

Supplementary file

Alterations in immune and renal biomarkers among workers occupationally exposed to low levels of trichloroethylene below current regulatory standards

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Running title: Low levels of exposure to trichloroethylene and biologic alterations among workers

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Supplementary Table 1. Comparison between controls and the group exposed to less than 6 ppm for the levels of selected markers

Variable	Controls (n=96)				TCE-exposed group (<6 ppm) (n=23)			TCE-exposed group (<4 ppm) (n=18)			TCE-exposed group (<3 ppm) (n=12)			TCE-exposed group (<2 ppm) (n=9)			TCE-exposed group (<1 ppm) (n=4)		
	Mean (SD)	Mean (SD)	% diff	P	Mean (SD)	% diff	P	Mean (SD)	% diff	P	Mean (SD)	% diff	P	Mean (SD)	% diff	P			
Immune regulation																			
CD4+ effect memory ^a	224852 (92895)	175047 (58296)	-22.1	0.10	178574 (61202)	-20.6	0.18	170250 (75409)	-24.3	0.23	170250 (75409)	-24.3	0.23	209834 (70812)	-6.7	0.71			
sCD27 ^b	148.8 (107.5)	59.2 (22.1)	-60.2	<0.0001	61.7 (24.2)	-58.6	0.0003	55.3 (11.3)	-62.8	0.0006	53.9 (12.8)	-63.8	0.0007	51.6 (14.6)	-65.3	0.01			
sCD30 ^b	28.7 (18.8)	20.2 (8.7)	-29.7	0.08	21.0 (9.6)	-26.6	0.22	21.1 (11.2)	-26.3	0.27	23.2 (12.3)	-19.1	0.54	24.5 (16.3)	-14.7	0.67			
IL10 ^c	13.8 (23.0)	4.2 (4.7)	-69.6	0.06	3.5 (3.7)	-74.5	0.10	3.7 (4.4)	-73.2	0.13	4.4 (4.8)	-67.9	0.27	4.0 (1.0)	-70.8	0.64			
IgG ^d	10990247 (2970544)	9365024 (1279961)	-14.8	0.04	9479464 (1373567)	-13.7	0.10	9687395 (1238729)	-11.9	0.24	9588709 (913856)	-12.8	0.20	9026261 (700340)	-17.9	0.13			
IgM ^d	1178848 (815850)	677952 (243667)	-42.5	0.0003	701612 (236596)	-40.5	0.0007	707570 (211093)	-40.0	0.01	663729 (219579)	-43.7	0.03	540437 (143023)	-54.2	0.07			
Kidney function																			
KIM-1 ^e	211.7 (159.5)	316.7 (235.9)	49.6	0.03	317.7 (253.1)	50.1	0.09	243.7 (167.2)	15.1	0.20	244.8 (188.6)	15.6	0.44	189.3 (73.3)	-10.6	0.74			

^acell/μl blood; ^bng/ml plasma; ^cpg/ml serum; ^dμg/ml serum; ^eng/l urine

Notes: For each endpoint, the same covariates as in our previous reports were included in each model; Covariates included in the linear models were age (as a continuous variable), sex, current smoking (yes/no), current alcohol consumption (yes/no), recent infections (flu or respiratory infections in the previous month) and body mass index (BMI).

Supplementary Table 2. Spearman correlation matrix for selected biomarkers that showed significant differences between controls and those exposed to less than 10 ppm of TCE

