility with elevated PFAS in groundwater										
No	235	4.5 (4.0, 5.0)	-	-0.2 (-0.7, 0.4)	-	50	4.2 (3.7, 4.7)	-	-0.1 (-0.6, 0.4)	-
Yes	595	4.4 (3.9, 4.9)	0.26	-0.2 (-0.7, 0.3)	0.56	312	4.2 (3.8, 4.7)	0.74	-0.1 (-0.6, 0.4)	0.82

^aLeast-squares arithmetic means of principal components computed from multiple linear regression models adjusting for all variables listed in the table and case-control status.

Supplementary Table 9: Case-control analysis investigating the association between serum pre-diagnostic concentrations of PFOS, PFOA, PFHxS and PFNA (categorized using quartiles among controls as cutpoints) and testicular germ cell tumors among active-duty U.S. Air Force servicemen, restricted to matched sets with case samples collected ≥ 0.3 years after start of military service (269 cases, 269 controls).

PFOS				PFOA				PFHxS				PFNA			
Conc. (ng/mL)	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	Conc. (ng/mL)	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	Conc. (ng/mL)	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	Conc. (ng/mL)	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)
<i>All Subjects:</i>															
<i>First/Only Sample</i>															
≤18.3	32/33	1.0	1.0	≤4.45	56/51	1.0	1.0	≤2.1	41/44	1.0	1.0	≤0.6	96/85	1.0	1.0
18.4-29.3	45/55	1.1 (0.5, 2.2)	1.4 (0.6, 3.3)	4.46-5.87	65/55	1.0 (0.6, 1.9)	1.0 (0.5, 2.0)	2.2-3.6	63/58	1.1 (0.6, 2.0)	1.2 (0.6, 2.3)	0.7-0.9	91/92	0.8 (0.5, 1.2)	0.6 (0.4, 1.1)
29.4-42.2	98/79	1.7 (0.8, 3.8)	2.3 (0.9, 6.2)	5.88-7.85	68/80	0.8 (0.5, 1.4)	0.9 (0.4, 1.7)	3.7-7.0	84/81	1.1 (0.6, 1.9)	1.1 (0.6, 2.1)	1.0-1.2	50/57	0.7 (0.4, 1.2)	0.6 (0.3, 1.2)
>42.2	94/102	1.2 (0.6, 2.8)	2.0 (0.7, 6.0)	>7.85	80/83	0.9 (0.5, 1.5)	0.9 (0.4, 2.0)	>7.0	81/86	1.0 (0.6, 1.8)	1.0 (0.5, 2.1)	>1.2	32/35	0.7 (0.3, 1.4)	0.5 (0.2, 1.3)
