

APPENDIX O

Renal Assessment

TABLE 0-1.
Unadjusted Exposure Index Analyses for Renal Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Kidney Disease	Officer	n	127	130	123	Overall	1.08 (0.44,2.64)	0.226
		Number/%						
		Abnormal	10 7.9%	11 8.5%	17 13.8%	H vs. L	0.96 (0.33,2.85)	0.999
	Enlisted Flyer	Normal	117 92.1%	119 91.5%	106 86.2%	H vs. L	1.88 (0.82,4.28)	0.155
		n	55	65	57	Overall	0.96 (0.33,2.85)	0.165
		Number/%						
Urinary Protein	Enlisted Flyer	Abnormal	7 12.7%	8 12.3%	2 3.5%	H vs. L	0.41 (0.04,4.69)	0.593
		Normal	48 87.3%	57 87.7%	55 96.5%	H vs. L	0.47 (0.04,5.37)	0.615
	Enlisted Groundcrew	n	153	163	141	Overall	0.54 (0.25,1.19)	0.214
		Number/%						
		Abnormal	18 11.8%	11 6.7%	10 7.1%	H vs. L	0.57 (0.26,1.29)	0.172
		Normal	135 88.2%	152 93.3%	131 92.9%	H vs. L	0.57 (0.26,1.29)	0.233
Urea Nitrogen	Officer	n	127	130	123	Overall	0.48 (0.09,2.67)	0.696
		Number/%						
		Abnormal	4 3.1%	2 1.5%	3 2.4%	H vs. L	0.77 (0.17,3.51)	0.443
	Enlisted Flyer	Normal	123 96.9%	128 98.5%	120 97.6%	H vs. L	0.82 (0.29,2.32)	0.794
		n	55	65	57	Overall	1.24 (0.46,3.29)	0.804
		Number/%						
	Enlisted Groundcrew	Abnormal	2 3.6%	1 1.5%	1 1.8%	H vs. L	0.47 (0.04,5.37)	0.615
		Normal	53 96.4%	64 98.5%	56 98.2%	H vs. L	0.82 (0.29,2.32)	0.794
		n	154	163	142	Overall	1.24 (0.46,3.29)	0.804
Creatinine	Officer	Number/%						
		Abnormal	8 5.2%	7 4.3%	9 6.3%	H vs. L	0.88 (0.82,4.28)	0.155
		Normal	146 94.8%	156 95.7%	133 93.7%	H vs. L	1.88 (0.82,4.28)	0.155
	Enlisted Flyer	n	55	65	57	Overall	0.96 (0.33,2.85)	0.165
		Number/%						
		Abnormal	7 12.7%	8 12.3%	2 3.5%	H vs. L	0.96 (0.33,2.85)	0.165
	Enlisted Groundcrew	Normal	48 87.3%	57 87.7%	55 96.5%	H vs. L	0.96 (0.33,2.85)	0.165

TABLE 0-1. (continued)
Unadjusted Exposure Index Analyses for Renal Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Urinary Occult Blood	Officer	n Number/%	127	130	123	Overall		0.334
		Abnormal	17 13.4%	15 11.5%	22 17.9%	M vs. L	0.84 (0.40,1.77)	0.708
		Normal	110 86.6%	115 88.5%	101 82.1%	H vs. L	1.41 (0.71,2.81)	0.385
	Enlisted Flyer	n Number/%	55	65	57	Overall		0.325
		Abnormal	12 21.8%	14 21.5%	7 12.3%	M vs. L	0.98 (0.41,2.35)	0.999
		Normal	43 78.2%	51 78.5%	50 87.7%	H vs. L	0.50 (0.18,1.39)	0.214
Urinary White Blood Cell Count	Enlisted Groundcrew	n Number/%	154	163	141	Overall		0.144
		Abnormal	25 16.2%	34 20.9%	36 25.5%	M vs. L	1.36 (0.77,2.41)	0.315
		Normal	129 83.8%	129 79.1%	105 74.5%	H vs. L	1.77 (1.00,3.13)	0.061
	Officer	n Number/%	127	130	123	Overall		0.558
		Abnormal	11 8.7%	7 5.4%	10 8.1%	M vs. L	0.60 (0.23,1.60)	0.337
		Normal	116 91.3%	123 94.6%	113 91.9%	H vs. L	0.93 (0.38,2.28)	0.999
	Enlisted Flyer	n Number/%	55	65	57	Overall		0.763
		Abnormal	7 12.7%	8 12.3%	5 8.8%	M vs. L	0.96 (0.33,2.85)	0.999
		Normal	48 87.3%	57 87.7%	52 91.2%	H vs. L	0.66 (0.20,2.22)	0.554
	Enlisted Groundcrew	n Number/%	154	163	142	Overall		0.447
		Abnormal	20 13.0%	15 9.2%	19 13.4%	M vs. L	0.68 (0.33,1.38)	0.290
		Normal	134 87.0%	148 90.8%	123 86.6%	H vs. L	1.04 (0.53,2.03)	0.999