<i>Controls</i>		CD4+ effector memory T cells	sCD27	sCD30	IL-10	IgG	IgM	KIM-1
	CD4+ effect memory T cells	1.00 ^a	0.01	0.02	-0.14	-0.07	0.18	0.07
	sCD27		1.00	0.72	0.31	-0.18	-0.14	-0.03
	sCD30			1.00	0.08	-0.19	-0.11	-0.11
	IL-10				1.00	0.08	0.04	-0.24
	IgG					1.00	0.16	-0.19
	IgM						1.00	-0.04
	KIM-1							1.00
	WBC	0.44	0.09	0.13	0.02	-0.10	0.05	0.07
	Lymphocytes	0.58	-0.01	0.05	-0.02	0.01	0.17	-0.07
	T cells	0.52	-0.01	0.05	-0.07	0.01	0.09	-0.10
	CD4+ T cells	0.65	0.05	0.11	-0.13	-0.11	0.04	-0.13
	CD4+ naïve	0.13	0.19	0.27	-0.18	-0.18	-0.09	-0.12
	CD25Fox	0.33	-0.07	-0.02	-0.14	0.05	-0.11	-0.21
	CD8+ T cells	0.34	0.02	0.03	0.04	0.06	0.12	-0.15
	CD8+ naïve	-0.01	0.05	0.23	-0.08	-0.06	0.14	-0.24
	CD8EM	0.49	0.04	0.08	-0.13	0.19	0.24	-0.16
	B cells	0.35	0.21	0.21	-0.16	-0.30	-0.03	0.25
	NK cells	0.29	0.02	-0.01	0.11	0.02	0.30	0.00
	PiGST	0.24	-0.05	-0.16	-0.22	-0.17	0.16	0.66
<i>Exposed workres</i>		CD4+ Effector Memory cells	sCD27	sCD30	IL-10	IgG	IgM	KIM-1
	CD4+ effect memory T cells	1.00	-0.03	-0.26	-0.13	-0.17	0.16	-0.04
	sCD27		1.00	0.29	0.04	0.15	0.10	0.12
	sCD30			1.00	0.28	0.07	-0.15	0.10
	IL-10				1.00	0.32	-0.14	0.03
	IgG					1.00	-0.12	-0.25
	IgM						1.00	0.15
	KIM-1							1.00
	WBC	0.38	-0.04	-0.08	0.11	0.09	0.04	0.01
	Lymphocytes	0.69	-0.09	-0.21	0.07	0.04	-0.04	-0.12
	T cells	0.66	-0.15	-0.17	-0.01	-0.10	-0.03	-0.15

	CD4+ T cells	0.73	-0.04	-0.25	-0.01	0.05	-0.02	-0.11	
	CD4+ naïve	0.31	-0.10	-0.16	-0.01	-0.04	-0.04	0.03	
	CD25Fox	0.33	0.11	-0.07	0.06	0.08	-0.23	-0.08	
	CD8+ T cells	0.44	-0.18	-0.11	0.12	-0.02	-0.05	-0.11	
	CD8+ naïve	0.24	-0.12	-0.11	0.13	-0.04	-0.03	-0.18	
	CD8EM	0.53	-0.19	-0.05	0.15	-0.07	0.06	0.05	
	B cells	0.63	0.15	-0.09	-0.10	0.00	0.10	0.02	
	NK cells	0.27	0.04	-0.12	0.17	0.15	-0.08	-0.08	
	PiGST	0.03	-0.05	0.11	0.14	-0.08	-0.02	0.44	
<i>Low exposed workers (<10 ppm)</i>		CD4+ Effector Memory cells	sCD27	sCD30	IL-10	IgG	IgM	KIM-1	
		CD4+ effect memory T cells	1.00	0.06	0.03	0.02	-0.15	-0.00	-0.22
		sCD27		1.00	0.15	0.09	0.16	0.12	0.34
		sCD30			1.00	0.10	-0.02	-0.38	0.32
		IL-10				1.00	-0.03	0.24	0.30
		IgG					1.00	-0.07	-0.39
		IgM						1.00	0.20
		KIM-1							1.00
		WBC	0.43	0.21	0.06	0.11	0.31	0.01	-0.21
		Lymphocytes	0.78	0.00	0.12	0.34	0.07	0.09	-0.19
		T cells	0.78	-0.03	0.04	0.19	-0.07	0.04	-0.17
		CD4+ T cells	0.76	0.17	-0.02	0.14	0.06	-0.07	-0.16
		CD4+ naïve	0.43	0.28	0.03	0.23	-0.12	0.00	0.21
		CD25Fox	0.17	-0.13	0.03	0.04	0.04	-0.30	0.02
		CD8+ T cells	0.57	-0.18	0.03	0.27	-0.13	0.08	-0.15
	CD8+ naïve	0.51	-0.15	-0.10	0.10	-0.20	0.10	-0.15	
	CD8EM	0.51	-0.18	0.11	0.44	-0.20	0.12	-0.05	
	B cells	0.45	0.26	0.12	0.21	0.18	-0.07	-0.00	
	NK cells	0.46	0.08	0.16	0.44	0.17	0.11	-0.07	
	PiGST	0.04	-0.04	0.05	0.02	-0.26	0.17	0.21	

^a Spearman correlation coefficient; Note. Colors represents range of correlation coefficients: Blue ($|r_{sp}| < 0.3$), Yellow ($0.3 \leq |r_{sp}| < 0.5$), and Red ($0.5 \leq |r_{sp}| \leq 1$).