		<i>P</i> _{trend} = 0.96	<i>P</i> _{trend} = 0.38			<i>P</i> _{trend} = 0.49	<i>P</i> _{trend} = 0.81			<i>P</i> _{trend} = 0.75	<i>P</i> _{trend} = 0.77			<i>P</i> _{trend} = 0.23	<i>P</i> _{trend} = 0.15
<i>Subjects With Two Samples:</i>															
<i>First Sample</i>															
≤18.3	8/ 13	1.0	1.0	≤4.45	15/ 18	1.0	1.0	≤2.1	18/12	1.0	1.0	≤0.6	32/ 32	1.0	1.0
18.4-29.3	21/ 21	2.2 (0.7, 7.0)	3.1 (0.7, 14.5)	4.46-5.87	29/ 25	1.4 (0.6, 3.5)	1.7 (0.5, 6.5)	2.2-3.6	22/23	0.5 (0.2, 1.6)	0.3 (0.1, 1.4)	0.7-0.9	35/ 34	1.1 (0.5, 2.3)	0.7 (0.2, 1.8)
29.4-42.2	39/ 35	2.9 (0.8, 10.0)	4.0 (0.6, 25.5)	5.88-7.85	24/ 26	1.2 (0.4, 3.4)	2.0 (0.4, 9.2)	3.7-7.0	28/32	0.5 (0.2, 1.4)	0.3 (0.1, 1.1)	1.0-1.2	16/ 19	0.9 (0.4, 2.2)	0.5 (0.1, 1.9)
>42.2	26/ 25	3.0 (0.8, 11.6)	4.8 (0.7, 34.5)	>7.85	26/ 25	1.5 (0.5, 4.0)	1.8 (0.4, 8.9)	>7.0	26/27	0.6 (0.2, 1.7)	0.3 (0.1, 1.3)	>1.2	11/ 9	1.4 (0.4, 4.4)	0.5 (0.1, 3.0)
		<i>P</i> _{trend} = 0.20	<i>P</i> _{trend} = 0.28			<i>P</i> _{trend} = 0.54	<i>P</i> _{trend} = 0.64			<i>P</i> _{trend} = 0.85	<i>P</i> _{trend} = 0.51			<i>P</i> _{trend} = 0.71	<i>P</i> _{trend} = 0.41
<i>Second Sample</i>															
≤13.2	39/ 45	1.0	1.0	≤4.25	51/ 46	1.0	1.0	≤2.3	45/47	1.0	1.0	≤0.7	49/ 45	1.0	1.0
13.3-21.2	37/ 45	1.1 (0.6, 2.0)	1.6 (0.7, 3.6)	4.26-5.65	51/ 44	1.1 (0.6, 1.9)	1.1 (0.5, 2.2)	2.4-3.7	41/43	1.1 (0.6, 2.3)	1.2 (0.6, 2.7)	0.8-1.0	50/ 44	1.0 (0.5, 1.8)	0.6 (0.3, 1.4)
21.3-33.5	49/ 46	2.0 (0.9, 4.4)	3.0 (1.1, 7.8)	5.66-7.55	39/ 48	0.8 (0.4, 1.5)	0.7 (0.3, 1.6)	3.8-6.2	41/45	1.0 (0.6, 2.0)	0.7 (0.3, 1.5)	1.1-1.5	44/ 46	0.8 (0.4, 1.6)	0.4 (0.1, 1.0)
>33.5	55/ 44	2.8 (1.1, 7.2)	5.0 (1.5, 17.1)	>7.55	39/ 42	0.8 (0.4, 1.6)	0.6 (0.2, 1.7)	>6.2	53/45	1.4 (0.7, 2.9)	1.1 (0.5, 2.5)	>1.5	37/ 45	0.7 (0.3, 1.4)	0.2 (0.1, 0.7)
		<i>P</i> _{trend} = 0.02	<i>P</i> _{trend} = 0.008			<i>P</i> _{trend} = 0.37	<i>P</i> _{trend} = 0.25			<i>P</i> _{trend} = 0.26	<i>P</i> _{trend} = 0.82			<i>P</i> _{trend} = 0.24	<i>P</i> _{trend} = 0.01

