

AR226-1926

Table A. PFOA levels by water district/source.

PFOA Levels (ppb)	Location	Households
1.7-4.3	Little Hocking, Ohio	4200
0.4-3.9	Lubeck, WV	3700
0.25-0.37	Tuppers Plains, Ohio	4800
0.08-0.13	Belpre, Ohio	6000
0.06-0.1	Mason, WV	4200
0.06-0.07	Pomeroy, Ohio	1000
0.165	Blennerhassett	71
1.0-5.0	Dupont, Washington Works	N/A
1.75-1.87	GE Plastic	N/A
0.05-8.6	68 Private Wells WVA & Ohio	68

Abbreviations:

N/A Not Applicable

Table B. Demographics in a residentially PFOA-exposed population.

Variable	Categories	n	Percentage
Age	20 – 34	105	18.17
	35 – 44	104	17.99
	45 – 54	135	23.36
	55 – 64	154	26.64
	65 – 80	80	13.84
Gender	Male	284	49.13
	Female	294	50.87
Race/Ethnicity	White	558	97.38
	African American	6	1.05
	Others	9	1.57
Education	Less than 9 th grade	17	2.98
	9 – 11 th grade	59	10.33
	12 th /Vocational/Some College	430	75.31
	College Graduate	65	11.38
Body Mass Index (BMI)	Underweight (<23)	106	18.53
	Average (23 – 28)	190	33.22
	Overweight (>28)	276	48.25

Smoking Habit	Never smoked	252	60.58
	Smoked less than 15 years	72	17.31
	Smoked more than 15 years	92	22.12
Work History	Plant 1	54	9.42
	Plant 2	19	3.32
	No plant work	500	87.26

Table C. Unadjusted odds ratios of cancer and 95% confidence interval for demographic variables of a population residentially exposed to PFOA.

Variable	Categories	# Cancer Obs. Used in Logistic Regression	Percentage with Cancer	Odds Ratio	95% CI	P-value
Gender	Male	25	8.80%	1.04	(0.58 - 1.86)	0.9
	Female **	25	8.50%	1	-	-
Age	20 - 34 **	5	4.76%	1	-	0.0002*
	35 - 44	4	3.88%	0.8	(0.21 - 3.07)	0.74
	45 - 54	9	6.67%	1.43	(0.46 - 4.40)	0.53
	55 - 64	16	10.39%	2.32	(0.82 - 6.54)	0.11
	65 - 80	16	20.00%	5	(1.75 - 14.32)	0.003
Education	Less than 9 th grade	8	47.06%	10.84	3.97-29.53	<0.0001
	9 th grade or higher **	42	7.58%	1	-	-
Body Mass Index (BMI)	Underweight (<23)	8	7.55%	0.78	(0.33 - 1.86)	0.58
	Average (23 - 28) **	18	9.47%	1	-	-
	Overweight (>28)	23	8.33%	0.87	(0.46 - 1.66)	0.67
Smoking Habit						0.16*

	Never smoked **	20	7.94%	1	-	-
	Smoked less than 15 years	7	9.72%	1.25	(0.51 3.08)	0.63
	Smoked more than 15 years	12	13.04%	1.74	(0.81 3.72)	0.15
Work Site						
	Plant 1	8	14.81%	1.87	(0.83 4.22)	0.13
	Plant 2	1	5.26%	0.48	(0.06 3.62)	0.47
	No plant employment **	41	8.20%	1	-	-

* p-value refers to the p-value for a test for trend

** Denotes the reference value of each variable for the logistic regression

Table D. Comparison of total cancer prevalence rates (per 100,000) between PFOA-exposed resident population and the US population (Whites only) by age and gender.

	US Population		Exposed Population		Prevalence Ratio			
	Age Specific Rates Male	Age Specific Rates Female	Age Specific Rates Male	Age Specific Rates Female	Rates ratio of Exposed/US Males	P-value	Rates ratio of Exposed/US Females	P-value
Age Group								
20-34	338	451	1,923	7,547	5.69	0.16	16.75	0.0001
35-44	799	1,447	-	7,547	-	-	5.21	0.008
45-54	1,722	3,167	4,839	8,219	2.81	0.09	2.59	0.03
55-64	5,080	5,390	9,211	11,538	1.81	0.1	2.14	0.03
65+	15,661	9,173	32,558	5,405	2.08	0.009	0.59	0.85

Table E. Standardized Morbidity Prevalence ratio comparing age-adjusted observed cancer rates (per 100,000) to expected cancer rates

CANCER TYPE	Number of Cases	Observed Rates (per 100,000)	Age Adjusted Expected Rates (per 100,000)	Prevalence Ratio	Confidence Interval
All Cancer	50	8,651	3,426	2.58	1.91 – 3.47*
Bladder	5	865	163	5.3	2.19 – 12.87*
Breast	5	1,701	1,579	1.12	0.46 – 2.71
Colon/Rectal	4	692	261	2.65	0.99 – 7.11
Kidney	1	173	79	2.2	0.31 – 15.63
Lung	7	1,211	153	7.89	3.72 – 16.74*
M. Myeloma	2	346	22	15.71	3.91 – 63.14*
Melanoma	3	519	214	2.42	0.78 – 7.54
Non-Hodgkins	5	865	130	6.67	2.76 – 16.13*
Prostate	9	3,169	1633	1.96	0.98 – 3.92
Uterine and/or Cervical	9	3,061	96	33.12	17.03 – 64.41*