Supplementary Table 3. Levels of biological markers by TCE exposure level, stratified by work duration of the exposed workers

Variable	Unit	Controls(n=96) Mean(SD)	TCE-exposed workers, Work Duration > 2 years						TCE-exposed workers, Work Duration <= 2 years							
			<10ppm(n=15)		≥10ppm(n=15)		<10ppm(n=20)		≥10ppm(n=30)							
			Mean(SD)	% diff. ^a	P ^b	Mean(SD)	% diff. P ^b	P _{trend} ^f	Mean(SD)	% diff. P ^b	P _{trend} ^f					
Immune																
WBC ^c	10 ³ cells/μl blood	6060.4(1348.3)	6102.0(1110.5)	0.7	6.2E-01	5295.3(1187.5)	-12.6	9.1E-03	3.3E-02	6434.0(1616.6)	6.2	3.5E-01	5648.7(1268.3)	-6.8	1.8E-01	2.8E-01
Granulocytes ^c	10 ³ cells/μl blood	3448.1(944.7)	3690.0(1079.5)	7.0	2.7E-01	3279.3(1093.9)	-4.9	3.8E-01	7.0E-01	3874.5(1167.0)	12.4	9.2E-02	3481.0(971.1)	1.0	8.5E-01	6.3E-01
Monocytes ^c	10 ³ cells/μl blood	458.8(179.0)	436.7(141.0)	-4.8	9.8E-01	425.3(138.8)	-7.3	3.5E-01	4.0E-01	459.5(181.8)	0.2	6.0E-01	452.0(174.5)	-1.5	9.3E-01	8.6E-01
Lymphocytes ^c	10 ³ cells/μl blood	2153.5(551.8)	1975.3(488.3)	-8.3	2.9E-01	1590.7(417.2)	-26.1	9.3E-05	1.1E-04	2100.0(600.3)	-2.5	9.2E-01	1715.7(452.2)	-20.3	1.7E-04	3.8E-04
T cells ^c	10 ³ cells/μl blood	1346.2(376.2)	1324.5(380.3)	-1.6	7.2E-01	1045.2(315.8)	-22.4	4.3E-03	8.2E-03	1367.8(406.5)	1.6	1.0E00	1168.9(357.2)	-13.2	1.8E-02	2.7E-02
CD4+ T cells ^c	10 ³ cells/μl blood	675.0(199.6)	657.5(218.3)	-2.6	6.1E-01	544.4(175.1)	-19.3	1.7E-02	2.0E-02	698.6(231.8)	3.5	8.0E-01	586.0(192.5)	-13.2	2.7E-02	4.1E-02
CD4+ naive ^c	10 ³ cells/μl blood	283.2(125.5)	276.2(155.4)	-2.5	6.6E-01	231.2(99.2)	-18.4	3.7E-01	3.3E-01	324.5(135.8)	14.6	9.3E-01	232.1(117.5)	-18.0	7.1E-03	1.0E-02
CD4+ effector	10 ³ cells/μl blood	224.9(92.9)	185.9(57.8)	-17.3	9.2E-02	167.7(64.2)	-25.4	1.2E-03	4.9E-04	178.8(57.4)	-20.5	1.9E-01	192.3(94.6)	-14.5	5.5E-02	4.1E-02
CD4CD25 ^c	10 ³ cells/μl blood	68.6(35.2)	74.9(31.7)	9.3	3.4E-01	57.8(29.0)	-15.7	6.2E-02	1.9E-01	83.3(36.1)	21.5	7.9E-02	67.7(39.4)	-1.3	5.1E-01	7.7E-01
CD4CM ^c	10 ³ cells/μl blood	168.6(70.6)	192.2(58.2)	14.0	1.1E-01	150.2(44.0)	-10.9	2.4E-01	6.2E-01	180.0(85.2)	6.7	1.1E-01	176.7(70.2)	4.8	2.6E-01	1.8E-01
CD4Fox ^c	10 ³ cells/μl blood	51.7(20.8)	45.1(29.8)	-12.8	1.2E-01	45.9(22.3)	-11.3	8.6E-02	3.7E-02	55.0(23.8)	6.3	5.0E-01	50.0(27.8)	-3.3	7.6E-01	8.7E-01
CD25Fox ^c	10 ³ cells/μl blood	53.1(21.3)	46.2(27.4)	-13.0	1.7E-01	44.2(19.5)	-16.8	2.0E-02	1.0E-02	53.9(23.8)	1.4	8.3E-01	51.3(29.1)	-3.4	5.9E-01	6.4E-01