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TABLE 0-1. (continued)
Unadjusted Exposure Index Analyses for Renal Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Blood Urea Nitrogen	Officer	n	127	130	123	Overall		0.891
		Mean*	14.62	14.82	14.74	M vs. L	--	0.633
		95% C.I.*	(14.05, 15.19)	(14.20, 15.46)	(14.14, 15.35)	H vs. L	--	0.775
Blood Urea Nitrogen	Enlisted Flyer	n	55	65	57	Overall		0.983
		Mean*	13.84	13.80	13.93	M vs. L	--	0.963
		95% C.I.*	(12.79, 14.93)	(12.87, 14.77)	(13.15, 14.72)	H vs. L	--	0.895
Blood Urea Nitrogen	Enlisted Groundcrew	n	154	163	142	Overall		0.639
		Mean*	14.08	13.72	14.00	M vs. L	--	0.389
		95% C.I.*	(13.50, 14.67)	(13.15, 14.30)	(13.48, 14.52)	H vs. L	--	0.841
Urine Specific Gravity	Officer	n	127	130	123	Overall	--	0.786
		Mean	1.0144	1.0149	1.0150	M vs. L	--	0.554
		95% C.I.	(1.0132, 1.0156)	(1.0137, 1.0161)	(1.0137, 1.0162)	H vs. L	--	0.541
Urine Specific Gravity	Enlisted Flyer	n	55	65	57	Overall	--	0.358
		Mean	1.0159	1.0155	1.0141	M vs. L	--	0.803
		95% C.I.	(1.0139, 1.0178)	(1.0138, 1.0173)	(1.0123, 1.0158)	H vs. L	--	0.178
Urine Specific Gravity	Enlisted Groundcrew	n	154	163	142	Overall	--	0.967
		Mean	1.0167	1.0168	1.0166	M vs. L	--	0.885
		95% C.I.	(1.0156, 1.0178)	(1.0158, 1.0179)	(1.0154, 1.0179)	H vs. L	--	0.907

*Transformed from square root scale.

--No relative risk given for variables analyzed continuously.

TABLE 0-2.
Interaction Summaries of Adjusted Exposure Index Analyses for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value	
				Low	Medium	High				
Urinary Protein	Exposure Index-by-Diabetic Class (Officer)	Diabetic	n	8	8	14	Overall		0.010*	
			Number/%							
			Abnormal	3	37.5%	0	0.0%	0	0.0%	
	Exposure Index-by-Diabetic Class (Officer)	Impaired	Normal	5	62.5%	8	100.0%	14	100.0%	
			n	11	14	16	Overall		0.247*	
			Number/%							
		Normal	Abnormal	1	9.1%	0	0.0%	0	0.0%	
			Normal	10	90.9%	14	100.0%	16	100.0%	
			n	108	108	93	Overall		0.190*	
Urinary Protein	Exposure Index-by-Race (Enlisted Groundcrew)	Nonblack	n	138	149	129	Overall		0.259*	
			Number/%							
			Abnormal	4	2.9%	6	4.0%	9	7.0%	
			Normal	134	97.1%	143	96.0%	120	93.0%	
	Exposure Index-by-Age (Enlisted Groundcrew)	Black	n	16	14	13	Overall		0.092*	
			Number/%							
			Abnormal	4	25.0%	1	7.1%	0	0.0%	
			Normal	12	75.0%	13	92.9%	13	100.0%	
Urinary Occult Blood	Born ≥1942	Exposure Index-by-Age (Enlisted Groundcrew)	n	87	129	81				
			Number/%							
			Abnormal	11	12.6%	23	17.8%	20	24.7%	
		Born <1942	Normal	76	87.4%	106	82.2%	61	75.3%	
	Born <1942		n	67	34	60				
			Number/%							
			Abnormal	14	20.9%	11	32.4%	16	26.7%	
			Normal	53	79.1%	23	67.6%	44	73.3%	