Abbreviations: PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; PFNA, perfluorononaic acid; OR, odds ratio; CI, confidence interval.

^aORs computed by conditional logistic regression of matched pairs with adjustment for military grade and number of deployments.

^bORs computed by conditional logistic regression of matched pairs with adjustment for military grade, number of deployments and all other PFAS (all PFAS covariates involve the same exposure metric and categorization as the PFAS of interest).

Supplementary Table 10: Case-control analysis investigating the association between serum pre-diagnostic concentrations of PFOS, PFOA, PFHxS and PFNA (categorized using quartiles among controls as cutpoints) and testicular germ cell tumors among active-duty U.S. Air Force servicemen without adjustment for military grade or number of deployments (530 cases, 530 controls).

Conc. (ng/mL)	PFOS			Conc. (ng/mL)	PFOA			Conc. (ng/mL)	PFHxS			Conc. (ng/mL)	PFNA		
	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)		N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)		N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)		N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)
<i>All Subjects:</i>															
<i>First/Only Sample</i>															
≤18.3	131/133	1.0	1.0	≤4.45	161/139	1.0	1.0	≤2.1	129/138	1.0	1.0	≤0.6	177/156	1.0	1.0
18.4-29.3	116/135	0.9 (0.6, 1.4)	1.1 (0.7, 1.8)	4.46-5.87	115/126	0.7 (0.5, 1.1)	0.7 (0.5, 1.1)	2.2-3.6	118/133	1.0 (0.7, 1.4)	0.9 (0.6, 1.4)	0.7-0.9	172/151	0.9 (0.7, 1.3)	0.8 (0.6, 1.2)
29.4-42.2	153/131	1.3 (0.8, 2.2)	1.8 (1.0, 3.3)	5.88-7.85	121/137	0.7 (0.5, 1.0)	0.7 (0.5, 1.1)	3.7-7.0	146/128	1.3 (0.9, 1.8)	1.2 (0.8, 1.8)	1.0-1.2	91/101	0.7 (0.5, 1.0)	0.6 (0.4, 1.0)
>42.2	130/131	1.2 (0.7, 1.9)	1.8 (0.9, 3.5)	>7.85	133/128	0.8 (0.6, 1.2)	0.8 (0.5, 1.4)	>7.0	137/131	1.1 (0.8, 1.6)	1.2 (0.8, 1.8)	>1.2	90/122	0.5 (0.3, 0.7)	0.4 (0.2, 0.7)
		<i>P</i> _{trend} = 0.54	<i>P</i> _{trend} = 0.13			<i>P</i> _{trend} = 0.56	<i>P</i> _{trend} = 0.86			<i>P</i> _{trend} = 0.43	<i>P</i> _{trend} = 0.40			<i>P</i> _{trend} = 0.0006	<i>P</i> _{trend} = 0.002
<i>Subjects With Two Samples:</i>															
<i>First Sample</i>															
≤18.3	29/ 33	1.0	1.0	≤4.45	46/ 35	1.0	1.0	≤2.1	44/40	1.0	1.0	≤0.6	60/ 62	1.0	1.0