CD8+ T cells ^c	10 ³ cells/μl blood	543.5(216.0)	538.6(184.3)	-0.9	9.2E-01	385.3(132.9)	-29.1	1.9E-03	6.3E-03	518.9(169.8)	-4.5	8.1E-01	440.4(151.7)	-19.0	1.4E-02	1.9E-02
CD8+ naive ^c	10 ³ cells/μl blood	209.9(103.6)	214.4(97.8)	2.2	8.0E-01	121.6(68.7)	-42.1	7.4E-04	1.9E-03	224.8(106.3)	7.1	2.9E-01	163.6(97.6)	-22.0	3.3E-04	3.3E-04
CD8EM ^c	10 ³ cells/μl blood	149.5(72.2)	170.5(89.6)	14.1	3.8E-01	109.8(63.3)	-26.6	1.4E-02	5.8E-02	130.7(46.5)	-12.6	7.5E-01	126.9(50.1)	-15.1	3.5E-01	4.0E-01
CD8CM ^c	10 ³ cells/μl blood	8.5(7.5)	8.5(2.9)	0.1	2.4E-01	5.8(3.6)	-32.2	5.5E-02	2.0E-01	7.4(6.8)	-12.9	5.1E-01	10.1(13.3)	18.1	3.3E-01	3.0E-01
B cells ^c	10 ³ cells/μl blood	220.9(132.0)	161.7(39.7)	-26.8	2.2E-01	127.0(68.1)	-42.5	1.8E-04	1.8E-04	224.5(127.6)	1.6	8.2E-01	172.5(62.9)	-21.9	2.3E-01	2.8E-01
NK cells ^c	10 ³ cells/μl blood	467.4(278.7)	362.7(152.8)	-22.4	2.6E-01	319.6(159.3)	-31.6	2.7E-02	1.8E-02	364.6(125.1)	-22.0	4.5E-01	282.3(159.7)	-39.6	1.4E-04	1.9E-04
sCD27 ^c	ng/ml plasma	148.8(107.5)	59.7(26.7)	-59.9	7.9E-04	51.6(29.6)	-65.3	3.0E-05	1.0E-06	52.3(16.9)	-64.9	2.0E-04	62.6(21.4)	-57.9	9.0E-06	1.8E-06
sCD30 ^c	ng/ml plasma	28.7(18.8)	19.5(7.6)	-32.1	1.2E-01	19.2(9.3)	-33.0	1.6E-02	7.0E-03	18.1(7.9)	-37.0	2.3E-02	19.0(6.9)	-33.9	3.5E-02	1.6E-02
IL-10 ^d	pg/ml serum	13.8(23.0)	2.1(1.2)	-84.7	1.6E-02	4.4(6.2)	-68.2	9.4E-03	2.3E-03	5.2(5.3)	-62.7	4.6E-01	5.0(4.5)	-64.1	7.7E-02	7.0E-02
IL-6 ^d	pg/ml serum	3.9(4.5)	3.0(1.7)	-24.8	5.9E-01	4.8(8.4)	22.3	7.7E-01	9.4E-01	5.1(3.0)	30.8	3.9E-02	2.6(2.2)	-34.7	3.7E-01	6.6E-01
TNF-α ^d	pg/ml serum	5.4(2.8)	5.2(1.6)	-3.6	3.9E-01	5.7(1.7)	4.9	4.0E-01	2.9E-01	6.0(2.3)	10.8	2.2E-01	5.1(2.4)	-4.9	9.0E-01	7.0E-01
IgE ^e	μg/ml serum	128.8(138.5)	126.2(121.1)	-2.0	8.4E-01	99.8(83.1)	-22.6	6.4E-01	6.3E-01	83.7(62.3)	-35.0	2.5E-01	132.5(156.8)	2.9	9.3E-01	8.2E-01
IgG ^e	μg/ml serum	10990.2(2970.5)	9515.1(1891.6)	-13.4	1.7E-01	7876.0(2206.3)	-28.3	1.9E-04	2.1E-04	9025.0(1481.7)	-17.9	1.4E-02	9472.1(1950.9)	-13.8	1.8E-02	1.2E-02
IgM ^e	μg/ml serum	1178.8(815.8)	836.2(456.7)	-29.1	2.7E-02	722.8(302.1)	-38.7	8.8E-02	3.4E-02	710.5(209.3)	-39.7	2.6E-03	706.4(397.7)	-40.1	1.5E-04	9.4E-05
Kidney function																
KIM-1 ^e	ng/l urine	211.7(159.5)	332.8(300.8)	57.2	1.4E-01	340.4(228.9)	60.8	4.7E-04	3.5E-04	315.3(210.9)	49.0	2.7E-02	283.0(187.0)	33.7	1.1E-02	7.0E-03

