

Supplemental Material for

Biomonitoring hexamethylene diisocyanate (HDI) exposure based on serum levels of HDI-specific IgG. Adam V. Wisnewski*, Meredith H. Stowe*, Abby Nerlinger*, Paul Opare-addo*, David DeCamp[†], Christopher R. Kleinsmith[‡], and Carrie A. Redlich*

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Supplemental Table 1: Self-Reported PPE Use by Task

Task (N= # Workers) ^a	PPE Type	Total (%)	309 th MXW N (%)	388 th FW N (%)
			N=56	N=11
Painting (N=67)	Glove Type			
	Nitrile	37 (55.2)	28 (50.0)	9 (81.1)
	Latex	15 (22.4)	13 (23.2)	2 (18.1)
	Other	7 (10.4)	7 (12.5)	0 (0.0)
	None	8 (11.9)	8 (14.3)	0 (0.0)
	Respirator Type			
	Supplied Air ^b	61 (91.0)	50 (89.3)	11 (100.0)
	Cartridge ^c	3 (4.5)	3 (5.4)	0 (0.0)
	Unclear / None	3 (4.5)	3 (5.4)	0 (0.0)
	Head Covering			
Hood	51 (76.1)	40 (71.4)	11 (100.0)	
None	16 (23.9)	16 (21.57)	0 (0.0)	
Taping (N=67)	Glove Type		N=53	N=14
	Nitrile	14 (20.9)	8 (15.1)	6 (42.3)
	Latex	4 (6.0)	2 (3.8)	2 (14.3)
	Other	3 (4.5)	3 (5.6)	0 (0)
	None	46 (68.7)	40 (75.5)	6 (42.9)
	Respirator Type			
	Supplied Air ^b	1 (1.5)	1 (1.9)	0 (0)
	Cartridge ^c	0 (0.0)	0 (0)	0 (0)
	Unclear / None	66 (98.5)	52 (98.1)	14 (100.0)
	Head Covering			
Hood	1 (1.5)	1 (1.9)	0 (0.0)	
No Hood	66 (98.5)	52 (98.1)	14 (100.0)	
Mixing Paint (N= 67)	Glove Type		N=56	N=11
	Nitrile	35 (52.2)	27 (48.2)	8 (72.7)
	Latex	18 (26.9)	17 (30.4)	1 (9.1)
	Other	4 (6.0)	4 (7.1)	0 (0.0)
	None	10 (14.9)	8 (14.3)	2 (18.2)
	Respirator Type [#]			
	Supplied Air ^b	8 (11.9)	6 (10.7)	2 (18.2)
	Cartridge ^c	16 (23.9)	11 (19.6)	5 (45.5)
	Unclear / None	43 (64.2)	39 (69.6)	4 (36.4)
	Head Covering			
Hood	13 (19.4)	7 (12.5)	6 (54.6)	
None	54 (80.6)	49 (87.5)	5 (45.5)	
Sandblasting (N=25)	Glove Type		N=16	N=9
	Nitrile	15 (60.0)	10 (62.5)	5 (55.6)
	Latex	2 (8.0)	0 (0.0)	2 (22.2)
	Other	2 (8.0)	2 (12.5)	0 (0.0)
	None	6 (24.0)	4 (25.0)	2 (22.2)
	Respirator Type			
	Supplied Air ^b	18 (72.0)	11 (68.8)	7 (77.8)
	Cartridge ^c	1 (4.0)	0 (0.0)	1 (11.1)
	Unclear / None	6 (24.0)	5 (31.3)	1 (11.1)
	Head Covering			
Hood	12 (48.0)	7 (43.8)	5 (55.6)	
None	13 (52.0)	9 (56.3)	4 (44.4)	

^aSome individuals reported wearing more than one type of PPE for the same task; ^bSupplied air respirator (+ cartridge); ^cOnly a cartridge respirator. 388th FW Personnel are more likely to report wearing hood covering when painting ($p<0.05$)*, nitrile gloves when taping ($p<0.05$)** , and a respirator when mixing paint ($p<0.01$)[#].

Supplemental Table 2: HDI-IgG Titers of Individual Serum Samples

ID#	HDI-IgG Titre
011	1:40
015	1:40
024	1:20
027	1:40
034	1:320
037	1:40
039	1:80
044	1:40
045	1:80
049	1:2,560
051	1:320
055	1:1,280
059	1:20
060	1:40
061	1:320
070	1:2,560
074	1:80

Supplemental Table 3: HDI-IgG Status of Workers

	HDI-IgG No. Elevated / Total in Group (%)	Titre Mean \pm SD	Range
Total workers	74 (100)	107.3 \pm 441.5	1-2560
Gender			
Male	16/66 (24.2)	118.9 \pm 466.4	1-2560
Female	1/8 (12.5)	10.9 \pm 27.9	1-80
Organization			
309th MXW	16/59 (27.1)	133.6 \pm 491.8	1-2560
<i>Aircraft Painters</i>	13/42 (30.8)	132.0 \pm 545.2	
C -130	6/21 (28.6)	205.5 \pm 608.9	1-2560
F-16	6/18 (33.3)	52.7 \pm 110.7	1-320
A-10	1/3 (33.3)	14.0 \pm 22.5	1-40
<i>Other Painters</i>	1/12 (8.3)	8.9 \pm 22.1	
Landing Gear	1/4 (25.0)	20.8 \pm 39.5	1-80
Generator	0/8 (0)	1 \pm 0.0	1
<i>Miscellaneous Painters</i>			
F-22, Missile and Parts	0/3 (0)	1 \pm 0.0	1
<i>Miscellaneous Mechanics</i>			
75 ABW Vehicle & Maintenance	2/2 (100)	1300.0 \pm 1781.9	40-2560
388th FW (All workers)	1/15 (6.7)	3.6 \pm 10.1	1-40
Shift			
Day or Swing	14/69 (20.3)	54.7 \pm 311.1	1-2560
Night (C-130)	3/5 (60)	832.4 \pm 1098.9	1-2560
Current Smoker			
Yes	1/20 (5.0)	17.0 \pm 71.3	1-320
No	16/54 (29.6)	140.7 \pm 512.3	1-2560

Supplemental Table 4: HDI-IgG status and PPE Use (during painting) by 309th MXW Aircraft

Painters (N=39)^a

PPE Type	HDI-IgG No. Elevated/Total Use PPE (%)	Titre Mean ± Std Dev	Range
Glove Type*			
Nitrile	7/19 (36.8)	246.9 ± 634.8	1-2560
Latex	2/7 (28.6)	9.3 ± 15.3	1-40
Other	2/6 (33.3)	60.7 ± 128.0	1-320
None	1/7 (14.3)	3.7 ± 7.2	1-20
Respirator Type*			
Supplied Air Respirator	9/34 (26.5)	103.1 ± 440.9	1-2560
Cartridge Respirator	2/2 (100.0)	800.0 ± 678.8	1-1280
Unknown / None	1/3 (33.3)	14.0 ± 22.5	1-40
Head Covering*			
Hood	7/28 (25.0)	145.8 ± 530.9	1-2560
No Hood	5/11 (45.5)	96.9 ± 145.2	1-320

^aData unavailable for 3 workers from the 573rd squadron, *Differences between reported PPE use and HDI-IgG status for each PPE-type were not statistical significant ($p > 0.05$).