18.4-29.3	49/ 54	1.1 (0.6, 2.1)	1.2 (0.5, 2.5)	4.46-5.87	46/ 58	0.6 (0.3, 1.1)	0.6 (0.3, 1.3)	2.2-3.6	47/49	0.9 (0.5, 1.6)	0.8 (0.4, 1.5)	0.7-0.9	71/ 52	1.4 (0.8, 2.4)	1.0 (0.5, 1.9)
29.4-42.2	65/ 61	1.4 (0.7, 2.9)	1.5 (0.6, 3.8)	5.88-7.85	47/ 52	0.6 (0.3, 1.2)	0.8 (0.3, 1.7)	3.7-7.0	50/52	0.8 (0.4, 1.6)	0.8 (0.4, 1.8)	1.0-1.2	24/ 35	0.7 (0.4, 1.3)	0.4 (0.2, 1.1)
>42.2	44/ 39	1.5 (0.7, 3.3)	2.0 (0.6, 6.2)	>7.85	48/ 42	0.9 (0.5, 1.7)	1.0 (0.4, 2.5)	>7.0	46/46	0.9 (0.5, 1.7)	0.8 (0.4, 1.7)	>1.2	32/ 38	0.8 (0.4, 1.6)	0.4 (0.1, 1.3)
		<i>P</i> _{trend} = 0.29	<i>P</i> _{trend} = 0.21			<i>P</i> _{trend} = 0.98	<i>P</i> _{trend} = 0.25			<i>P</i> _{trend} = 0.91	<i>P</i> _{trend} = 0.78			<i>P</i> _{trend} = 0.23	<i>P</i> _{trend} = 0.06
<i>Second Sample</i>															
≤13.2	42/ 48	1.0	1.0	≤4.25	55/ 48	1.0	1.0	≤2.3	48/49	1.0	1.0	≤0.7	44/ 40	1.0	1.0
13.3-21.2	38/ 46	1.1 (0.6, 2.0)	1.7 (0.8, 3.6)	4.26-5.65	52/ 46	0.9 (0.5, 1.6)	0.9 (0.4, 1.8)	2.4-3.7	42/46	1.0 (0.5, 1.9)	1.1 (0.5, 2.2)	0.8-1.0	47/ 49	0.9 (0.5, 1.7)	0.7 (0.3, 1.5)
21.3-33.5	50/ 47	1.7 (0.8, 3.5)	2.7 (1.1, 6.9)	5.66-7.55	39/ 49	0.6 (0.3, 1.2)	0.6 (0.3, 1.2)	3.8-6.2	41/46	1.0 (0.5, 1.8)	0.8 (0.4, 1.6)	1.1-1.5	50/ 52	0.7 (0.3, 1.3)	0.3 (0.1, 0.9)
>33.5	57/ 46	2.5 (1.0, 5.9)	5.1 (1.6, 16.1)	>7.55	41/ 44	0.7 (0.3, 1.4)	0.6 (0.2, 1.4)	>6.2	56/46	1.3 (0.7, 2.5)	1.0 (0.5, 2.2)	>1.5	46/ 46	0.6 (0.3, 1.2)	0.2 (0.1, 0.7)
		<i>P</i> _{trend} = 0.03	<i>P</i> _{trend} = 0.006			<i>P</i> _{trend} = 0.35	<i>P</i> _{trend} = 0.18			<i>P</i> _{trend} = 0.26	<i>P</i> _{trend} = 0.76			<i>P</i> _{trend} = 0.12	<i>P</i> _{trend} = 0.01
<i>Both Samples (First/Second)</i>															
≤29.3/≤21.2	53/ 67	1.0	1.0	≤4.45/≤4.25	72/ 65	1.0	1.0	≤3.6/≤3.7	72/73	1.0	1.0	≤0.9/≤1.0	92/ 73	1.0	1.0
>29.3/≤21.2	25/ 20	1.2 (0.6, 2.7)	1.7 (0.7, 4.1)	>4.45/≤4.25	35/ 29	1.1 (0.6, 2.1)	1.0 (0.5, 2.0)	>3.6/≤3.7	18/22	0.8 (0.4, 1.7)	0.8 (0.4, 1.8)	>0.9/≤1.0	11/ 18	0.5 (0.2, 1.0)	0.4 (0.2, 1.1)
≤29.3/>21.2	27/ 27	2.1 (0.9, 4.9)	1.9 (0.7, 5.0)	≤4.45/>4.25	20/ 28	0.5 (0.2, 1.1)	0.4 (0.2, 1.1)	≤3.6/>3.7	19/16	1.3 (0.6, 2.9)	0.8 (0.3, 2.1)	≤0.9/>1.0	39/ 41	0.6 (0.3, 1.2)	0.4 (0.2, 1.0)
>29.3/>21.2	82/ 73	1.8 (1.0, 3.4)	2.4 (1.2, 5.0)	>4.45/>4.25	60/ 65	0.8 (0.4, 1.3)	0.7 (0.3, 1.3)	>3.6/>3.7	78/76	1.1 (0.6, 1.8)	0.8 (0.5, 1.5)	>0.9/>1.0	45/ 55	0.5 (0.3, 1.0)	0.3 (0.1, 0.7)