TABLE 0-2. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value		
				Low	Medium	High					
Urinary White Blood Cell Count(a)	Born ≥1942 Diabetic	n	0	1	0	Overall					
			Number/%								
		Abnormal	0	—	1	100.0%	0	M vs. L	—		
		Normal	0	—	0	0.0%	0	H vs. L	—		
	Born ≥1942 Impaired	n	1	1	0	Overall					
			Number/%								
		Abnormal	0	0.0%	1	100.0%	0	M vs. L	9.00 (0.10,831.78)**		
		Normal	1	100.0%	0	0.0%	0	H vs. L	—		
	Exposure Index-by- Age	Born ≥1942	n	10	16	9	Overall				
			Number/%								
		Normal	Abnormal	3 30.0%	0 0.0%	1 11.1%	M vs. L	0.07 (0.003,1.42)**	0.065*		
		Normal	Normal	7 70.0%	16 100.0%	8 88.9%	H vs. L	0.29 (0.02,3.48)**	0.582*		
	Exposure Index-by- Diabetic Class (Enlisted Flyer)	Born <1942	n	1	8	5	Overall				
			Number/%								
		Diabetic	Abnormal	0 0.0%	1 12.5%	0 0.0%	M vs. L	0.60 (0.02,23.07)**	0.668*		
		Normal	Normal	1 100.0%	7 87.5%	5 100.0%	H vs. L	—	—		
	Born <1942 Impaired	Born <1942	n	8	6	6	Overall				
			Number/%								
		Impaired	Abnormal	0 0.0%	2 33.3%	1 16.7%	M vs. L	9.44 (0.37,242.18)**	0.222*		
		Normal	Normal	8 100.0%	4 66.7%	5 83.3%	H vs. L	4.64 (0.16,135.57)**	0.165*		
	Born <1942 Normal	Born <1942	n	35	33	37	Overall				
			Number/%								
		Normal	Abnormal	4 11.4%	4 12.1%	3 8.1%	M vs. L	0.79 (0.16,3.90)	0.776		
		Normal	Normal	31 88.6%	29 87.9%	34 91.9%	H vs. L	0.58 (0.11,3.03)	0.515		

TABLE 0-2. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Blood Urea Nitrogen	Exposure Index-by- Race	Nonblack	n	125	127	121	M vs. L	(b)	0.877
			Adj. Mean(c)	14.65	14.71	14.55	H vs. L	(b)	0.814
	(Officer)	Black	95% C.I.(c)	(13.91,15.41)	(13.96,15.49)	(13.84,1.27)			
			n	2	2	3	M vs. L	(b)	0.035
			Adj. Mean	16.93	10.65	19.51	H vs. L	(b)	0.494
			95% C.I.	(12.24,22.38)	(7.62,14.19)	(14.45,25.33)			

*Unadjusted estimate of relative risk and confidence interval, or p-value, based on stratified tables.

**Unadjusted estimate of relative risk and confidence interval calculated after adding 0.5 to each cell.

—Zero counts in cells do not allow for calculation of percent, relative risk, confidence interval, or p-value.

(a)Results presented for urinary white blood cell count are based on stratification into the six categories shown. Unadjusted results are presented for all strata except Ranch Hands in normal diabetic class, born before 1942. These results have been adjusted for race.

(b)No relative risk given for variables analyzed continuously.

(c)Transformed from square root scale.

Note: Small sample sizes may affect validity of overall p-value.

Note: Results without (*) or (**) are adjusted for all other main effects in model (age, race, and diabetic class), unless otherwise noted.

TABLE 0-3.