* Excludes the null value

Table F. Demographics in an occupationally PFOA-exposed population

Variables	Categories	n	Percentage
Birth Year	1900 -- 1919	160	3.76
	1920 -- 1939	1209	28.42
	1940 -- 1959	2203	51.79
	1960 -- 1989	682	16.03
Gender	Male	3583	84.23
	Female	671	15.77
Years of Occupational Exposure	<21 years	1266	30.92
	21 -- 29	1462	35.71
	30 -- 50	1366	33.37
Working Condition	No direct PFOA exposure	2157	60.85
	Direct PFOA exposure	1388	39.15

Table G. Age-adjusted Proportional Hazard ratios of certain types of cancers among workers hired between 1950 and 1990, between those working in departments with direct PFOA exposure and those with no direct exposure.

Cancer Type	Department Environment	Number of Cancer Incidents	Percentage with Cancer	Hazard Ratio	CI	P-value
Pancreatic Cancer	No direct exposure	2	0.09%	1		
	Direct PFOA exposure	6	0.48%	4.46	(0.87,22.91)	0.07
Respiratory Cancer	No direct exposure	11	0.51%	1		
	Direct PFOA exposure	26	2.10%	4.41	(2.13,9.13)	<0.0001
Kidney Cancer	No direct exposure	6	0.28%	1		
	Direct PFOA exposure	11	0.89%	3.14	(1.10,8.95)	0.03
Colon/Rectal Cancer	No direct exposure	9	0.42%	1		
	Direct PFOA exposure	11	0.89%	2.96	(1.15,7.64)	0.02
Prostate Cancer	No direct exposure	14	0.65%	1		
	Direct PFOA exposure	23	1.86%	2.51	(1.24,5.08)	0.01
Non-Hodgkin's Lymph	No direct exposure	3	0.14%	1		
	Direct PFOA exposure	3	0.24%	2.44	(0.47, 12.73)	0.29
Bladder Cancer	No direct exposure	10	0.46%	1		

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	Direct PFOA exposure	10	0.81%	1.46	(0.59, 3.54)	0.41
Liver Cancer	No direct exposure	1	0.05%	1		
	Direct PFOA exposure	1	0.08%	1.13	(0.06, 23.07)	0.94
Breast Cancer	No direct exposure	5	0.23%	1		
	Direct PFOA exposure	1	0.08%	0.21	(0.02, 1.88)	0.16

Table H. Logistic regression analysis controlling for age and work environment

Cancer Type	Years of Exposure	Adjusted Odds Ratio	95% CI	P-Value
Prostate				
	<21 years	1	-	0.0002*
	21 – 29	2.68	0.82 – 8.79	0.1
	30 – 50	8.71	2.63 – 28.83	0.0004
Kidney				
	<21 years	1	-	0.03*
	21 – 29	6.28	0.75 – 52.89	0.09
	30 – 50	11.57	1.38 – 97.32	0.02
Respiratory				
	<21 years	1	-	0.07*
	21 – 29	1.42	0.61 – 3.30	0.42
	30 – 50	1.47	0.63 – 3.43	0.37
Bladder				
	<21 years	1	-	0.17*
	21 – 29	1.3	0.40 – 4.24	0.66
	30 – 50	2.09	0.59 – 7.40	0.29
Colon/Rectal				0.24*

	<21 years	1	-	-
	21 – 29	0.38	0.10 – 1.50	0.17
	30 – 50	1.41	0.50 – 4.00	0.52
Pancreatic				0.35*
	<21 years	1	-	-
	21 – 29	1.71	0.28 – 10.49	0.56
	30 – 50	1.92	0.28 – 13.20	0.51

*p-value refers to the p-value for a test for trend

Table A. Standardized Prevalence Ratio (SPR) comparing observed disease rate per 100,000 among a residentially PFOA-exposed population to the expected disease rate of the general U.S. population controlling for age and gender.

Disease or Symptom Type	Number diseased in exposed group	Observed Rates (per 100,000)	Expected Rates ^a (per 100,000)	SPR	CI ^b
Cardiovascular problems ^c	170	30,088	7,019	4.29	3.47 - 5.29*
Chronic bronchitis	113	22,114	6,145	3.60	2.92 - 4.44*
Kidney disease	21	3,757	1,665	2.26	1.45 - 3.51*
Shortness of breath on stairs	323	57,270	27,994	2.05	1.70 - 2.46*
Asthma	105	20,669	11,369	1.82	1.47 - 2.25*
Thyroid problems	82	15,589	10,019	1.56	1.22 - 1.98*
Diabetes	56	9,947	6,457	1.54	1.16 - 2.05*
High blood pressure	186	33,096	28,077	1.18	0.97 - 1.43
Liver problems	19	3,754	3,728	1.01	0.64 - 1.59

^aExpected rates are from NHANES 2001 - 2002 using sampling weights to calculate an unbiased estimate of national rates while adjusting for non-response, survey design and sampling technique while giving an accurate estimate of sampling error.