Abbreviations: PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; PFNA, perfluorononanoic acid; OR, odds ratio; CI, confidence interval.

^aORs computed by conditional logistic regression of matched pairs without adjustment for covariates.

^bORs computed by conditional logistic regression of matched pairs with adjustment for all other PFAS (all PFAS covariates involve the same exposure metric and categorization as the PFAS of interest).

Supplementary Table 11: Case-control analyses of serum concentrations of PFOS, PFOA, PFHxS and PFNA in the first/only samples and second samples among active-duty U.S. Air Force servicemen, categorized using a common set of cutpoints (the second-sample quartiles among controls; 530 cases, 530 controls).

PFAS	Conc. (ng/mL)	First/Only Sample (All Subjects)			First Sample (Subset With Two Samples)			Second Sample (Subset With Two Samples)			Both Samples (Subset With Two Samples)			
		N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	Conc. (ng/mL), First Sample / Second Sample	N _{Ca} /N _{Con}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)
PFOS	≤13.2	82/75	1.0	1.0	14/9	1.0	1.0	42/48	1.0	1.0	≤21.2 / ≤21.2	34/40	1.0	1.0
	13.3-21.2	76/93	0.8 (0.4, 1.4)	0.9 (0.5, 1.7)	24/36	0.4 (0.1, 1.2)	0.4 (0.1, 1.5)	38/46	1.1 (0.6, 1.9)	1.5 (0.7, 3.3)	>21.2 / ≤21.2	46/54	1.0 (0.5-2.1)	1.4 (0.6-3.2)
	21.3-33.5	147/143	1.0 (0.5, 1.8)	1.3 (0.6, 2.6)	65/60	0.8 (0.3, 2.2)	0.8 (0.2, 3.0)	50/47	1.9 (0.9, 4.1)	2.8 (1.1, 7.0)	≤21.2 / >21.2	4/5	1.1 (0.3, 4.9)	1.1 (0.2, 5.8)
	>33.5	225/219	1.0 (0.5, 1.9)	1.5 (0.7, 3.3)	84/82	0.7 (0.2, 2.2)	0.8 (0.2, 3.3)	57/46	2.6 (1.1, 6.4)	4.6 (1.4, 15.1)	>21.2 / >21.2	103/88	2.2 (1.0-4.6)	3.5 (1.3-9.3)
			<i>P</i> _{trend} = 0.56	<i>P</i> _{trend} = 0.12		<i>P</i> _{trend} = 0.63	<i>P</i> _{trend} = 0.61		<i>P</i> _{trend} = 0.02	<i>P</i> _{trend} = 0.009				
PFOA	≤4.25	143/124	1.0	1.0	39/27	1.0	1.0	55/48	1.0	1.0	≤5.65 / ≤5.65	68/60	1.0	1.0
	4.26-5.65	111/125	0.6 (0.4, 1.0)	0.6 (0.4, 1.2)	44/60	0.5 (0.2, 0.9)	0.5 (0.2, 1.0)	52/46	1.0 (0.6, 1.8)	1.0 (0.5, 2.0)	>5.65 / ≤5.65	39/34	1.2 (0.6, 2.2)	1.2 (0.6, 2.5)