**Unadjusted Analyses for Renal Variables by Group
(Original Comparisons Only)**

Variable	Statistic	Group		Original Comparison		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Number	Hand Percent	Number	Percent		
Kidney Disease	n	1,014		954			
	Yes	94	9.3	94	9.9	0.93 (0.69,1.26)	
	No	920	90.7	859	90.1		0.701
Urinary Protein	n	1,016		954			
	Abnormal	37	3.6	28	2.9	1.25 (0.76,2.06)	
	Normal	979	96.4	926	97.1		0.449
Urinary Occult Blood	n	1,015		954			
	Abnormal	182	17.9	155	16.2	1.13 (0.89,1.43)	
	Normal	833	82.1	799	83.8		0.338
Urinary White Blood Cell Count	n	1,016		954			
	Abnormal	102	10.0	83	8.7	1.17 (0.86,1.59)	
	Normal	914	90.0	871	91.3		0.316
Blood Urea Nitrogen	n	1,016		955			
	Mean*	14.21		14.37		--	
	95% C.I.*	(13.99,14.43)		(14.15,14.59)			0.318
Urine Specific Gravity	n	1,016		954			
	Mean	1.0157		1.0154		--	
	95% C.I.	(1.0153,1.0162)		(1.0150,1.0159)			0.365

*Converted from square root scale.

--No relative risk given for variables analyzed continuously.

TABLE 0-4.
Adjusted Analyses for Renal Variables by Group
(Original Comparisons Only)

Variable	Strati- fication	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
Kidney Disease		n	1,014	950	0.95 (0.70,1.28)	0.726	AGE (p=0.001)
Urinary Protein		n	1,016	942	****	****	OCC (p=0.007) AGE*DIAB (p=0.037) GRP*DIAB (p=0.003)
Urinary Occult Blood							GRP*OCC*RACE (p=0.020)
	Nonblack	n	955	887	1.14 (0.89,1.46)	0.299	AGE (p=0.003) OCC (p<0.001)
	Black Enlisted	n	53	51	1.43 (0.54,3.76)	0.465	GRP*OCC (p=0.051) AGE*DIAB (p=0.027)

TABLE 0-4. (continued)

Adjusted Analyses for Renal Variables by Group
(Original Comparisons Only)

Variable	Strati-fication	Statistic	Group				Covariate Remarks*
			Ranch Hand	Original Comparison	Adj. Relative Risk (95% C.I.)	p-Value	
Urinary White Blood Cell Count	Nonblack	n	956	893	****	****	GRP*AGE*RACE (p=0.048)
		n	53	51	****	****	GRP*OCC*RACE (p=0.022)
		n	1,016	952	****	****	OCC (p=0.010) GRP*DIAB (p=0.054) GRP*AGE -(p=0.053)
	Black Enlisted	Adj. Mean	****	****	--	--	GRP*OCC (p=0.015)
		95% C.I.	****	****	--	--	DIAB (p=0.017)
		n	1,016	951	****	****	GRP*AGE (p=0.010)
Blood Urea Nitrogen	Adj. Mean	****	****	--	--	--	AGE (p<0.001)
	95% C.I.	****	****	--	--	--	OCC (p=0.025)
	n	1,016	951	****	****	****	RACE*DIAB (p=0.049)
Urine Specific Gravity	Adj. Mean	****	****	--	--	--	GRP*RACE (p=0.077)
	95% C.I.	****	****	--	--	--	

***Abbreviations:**

OCC: occupation

GRP: group

DIAB: diabetic class

****Group-by-covariate interaction--adjusted relative risk/group means, p-value, and confidence interval are not presented.

--No relative risk given for variables analyzed continuously.

TABLE 0-5.

**Summary of Group-by-Covariate Interactions for Renal Variables
(Original Comparisons Only)**

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Original Comparison		
Urinary Protein	Group-by-Diabetic Class	Diabetic	n	78	76		
			Number/%				
			Abnormal	7	9.0%	11	14.4%
	Group-by-Diabetic Class	Impaired	Normal	71	91.0%	65	85.5%
			n	106	136		
			Number/%				
	Group-by-Diabetic Class	Normal	Abnormal	5	4.7%	11	8.1%
			Normal	101	95.3%	125	91.9%
			n	832	739		
	Group-by-Occupation (Black)	Officer	Number/%				
			Abnormal	25	3.0%	6	0.8%
			Normal	807	97.0%	733	99.2%
Urinary Occult Blood	Group-by-Occupation (Black)	Enlisted Flyer	n	7	7		
			Number/%				
			Abnormal	0	0.0%	3	42.9%
			Normal	7	100.0%	4	57.1%
	Group-by-Occupation (Black)	Enlisted Groundcrew	n	10	12		
			Number/%				
			Abnormal	3	30.0%	1	8.3%
			Normal	7	70.0%	11	91.7%
	Group-by-Occupation (White)	Enlisted Groundcrew	n	43	39		
			Number/%				
			Abnormal	13	30.2%	9	23.1%
			Normal	30	69.8%	30	76.9%