NAG ^e	ng/l urine	2.5(1.8)	2.3(1.1)	-7.1	7.5E-01	1.8(1.3)	-27.2	1.3E-01	2.0E-01	2.8(1.7)	15.5	5.9E-01	2.9(2.0)	17.6	3.8E-01	3.6E-01
PiGST ^b	ng/l urine	26.5(20.1)	36.3(30.4)	36.9	3.0E-01	25.1(17.5)	-5.1	2.7E-01	2.0E-01	30.7(17.4)	15.7	5.2E-01	31.9(29.3)	20.5	1.2E-01	1.2E-01
VEGF ^c	ng/l urine	302.7(352.4)	192.0(74.1)	-36.6	1.5E-01	210.2(114.7)	-30.5	1.8E-01	1.0E-01	273.0(190.4)	-9.8	5.8E-01	303.7(212.1)	0.3	8.1E-01	8.8E-01
AlphaGST ^d	ng/l urine	8.1(6.4)	9.5(4.9)	16.9	4.1E-01	7.8(8.6)	-3.5	9.8E-01	8.0E-01	7.6(4.9)	-6.2	2.3E-01	8.4(8.9)	3.5	7.7E-01	6.7E-01

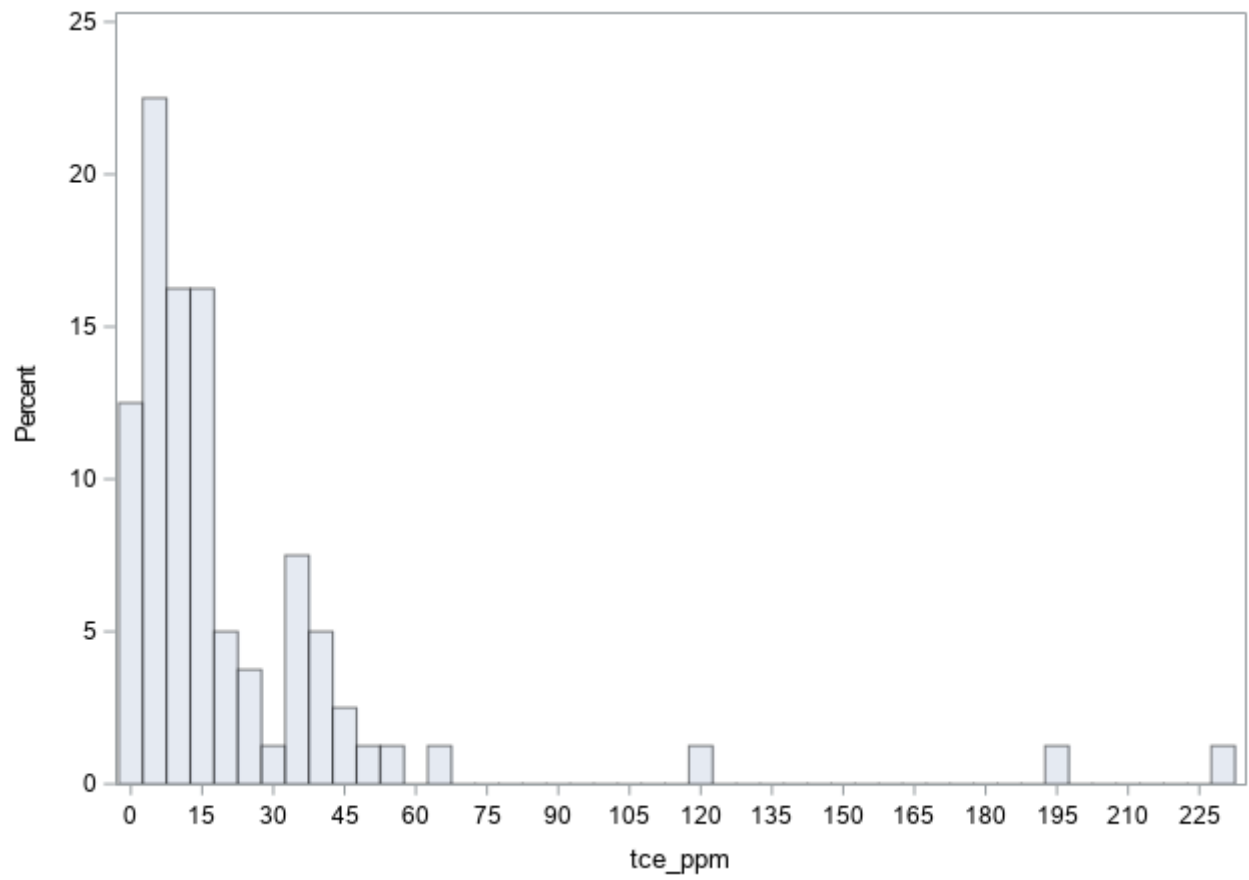
^a% difference; ^bFor each endpoint, the same covariates as in our previous reports were included in each model; Covariates included in the linear models were age (continuous), sex, current smoking (yes/no), current alcohol consumption (yes/no), recent infections (flu or respiratory infections in the previous month) and body mass index (kg/m², BMI); ^c analyzed for 80 workers and 96 controls; ^d analyzed for 71 workers and 78 controls; ^e analyzed for 80 workers and 45 controls; ^f Trend was determined by using an ordinal variable for TCE exposure.

