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Supplemental Material

Respiratory, Dermal, and Eye Irritation Symptoms Associated with Corexit™ EC9527A/EC9500A following the *Deepwater Horizon* Oil Spill: Findings from the GuLF STUDY

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Table S1 - Enrollment Survey questions with positive responses used to classify exposure status of participants

Question #	Question	Overall exposure	Personal exposure
E9g1	Dispersant is the chemical used to break up the oil in the water. Did you work on a vessel that handled dispersant?	X	
E9h1	Did you work on a vessel that sprayed dispersant on the surface of the water?	X	
E10d2	You said you worked on a vessel that applied dispersant to the water. Did you personally prepare the dispersant by mixing it with water or other chemicals?	X	X
E10d14	Did you personally spray dispersant or directly help another person spray dispersant onto the water from a vessel?	X	X
E10e1	Did you work outside, for example on a deck, while dispersant was being sprayed by someone on the vessel?	X	X
E31a	Dispersants are chemicals used to break up the oil on the water. Did you ever handle dispersants on land or apply them by plane?	X	
E32b	Did you prepare dispersant by mixing it with water or other chemicals?	X	X
E32c	Did you spray dispersants from a plane?	X	
E36a	Did you maintain or work on pumps or tanks that held dispersant, fuel, oil or oily water or something else? *Required response of at least half of the time to “How much of the time did the pumps or tanks hold dispersant?”	X	X
E36b	Did you handle or pump dispersant, fuel, oil or oily water, or something else? *Required response of at least half of the time to “How much of the time that you handled or pumped these materials was it dispersant?”	X	X
E36c	Did you connect or disconnect hoses or lines used to transfer dispersant, gasoline, diesel fuel, oil or oily water, or something else? *Required response of at least half of the time to “How much of the time did the transfer lines hold dispersant?”	X	X

Table S2: Symptoms at spill response associated with dispersant exposure, differentiating potential exposure to specific dispersants (GuLF STUDY 2011-2013)

	Only 9500 Exposure		*Possible 9527 Exposure*	
Symptom	*aPR*[a]	*95% CI*	*aPR*[a]	*95% CI*
Cough	1.32	(1.16, 1.50)	1.40	(1.19, 1.64)
Wheeze	1.19	(1.02, 1.38)	1.34	(1.12, 1.60)
Tightness in chest	1.33	(1.10, 1.63)	1.79	(1.45, 2.21)
Shortness of breath	1.23	(1.05, 1.45)	1.41	(1.16, 1.70)
Burning in nose/throat/lungs	1.22	(1.01, 1.47)	1.82	(1.52, 2.19)
Burning eyes	1.25	(1.08, 1.44)	1.50	(1.28, 1.75)
Itchy eyes	1.12	(1.00, 1.26)	1.31	(1.17, 1.47)
Skin irritation	1.28	(1.15, 1.43)	1.21	(1.05, 1.39)

[a]All models adjusted for gender, age, race, education. Skin irritation models further adjusted for contact with oil/tar and contact with cleaning chemicals. Respiratory and eye irritation models further adjusted for smoking, residential proximity to oil spill, level of oil exposure (THC), use of decontamination chemicals, and pre-existing lung disease (respiratory models).

Table S3 - Respiratory and eye irritation symptoms at the time of spill response associated with dispersant exposure, stratified by work location during spill response (GuLF STUDY 2011-2013)

	Worked only on land		*On the water, away from wellhead*		*On the water, near wellhead*	
Outcome	*aPR*[a]	*95% CI*	*aPR*[a]	*95% CI*	*aPR*[a]	*95% CI*
Cough	1.34	(1.16, 1.54)	1.52	(1.26, 1.83)	1.43	(1.18, 1.74)
Wheeze	1.29	(1.10, 1.51)	1.77	(1.43, 2.18)	1.25	(1.00, 1.56)
Tightness in chest	1.52	(1.25, 1.85)	1.74	(1.31, 2.30)	1.48	(1.11, 1.98)
Shortness of breath	1.35	(1.14, 1.59)	1.55	(1.23, 1.96)	1.60	(1.25, 2.05)
Burning in nose/throat/lungs	1.65	(1.38, 1.97)	1.75	(1.35, 2.28)	1.53	(1.18, 1.99)
Burning eyes	1.39	(1.21, 1.60)	1.85	(1.51, 2.28)	1.48	(1.20, 1.81)
Itchy eyes	1.30	(1.16, 1.46)	1.55	(1.31, 1.84)	1.32	(1.12, 1.55)

[a]All models adjusted for gender, age, race, education, smoking, residential proximity to oil spill, level of oil exposure (THC), use of decontamination chemicals, and pre-existing lung disease (respiratory models).