TABLE 0-5. (continued)

Summary of Group-by-Covariate Interactions for Renal Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Original Comparison	Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Ranch Hand			
Urinary White Blood Cell Count	<u>Nonblack:</u>	Born ≥1942	n	14	-	12		
		Diabetic	Abnormal	1	7.1%	2	16.7%	
		Normal	Normal	13	92.9%	10	83.3%	0.90 (0.38,2.10) 0.799
	Group-by-Age	Born ≤1942	n	22	-	33		
		Impaired	Abnormal	2	9.1%	4	12.1%	
		Normal	Normal	20	90.9%	29	87.9%	4.12 (2.06,8.24) <0.001
	Group-by-Diabetic Class	Born ≥1942	n	344	-	298		
		Normal	Abnormal	38	11.0%	13	4.4%	
		Normal	Normal	306	89.0%	285	95.6%	2.08 (1.16,3.71) 0.014
		Born <1942	n	57	-	57		
		Diabetic	Abnormal	6	10.5%	12	21.1%	
		Normal	Normal	51	89.5%	45	78.9%	0.38 (0.14,1.04) 0.059
		Born <1942	n	80	-	89		
		Impaired	Abnormal	14	17.5%	6	6.7%	
		Normal	Normal	66	82.5%	83	93.3%	1.77 (0.75,4.17) 0.191
		Born <1942	n	439	-	404		
		Normal	Abnormal	31	7.1%	37	9.2%	
		Normal	Normal	408	92.9%	367	90.8%	0.89 (0.55,1.44) 0.639

TABLE 0-5. (continued)

Summary of Group-by-Covariate Interactions for Renal Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Original Comparison	Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand				
Urinary White Blood Cell Count	Group-by-Occupation (Black)	Enlisted Flyer	Officer	n	7	7		
				Number/%				
				Abnormal	0	0.0%	2	28.6%
	Group-by-Occupation (Black)	Enlisted Flyer	Enlisted Groundcrew	Normal	7	100.0%	5	71.4%
				n	10		12	
				Number/%				
	Group-by-Age (Black Enlisted)	Born <1942	Born ≥1942	Abnormal	3	30.0%	0	0.0%
				Normal	7	70.0%	12	100.0%
				n	43		39	
	Group-by-Age (Black Enlisted)	Born <1942	Born ≥1942	Number/%				
				Abnormal	7	16.3%	7	17.9%
				Normal	36	83.7%	32	82.1%
Urinary White Blood Cell Count	Group-by-Age (Black Enlisted)	Born <1942	Born ≥1942	n	29	26		
				Number/%				
				Abnormal	4	13.8%	5	19.2%
				Normal	25	86.2%	21	80.8%
	Group-by-Age (Black Enlisted)	Born <1942	Born ≥1942	n	24	25		
				Number/%				
				Abnormal	6	25.0%	2	8.0%
				Normal	18	75.0%	23	92.0%

TABLE 0-5. (continued)

**Summary of Group-by-Covariate Interactions for Renal Variables
(Original Comparisons Only)**

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Original Comparison		
Blood Urea Nitrogen	Group-by-Race	Nonblack	n	956	894	--	0.726
			Adj. Mean*	14.16	14.22		
			95% C.I.*	(13.86,14.47)	(13.92,14.53)	--	0.057
		Black	n	60	58		
Urine Specific Gravity	Group-by-Race	Nonblack	n	956	893	--	0.104
			Adj. Mean	1.0163	1.0158		
			95% C.I.	(1.0157,1.0169)	(1.0151,1.0164)	--	0.081
		Black	n	60	58		
			Adj. Mean	1.0154	1.0177	--	0.081
			95% C.I.	(1.0135,1.0173)	(1.0158,1.0196)		

--No relative risk given for variables analyzed continuously. Also, no relative risk or p-value given for interactions involving occupation for urinary occult blood and urinary white blood cell count; tables presented only for illustrative purposes.

*Transformed from square root scale.