Supplementary Table 4. Spearman correlation matrix for co-variates and biomarkers

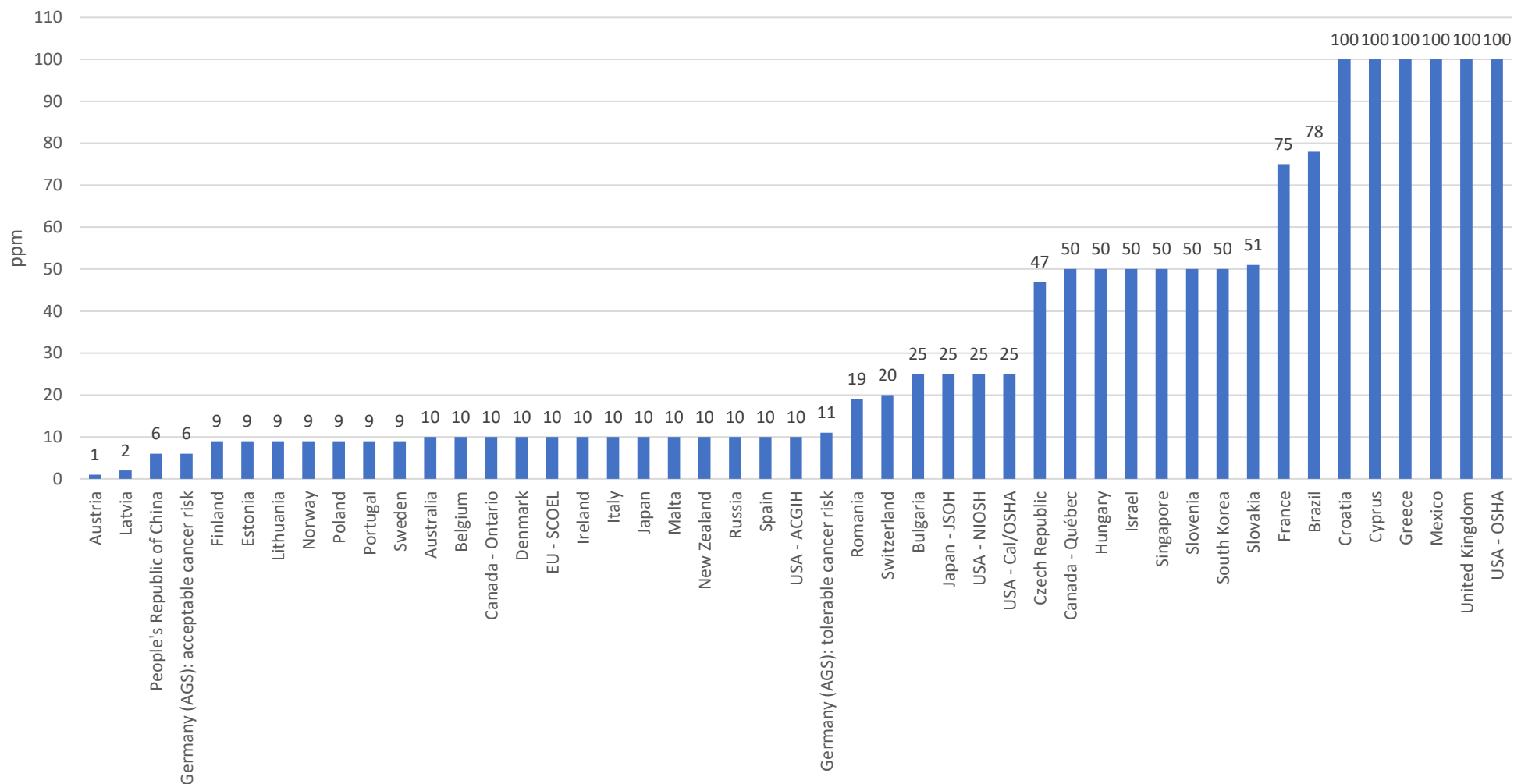
		age	sex	current smoking	current alcohol use	infection	BMI
Overall	WBC	0.01	0.05	0.14	0.03	0.12	0.21
	Granulocytes	0.00	0.04	0.12	0.03	0.10	0.19
	Monocytes	-0.10	0.18	0.27	-0.01	0.06	0.11
	Lymphocytes	0.05	-0.01	0.09	0.03	0.07	0.13
	T cells	-0.06	-0.08	-0.03	0.05	0.08	0.14
	CD4+ T cells	0.02	-0.11	-0.02	0.03	0.08	0.06
	CD4+ naïve	-0.22	0.02	0.03	0.07	0.15	-0.12
	CD4+ effector memory	0.22	-0.29	-0.02	0.01	0.04	0.19
	CD4CD25	0.01	0.16	0.21	-0.05	0.14	-0.08
	CD4CM	0.23	0.05	0.07	-0.06	0.13	0.20
	CD4Fox	-0.01	0.21	0.18	0.14	0.04	0.03
	CD25Fox	0.00	0.24	0.19	0.12	0.06	0.02
	CD8+ T cells	-0.04	0.08	0.05	0.05	0.05	0.13
	CD8+ naïve	-0.35	0.06	0.16	0.01	0.06	-0.20
	CD8EM	0.21	-0.12	-0.10	-0.01	0.02	0.29
	CD8CM	0.26	0.06	0.04	-0.13	0.04	0.20
	B cells	-0.02	0.02	0.12	0.03	0.15	-0.01
	NK cells	0.13	0.01	0.07	0.00	0.02	0.05
	sCD27	0.18	0.14	0.04	0.04	0.16	0.01
	sCD30	0.06	0.17	0.00	0.03	0.16	-0.06
	IL-10	0.14	0.16	-0.04	-0.02	0.07	-0.02
	IL-6	-0.05	0.01	0.02	-0.02	0.04	-0.04
	TNF-a	-0.08	0.34	0.24	-0.01	0.03	-0.05
	IgE	-0.11	-0.24	-0.18	0.02	0.10	-0.07
	IgG	0.00	0.13	-0.06	-0.05	-0.06	0.10
	IgM	0.05	-0.44	-0.19	0.04	0.11	-0.12
	KIM-1	0.05	0.02	0.01	0.09	-0.03	0.17
	NAG	-0.06	0.15	0.04	0.16	-0.04	0.22
	PiGST	0.01	-0.15	-0.08	-0.03	-0.03	0.21
	VEGF	-0.22	0.54	0.35	0.09	-0.19	-0.02