^bConfidence Interval

^cIncludes MI, Stroke, Angina
*Statistically significant (p≤0.05)

Table B. Prevalence Ratios (PR) comparing observed disease rate per 100,000 among a residentially PFOA-exposed population to the expected disease rate of the general U.S. population by age group and gender for various disease outcomes.

		Males		Females		Prevalence Ratio			
Age Group	Age Specific Rates (US ^a)	Age Specific Rates (EP ^b)	Age Specific Rates (US)	Age Specific Rates (EP)	EP/US Males	P	EP/US females	P	
Asthma									
18-34	12543.8	37209.30	15209.92	30000	2.97	<0.0001	1.97	<0.0001	
35-49	7895.13	14705.88	15149.32	21052.63	1.86	0.0005	1.39	0.0003	
50-64	9363.58	12903.23	13065.51	21568.63	1.38	0.002	1.65	<0.0001	
65+	5694.06	19047.62	10790.07	18181.82	3.35	<0.0001	1.69	0.01	
Chronic Bronchitis									
18-34	4136.27	23255.81	5867.84	18000	5.62	<0.0001	3.07	<0.0001	
35-49	4716.72	20000	8192.81	25333.33	4.24	<0.0001	3.09	<0.0001	
50-64	2870.57	18750	8022.41	27884.62	6.53	<0.0001	3.48	<0.0001	
65+	5000.83	15060	11843.53	25000	2.99	0.0006	2.11	0.0008	
High Blood Pressure									
18-34	9799.81	22000	7359.86	9090.91	2.24	<0.0001	1.24	0.05	
35-49	18366.5	21250	17218.61	13414.63	1.16	0.002	0.78	0.10	
50-64	32115.1	37623.76	38440.91	50877.19	1.17	<0.0001	1.32	<0.0001	

		Males		Females		Prevalence Ratio			
Age Group	Age Specific Rates (US ^a)	Age Specific Rates (EP ^b)	Age Specific Rates (US)	Age Specific Rates (EP)	EP/US Males	P	EP/US females	P	
65+	48057.7 7	59090.91	60185.45	57142.86	1.23	<0.0001	0.95	0.006	
Short of breath climbing stairs									
18-34	--	45098.04	--	58181.82	--	--	--	--	
	18804.0	44444.44	32506.6	56790.12	2.36	<0.0001	1.75	<0.0001	
35-49	2		6						
	33173.6	51960.78	42327.8	73684.21	1.57	<0.0001	1.74	<0.0001	
50-64	2		0						
	37010.2	54545.45	49553.3	71428.57	1.47	<0.0001	1.44	<0.0001	
65+	5		6						
Cardiovascular problems ^c									
18-34	647.54	21568.63	746.23	21818.18	33.31	<0.0001	29.24	<0.0001	
35-49	3273.62	28395.06	1775.02	21951.22	8.67	<0.0001	12.37	<0.0001	
50-64	8524.01	41176.47	7616.51	32456.14	4.83	<0.0001	4.26	<0.0001	
	26458.91	40909.09	18080.3	25714.29	1.55	<0.0001	1.42	0.005	
65+			6						
Liver									
18-34	424.68	2325.58	1696.30	6122.45	5.48	0.09	3.61	0.009	
35-49	6240.89	28.98.55	2642.29	4000	0.46	0.63	1.51	0.08	
50-64	5221.11	5376.34	3983.46	3921.57	1.03	0.10	0.98	0.15	
65+	3400.71	2439.02	3026.29	--	0.72	0.50	--	--	

		Males		Females		Prevalence Ratio			
Age Group	Age Specific Rates (US ^a)	Age Specific Rates (EP ^b)	Age Specific Rates (US)	Age Specific Rates (EP)	EP/US Males	P	EP/US females	P	
Kidney Disease									
18-34	342.84	2000.00	--	3636.36	5.83	0.08	--	--	
35-49	965.12	2500.00	267.94	1234.57	2.59	0.06	4.61	0.10	
50-64	1497.24	6930.69	2369.68	1785.71	4.63	<0.0001	0.75	0.38	
65+	6177.16	4545.45	4083.52	11428.57	0.74	0.39	2.80	0.006	
Thyroid Disease									
18-34	--	--	5761.79	13725.49	--	--	2.38	0.0008	
35-49	3551.87	5555.56	10420.1	20512.82	1.56	0.04	1.97	<0.0001	
50-64	4169.26	7216.49	18424.4	30188.68	1.73	0.005	1.64	<0.0001	
65+	12164.48	11904.76	28167.6	32352.94	0.98	0.11	1.15	0.01	

^aExpected rates are from NHANES 2001 – 2002 using sampling weights to calculate an unbiased estimate of national rates while

adjusting for non-response, survey design and sampling technique while giving an accurate estimate of sampling error.

^bPFOA-exposed population (EP)

^cMI, Stroke, Angina