	5.66-7.55	124/135	0.7 (0.5, 1.1)	0.7 (0.5, 1.5)	49/49	0.7 (0.3, 1.4)	0.8 (0.3, 1.8)	39/49	0.7 (0.4, 1.4)	0.6 (0.3, 1.4)	≤5.65 / >5.65	15/27	0.5 (0.2, 1.1)	0.4 (0.2, 1.0)
	>7.55	152/146	0.8 (0.5, 1.2)	0.8 (0.5, 1.5)	55/51	0.8 (0.4, 1.5)	0.8 (0.3, 2.1)	41/44	0.7 (0.4, 1.5)	0.6 (0.2, 1.6)	>5.65 / >5.65	65/66	0.9 (0.5, 1.5)	0.9 (0.4, 1.8)
			<i>P</i> _{trend} = 0.63	<i>P</i> _{trend} = 0.95		<i>P</i> _{trend} = 0.90	<i>P</i> _{trend} = 0.63		<i>P</i> _{trend} = 0.35	<i>P</i> _{trend} = 0.22				
PFHxS	≤2.3	149/159	1.0	1.0	53/47	1.0	1.0	48/49	1.0	1.0	≤3.7 / ≤3.7	74/76	1.0	1.0
	2.4-3.7	105/119	0.9 (0.6, 1.3)	0.9 (0.6, 1.3)	40/46	0.8 (0.4, 1.4)	0.7 (0.4, 1.5)	42/46	1.1 (0.5, 2.1)	1.1 (0.5, 2.4)	>3.7 / ≤3.7	16/19	0.9 (0.4, 1.8)	0.9 (0.4, 2.0)
	3.8-6.2	122/94	1.4 (0.9, 2.0)	1.3 (0.9, 2.0)	41/42	0.8 (0.4, 1.7)	0.9 (0.4, 2.0)	41/46	1.0 (0.5, 1.9)	0.8 (0.4, 1.6)	≤3.7 / >3.7	19/17	1.2 (0.5, 2.7)	1.0 (0.4, 2.5)
	>6.2	154/158	1.0 (0.7, 1.4)	1.0 (0.7, 1.5)	53/52	0.9 (0.5, 1.6)	0.9 (0.4, 1.7)	56/46	1.4 (0.7, 2.8)	1.2 (0.5, 2.5)	>3.7 / >3.7	78/75	1.1 (0.7, 1.9)	1.0 (0.6, 1.8)
			<i>P</i> _{trend} = 0.95	<i>P</i> _{trend} = 0.80		<i>P</i> _{trend} = 0.89	<i>P</i> _{trend} = 0.92		<i>P</i> _{trend} = 0.18	<i>P</i> _{trend} = 0.48				
PFNA	≤0.7	244/213	1.0	1.0	88/79	1.0	1.0	44/40	1.0	1.0	≤1.0 / ≤1.0	98/82	1.0	1.0
	0.8-1.0	145/145	0.7 (0.5, 1.0)	0.7 (0.5, 1.0)	52/55	0.7 (0.4, 1.3)	0.5 (0.2, 1.0)	47/49	0.9 (0.5, 1.7)	0.6 (0.3, 1.5)	>1.0 / ≤1.0	5/9	0.4 (0.1, 1.3)	0.3 (0.1, 1.4)
	1.1-1.5	84/116	0.6 (0.4, 0.8)	0.6 (0.3, 0.9)	25/36	0.6 (0.3, 1.2)	0.4 (0.1, 1.0)	50/52	0.7 (0.4, 1.5)	0.3 (0.1, 0.9)	≤1.0 / >1.0	42/52	0.6 (0.3, 1.1)	0.5 (0.2, 1.0)
	>1.5	57/56	0.7 (0.4, 1.2)	0.7 (0.4, 1.5)	22/17	1.2 (0.5, 2.8)	0.6 (0.2, 1.9)	46/46	0.6 (0.3, 1.4)	0.2 (0.1, 0.8)	>1.0 / >1.0	42/44	0.7 (0.4, 1.4)	0.6 (0.2, 1.3)
			<i>P</i> _{trend} = 0.07	<i>P</i> _{trend} = 0.29		<i>P</i> _{trend} = 0.86	<i>P</i> _{trend} = 0.34		<i>P</i> _{trend} = 0.20	<i>P</i> _{trend} = 0.02				