	AlphaGST	-0.09	-0.28	-0.21	-0.14	-0.11	0.01
Controls	WBC	0.02	0.13	0.30	0.06	0.19	0.25
	Granulocytes	0.00	0.10	0.26	0.07	0.21	0.26
	Monocytes	-0.11	0.19	0.38	0.03	0.09	0.06
	Lymphocytes	0.13	0.09	0.22	0.02	0.09	0.19
	T cells	-0.04	0.00	-0.01	0.08	0.12	0.22
	CD4+ T cells	0.05	-0.02	0.02	0.13	0.10	0.03
	CD4+ naïve	-0.20	0.20	0.06	0.13	0.17	-0.15
	CD4+ effector memory	0.24	-0.29	0.10	0.06	-0.02	0.24
	CD4CD25	0.12	0.23	0.31	-0.02	0.24	-0.05
	CD4CM	0.35	0.17	0.11	-0.04	0.19	0.24
	CD4Fox	0.03	0.21	0.18	0.17	0.10	0.02
	CD25Fox	0.04	0.25	0.20	0.16	0.14	0.01
	CD8+ T cells	-0.03	0.17	0.07	0.06	0.06	0.25
	CD8+ naïve	-0.39	0.21	0.34	0.07	-0.02	-0.18
	CD8EM	0.15	-0.08	-0.02	-0.03	-0.03	0.35
	CD8CM	0.31	0.14	0.13	-0.18	0.11	0.24
	B cells	0.05	0.13	0.30	0.13	0.16	-0.03
	NK cells	0.20	-0.07	0.10	-0.09	0.00	0.10
	sCD27	0.19	0.29	0.14	0.09	0.22	-0.03
	sCD30	0.05	0.24	0.12	0.00	0.26	-0.13
	IL-10	0.23	0.20	-0.04	-0.10	0.05	-0.02
	IL-6	0.07	0.05	0.02	0.02	0.02	-0.12
	TNF-a	0.08	0.31	0.21	0.01	0.05	0.00
	IgE	-0.21	-0.36	-0.31	0.01	0.10	-0.16
	IgG	0.06	0.24	0.00	0.17	-0.36	0.23
	IgM	-0.06	-0.43	-0.23	-0.13	-0.14	-0.18
	KIM-1	-0.08	-0.12	0.00	0.01	-0.01	0.33
	NAG	-0.21	0.09	-0.03	0.00	-0.22	0.17
	PiGST	-0.08	-0.30	-0.02	-0.02	-0.05	0.29
	VEGF	-0.22	0.48	0.33	0.06	-0.21	0.06
	AlphaGST	-0.07	-0.29	-0.08	-0.18	-0.02	-0.01