Table S4 - Symptoms at spill response associated with dispersant exposure, stratified by the estimated airborne level of THC exposure (GuLF STUDY 2011-2013)

	THC < 0.3ppm (N=11,714[b], 12,059[c])			THC 0.3-0.99ppm (N=7,226[b], 7,423[c])		
Symptom	*Exposed [n (%)]*	*Unexposed [n (%)]*	*aPR (95% CI)[a]*	*Exposed [n (%)]*	*Unexposed [n (%)]*	*aPR (95% CI)[a]*
Cough	6 (21%)	922 (8%)	2.14 (1.10, 4.14)	82 (22%)	798 (12%)	1.38 (1.13, 1.69)
Wheeze	5 (18%)	736 (6%)	2.76 (1.29, 5.90)	63 (17%)	600 (9%)	1.25 (0.99, 1.58)
Tightness in chest	5 (18%)	423 (4%)	3.76 (1.73, 8.17)	50 (14%)	390 (6%)	1.50 (1.14, 1.97)
Shortness of breath	5 (18%)	640 (5%)	2.51 (1.19, 5.27)	63 (17%)	565 (8%)	1.35 (1.07, 1.70)
Burning in nose, throat, lungs	3 (11%)	375 (3%)	2.33 (0.84, 6.46)	54 (15%)	439 (6%)	1.54 (1.18, 2.00)
Burning eyes	4 (14%)	686 (6%)	1.70 (0.71, 4.06)	79 (21%)	722 (10%)	1.38 (1.13, 1.69)
Itching eyes	4 (14%)	1,151 (10%)	1.10 (0.46, 2.61)	104 (28%)	1,034 (15%)	1.35 (1.14, 1.59)

	THC 1.0-2.99ppm (N=6,601[b], 6,805[c])			THC ≥3.0ppm (N=3,095[b], 3,181[c])		
Symptom	*Exposed [n (%)]*	*Unexposed [n (%)]*	*aPR (95% CI)[a]*	*Exposed [n (%)]*	*Unexposed [n (%)]*	*aPR (95% CI)[a]*
Cough	156 (25%)	660 (11%)	1.49 (1.26, 1.75)	290 (25%)	262 (13%)	1.43 (1.23, 1.66)
Wheeze	137(22%)	504 (8%)	1.60 (1.34, 1.92)	221 (19%)	210 (11%)	1.31 (1.10, 1.56)
Tightness in chest	92 (14%)	309 (5%)	1.70 (1.34, 2.14)	158 (14%)	126 (6%)	1.51 (1.20, 1.89)
Shortness of breath	119 (19%)	451 (8%)	1.53 (1.26, 1.86)	200 (17%)	171 (9%)	1.42 (1.17, 1.72)
Burning in nose, throat, lungs	120 (19%)	350 (6%)	1.93 (1.57, 2.36)	190 (17%)	161 (8%)	1.45 (1.19, 1.78)
Burning eyes	171 (26%)	621 (10%)	1.71 (1.46, 2.00)	258 (22%)	232 (12%)	1.47 (1.24, 1.74)
Itching eyes	219 (33%)	828 (13%)	1.59 (1.40, 1.82)	332 (28%)	349 (17%)	1.26 (1.10, 1.44)

[a]All models adjusted for gender, age, race, education, smoking, residential proximity to oil spill, use of decontamination chemicals, and pre-existing lung disease (respiratory models).

[b]N for respiratory symptoms

[c]N for eye irritation symptoms

Table S5 - Symptoms within 30 days of enrollment associated with dispersant exposure, stratified by presence/absence of symptom at time of spill response (GuLF STUDY, 2011-2013)

	Symptoms at spill				No symptoms at spill			
Symptom	*N*[a]	*Exposed [n (%)]*	*Unexposed [n (%)]*	*aPR*[b] *(95% CI)*	*N*[a]	*Exposed [n (%)]*	*Unexposed [n (%)]*	*aPR*[b] *(95% CI)*
Cough	3,136	306 (58%)	1,453 (56%)	0.93 (0.86, 1.02)	24,670	279 (17%)	2,390 (10%)	1.04 (0.93, 1.18)
Wheeze	2,430	241 (58%)	1,079 (54%)	1.05 (0.95, 1.15)	25,418	235 (14%)	1,285 (5%)	1.27 (1.10, 1.45)
Tightness in chest	1,530	162 (54%)	612 (50%)	1.03 (0.91, 1.18)	26,391	171 (9%)	828 (3%)	1.31 (1.10, 1.56)
Shortness of breath	2,184	222 (58%)	993 (55%)	1.02 (0.92, 1.13)	25,789	210 (12%)	1,121 (5%)	1.19 (1.04, 1.36)
Burning in nose, throat, lungs	1,685	139 (38%)	440 (33%)	1.18 (0.99, 1.40)	26,285	104 (6%)	552 (2%)	1.55 (1.23, 1.96)
Burning Eyes	2,612	239 (49%)	895 (42%)	1.18 (1.04, 1.33)	25,537	121 (7%)	788 (3%)	1.33 (1.07, 1.64)
Itching Eyes	3,816	321 (51%)	1,493 (47%)	1.08 (0.98, 1.19)	24,323	157 (10%)	1,240 (5%)	1.17 (0.98, 1.40)
Skin irritation	4,651	150 (28%)	1,679 (41%)	0.86 (0.74, 1.00)	21,598	57 (12%)	7,212 (34%)	0.60 (0.47, 0.77)

[a] N with symptoms at spill and N without symptoms at spill do not sum to total enrollment model counts because of missing values for symptoms at spill.

[b] All models adjusted for gender, age, race, education, unemployment, disability, financial and perceived stress. Skin irritation models further adjusted for contact with oil/tar and contact with cleaning chemicals. Respiratory and eye irritation models further adjusted for smoking, residential proximity to oil spill, level of oil exposure (THC), use of decontamination chemicals, and pre-existing lung disease (respiratory models only).