Abbreviations: PFOS, perfluorooctanesulfonic acid; PFOA, perfluorooctanoic acid; PFHxS, perfluorohexanesulfonic acid; PFNA, perfluorononanoic acid; OR, odds ratio; CI, confidence interval.

^aORs computed by conditional logistic regression of matched pairs with adjustment for military grade and number of deployments.

^bORs computed by conditional logistic regression of matched pairs with adjustment for military grade, number of deployments and all other PFAS (all PFAS covariates involve the same exposure metric and categorization as the PFAS of interest).

Supplementary Table 12: Case-control analysis investigating the association between testicular germ cell tumors and pre-diagnostic concentrations of MeFOSAA, PFDA and PFUnDA among active-duty U.S. Air Force servicemen (530 cases, 530 controls)

MeFOSAA				PFDA				PFUnDA			
Conc. (ng/mL)	N _{Ca} /N _{Cont}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	Conc. (ng/mL)	N _{Ca} /N _{Cont}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)	Conc. (ng/mL)	N _{Ca} /N _{Cont}	OR ₁ ^a (95% CI)	OR ₂ ^b (95% CI)
<i>All Subjects:</i>											
≤0.5	121/130	1.0	1.0	≤0.2	302/278	1.0	1.0	≤0.1	250/219	1.0	1.0
0.6-1.3	133/134	1.2 (0.7, 2.0)	1.3 (0.8, 2.2)	0.3	119/124	0.8 (0.6, 1.2)	0.9 (0.6, 1.3)	0.2	190/220	0.7 (0.6, 1.0)	0.9 (0.6, 1.2)
1.4-2.4	147/131	1.4 (0.7, 2.5)	1.5 (0.8, 2.9)	>0.3	109/128	0.7 (0.5, 1.0)	0.9 (0.5, 1.5)	>0.2	90/91	0.9 (0.6, 1.3)	1.3 (0.8, 2.2)
>2.4	129/135	1.2 (0.6, 2.3)	1.5 (0.7, 3.0)								
		<i>P</i> _{trend} = 0.98	<i>P</i> _{trend} = 0.62			<i>P</i> _{trend} = 0.06	<i>P</i> _{trend} = 0.60			<i>P</i> _{trend} = 0.31	<i>P</i> _{trend} = 0.53
<i>Subset with two samples; first sample:</i>											
≤0.5	28/30	1.0	1.0	≤0.2	103/108	1.0	1.0	≤0.1	89/91	1.0	1.0
0.6-1.3	49/53	1.0 (0.4, 2.2)	1.0 (0.4, 2.5)	0.3	44/39	1.3 (0.7, 2.3)	1.2 (0.6, 2.5)	0.2	62/71	0.9 (0.6, 1.5)	1.0 (0.6, 1.9)
1.4-2.4	56/40	1.5 (0.6, 3.8)	1.5 (0.5, 4.6)	>0.3	40/40	1.3 (0.6, 2.5)	1.3 (0.5, 3.6)	>0.2	36/25	1.7 (0.9, 3.1)	2.0 (0.8, 4.9)
>2.4	54/64	1.0 (0.3, 2.8)	1.1 (0.3, 3.6)								
		<i>P</i> _{trend} = 0.61	<i>P</i> _{trend} = 0.83			<i>P</i> _{trend} = 0.46	<i>P</i> _{trend} = 0.62			<i>P</i> _{trend} = 0.20	<i>P</i> _{trend} = 0.21
<i>Subset with two samples; second sample:</i>											
≤0.2	47 / 60	1.0	1.0	≤0.2	56/54	1.0	1.0	≤0.1	52/49	1.0	1.0
0.3-0.5	30 / 23	1.6 (0.7, 3.6)	1.5 (0.6, 3.5)	0.3	52/56	1.0 (0.6, 1.7)	1.0 (0.5, 2.1)	0.2	74/87	0.9 (0.5, 1.5)	1.0 (0.5, 1.9)
0.6-1.7	43 / 36	2.1 (0.8, 5.5)	2.0 (0.7, 5.9)	>0.3	79/77	1.1 (0.6, 2.1)	1.8 (0.7, 4.7)	>0.2	61/51	1.2 (0.6, 2.1)	1.5 (0.6, 3.4)
>1.7	67 / 68	1.9 (0.6, 6.3)	2.6 (0.7, 10.0)								
		<i>P</i> _{trend} = 0.39	<i>P</i> _{trend} = 0.18			<i>P</i> _{trend} = 0.79	<i>P</i> _{trend} = 0.29			<i>P</i> _{trend} = 0.56	<i>P</i> _{trend} = 0.33
<i>Subset with two samples; both samples (first/second):</i>											
≤1.3/≤0.5	53/67	1.0	1.0	≤0.2/≤0.2	48/49	1.0	1.0	≤0.1/≤0.1	47/41	1.0	1.0
>1.3/≤0.5	25/20	2.8 (1.0, 7.9)	2.8 (0.9, 8.2)	>0.2/≤0.2	8/5	1.5 (0.4, 4.9)	1.4 (0.4, 5.3)	>0.1/≤0.1	5/8	0.5 (0.1, 1.7)	0.5 (0.1, 2.1)
≤1.3/>0.5	27/27	2.6 (1.0, 6.8)	2.4 (0.8, 6.9)	≤0.2/>0.2	55/59	0.9 (0.5, 1.8)	1.2 (0.5, 2.6)	≤0.1/>0.1	42/50	0.7 (0.4, 1.4)	0.9 (0.4, 1.8)
>1.3/>0.5	82/73	2.2 (0.8, 5.6)	2.2 (0.8, 6.2)	>0.2/>0.2	76/74	1.2 (0.6, 2.2)	1.5 (0.6, 3.7)	>0.1/>0.1	93/88	1.0 (0.6, 1.8)	1.2 (0.6, 2.7)