Exposed workers	WBC	-0.01	-0.06	-0.05	-0.02	0.02	0.15
	Granulocytes	0.03	-0.02	-0.04	0.00	-0.04	0.12
	Monocytes	-0.08	0.17	0.12	-0.08	0.02	0.16
	Lymphocytes	-0.11	-0.11	-0.01	-0.02	0.05	0.04
	T cells	-0.15	-0.21	-0.04	-0.03	0.03	0.00
	CD4+ T cells	-0.07	-0.21	-0.03	-0.08	0.06	0.06
	CD4+ naïve	-0.28	-0.17	0.02	-0.03	0.13	-0.12
	CD4+ effector memory	0.14	-0.31	-0.10	-0.08	0.07	0.12
	CD4CD25	-0.06	0.10	0.09	-0.07	0.03	-0.12
	CD4CM	0.13	-0.09	0.02	-0.10	0.09	0.14
	CD4Fox	-0.07	0.21	0.19	0.09	-0.02	0.03
	CD25Fox	-0.07	0.23	0.18	0.07	-0.01	0.02
	CD8+ T cells	-0.10	-0.05	0.04	-0.01	0.03	-0.03
	CD8+ naïve	-0.39	-0.13	0.01	-0.10	0.13	-0.28
	CD8EM	0.27	-0.16	-0.17	0.01	0.07	0.19
	CD8CM	0.15	-0.03	-0.05	-0.04	-0.06	0.15
	B cells	-0.15	-0.16	-0.14	-0.18	0.12	-0.01
	NK cells	-0.04	0.07	0.07	0.03	0.05	-0.03
	sCD27	-0.04	-0.11	-0.10	-0.17	0.06	0.03
	sCD30	-0.01	0.03	-0.15	-0.02	-0.05	-0.01
	IL-10	0.03	0.27	0.10	0.07	0.00	-0.02
	IL-6	-0.17	-0.05	0.00	-0.07	0.06	0.05
	TNF-a	-0.25	0.40	0.28	-0.03	0.03	-0.10
	IgE	-0.06	-0.15	-0.10	0.02	0.11	-0.01
	IgG	-0.05	0.14	-0.01	-0.24	0.10	0.06
	IgM	0.12	-0.48	-0.16	0.10	0.24	-0.04
	KIM-1	0.10	0.07	-0.04	0.19	-0.06	0.07
	NAG	0.03	0.18	0.07	0.27	0.03	0.27
	PiGST	0.06	-0.07	-0.13	-0.03	-0.04	0.18
	VEGF	-0.26	0.57	0.34	0.12	-0.22	-0.09
	AlphaGST	-0.09	-0.30	-0.27	-0.11	-0.17	0.01



Supplementary Figure 1. Distribution of level of TCE exposure among exposed workers.



Supplementary Figure 2. International comparison of recommended or regulatory limits for occupational exposure to trichloroethylene: time weighted average for 8 hours (unit: ppm). While many countries or organizations still set relatively high level as a standard (i.e., ≥ 25 ppm), many countries or organizations including USA – ACGIH and EU – SCOEL suggest or adopt 10 ppm as a standard. Note. The $\mu\text{g}/\text{m}^3$ unit was converted to ppm unit.

Abbreviations: AGS - Committee on Hazardous Substances (Ausschuss für Gefahrstoffe), SCOEL - Scientific Committee on Occupational Exposure Limits, NIOSH - National Institute of Occupational Safety and Health, Cal/NIOSH – California NIOSH, OSHA - Occupational Safety and Health Administration