Abbreviations: MeFOSAA, 2-(N-methyl-perfluorooctane sulfonamido) acetic acid; PFDA, perfluorodecanoic acid; PFUnDA, perfluoroundecanoic acid; OR, odds ratio; CI, confidence interval

^aORs computed by conditional logistic regression of matched pairs with adjustment for military grade and number of deployments.

^bORs computed by conditional logistic regression of matched pairs with adjustment for military grade, number of deployments and all other PFAS (all PFAS covariates involve the same exposure metric and categorization as the PFAS of interest).

Supplementary Table 13: Case-control analysis among active-duty U.S. Air Force servicemen investigating associations between first and second principal components from principal component analysis of PFAS concentrations in the first/only samples and second samples (categorized using quartiles among controls as cutpoints) and testicular germ cell tumors (530 cases, 530 controls).

PC1			PC2		
Categorized PC	N _{Ca} /N _{Con}	OR (95% CI)	Categorized PC	N _{Ca} /N _{Con}	OR (95% CI)
<i>All Subjects:</i>					
<i>First/Only Sample</i>					
≤2.96	117/132	1.0	≤(-1.03)	166/133	1.0
>2.96-4.07	158/133	1.6 (1.0, 2.7)	>(-1.03)-(-0.43)	132/132	0.7 (0.5, 1.1)
>4.07-4.70	114/132	1.3 (0.7, 2.4)	>(-0.43)-0.16	135/132	0.7 (0.5, 1.0)
>4.70	141/133	1.8 (1.0, 3.5)	>0.16	97/133	0.4 (0.3, 0.7)
		<i>P</i> _{trend} = 0.10			<i>P</i> _{trend} = 0.0006
<i>Subjects With Two Samples:</i>					
<i>First Sample</i>					
≤2.96	23/ 26	1.0	≤(-1.03)	58/ 53	1.0
>2.96-4.07	69/ 54	1.5 (0.6, 3.6)	>(-1.03)-(-0.43)	47/ 48	0.9 (0.5, 1.7)
>4.07-4.70	46/ 59	0.9 (0.3, 2.6)	>(-0.43)-0.16	51/ 41	1.1 (0.6, 2.0)
>4.70	49/ 48	1.4 (0.4, 4.3)	>0.16	31/ 45	0.6 (0.3, 1.2)
		<i>P</i> _{trend} = 0.91			<i>P</i> _{trend} = 0.35
<i>Second Sample</i>					
≤2.09	44/ 47	1.0	≤(-0.69)	46/ 46	1.0
>2.09-3.04	39/ 47	1.1 (0.5, 2.4)	>(-0.69)-(-0.08)	57/ 47	1.3 (0.7, 2.5)
>3.04-4.33	58/ 47	2.3 (0.9, 6.2)	>(-0.08)-0.52	45/ 48	0.9 (0.5, 1.8)
>4.33	46/ 46	2.3 (0.7, 7.5)	>0.52	39/ 48	0.9 (0.4, 1.8)
		<i>P</i> _{trend} = 0.15			<i>P</i> _{trend} = 0.43

Abbreviations: PC1, first principal component; PC2, second principal component; OR, odds ratio; CI, confidence interval.

ORs computed by conditional logistic regression of matched pairs with adjustment for military grade, number of deployments and both principal components (both principal components involve the same exposure metric and categorization).