

## 2. C1-C5 VERSUS C6-C10 ANALYSES

During the analyses for the 1984 mortality update, Air Force statisticians received a mortality database on the entire matched Comparison cohort, consisting at that time of 9982 records. In each matched set, the Comparisons included in the previous mortality reports are referred to as the C1-C5 Comparisons. The remaining matched Comparisons are called the C6-C10 Comparisons. When Ranch Hand versus Comparison analysis results changed after introducing the new Comparisons, it was found that the C1-C5 Comparisons appeared statistically different, with respect to their mortality experience, from the C6-C10 matched Comparisons. The C1-C5 and C6-C10 Comparisons were contrasted via logrank tests and Mantel-Haenszel relative risks using 5-year age stratification within levels of rank and occupation. The results of those analyses, on data available for the 1984 update (cumulative deaths up to 31 December 1983, verified as of 15 April 1984) are shown in Table 7. Throughout this report the abbreviation for confidence interval is C I.

TABLE 7

Logrank Test Results Comparing C1-C5 with C6-C10 on  
Cumulative Deaths Occurring on or Before 31 December 1983  
and Verified as of 15 June 1984, Survival Measured from Birth

Race	Occupation	Logrank		Mantel-Haenszel		P-value
		Test	P-value	Relative Risk	95% C I	
Non-black	Pilots	-1.60	0.11	0.72	(0.26,2.00)	0.52
	Navigators	0.47	0.63	1.21	(0.29,4.96)	0.79
	Nonflying Officers					
	Enlisted Flyers	-1.53	0.13	0.70	(0.24,2.02)	0.51
	Nonflying Enlisted	2.15	0.03	1.55	(0.35,6.79)	0.56
Black	Pilots					
	Navigators					
	Nonflying Officers					
	Enlisted Flyers	1.59	0.11	4.38	(0.36,52.96)	0.25
	Nonflying Enlisted	0.45	0.65	1.24	(0.25,6.02)	0.14

These results suggested that nonblack enlisted nonflying Comparisons in the C1-C5 cohort were dying at a younger age than the corresponding nonblack enlisted nonflying C6-C10 Comparisons. The relative risk for this group, while elevated (RR=1.55), was not significantly different from unity. These analyses suggest that the C1-C5 Comparison cohort was representative of the C1-C10 matched cohort in all but the nonblack enlisted nonflying stratum. In the non-black enlisted nonflying stratum, the C1-C5 mortality appeared worse than expected relative to the C6-C10 mortality and so Ranch Hand mortality in the stratum would appear more favorable than expected relative to their C1-C5 Comparisons. Based on these data, Air Force Principal Investigators recommended the expansion of the mortality study to the entire matched Comparison cohort. The Advisory Committee concurred that expansion was appropriate but asked that the mortality study include the entire Comparison population.

A contrast of the C1-C5 and C6-C10 Comparison mortality using current data was also carried out. Summary counts, person-years and death rates are shown in Table 8. Analytical results are shown in Table 9 with mortality measured from birth and from tour start date.

TABLE 8

Stratum-Specific Counts, Person-years and Death Rates  
for C1-C5 and C6-C10 Comparisons  
Person-years Computed from Tour Start Date

Nonblack Pilots

Group	Number at Risk	Number Dead	Rate (%)	Person-years	Rate Per 1000 Person-years
C1-C5	1749	101	5.77	35169	2.87
C6-C10	1175	92	7.83	23398	3.93

Nonblack Navigators

Group	Number at Risk	Number Dead	Rate (%)	Person-years	Rate Per 1000 Person-years
C1-C5	404	20	4.95	8184	2.44
C6-C10	310	13	4.19	6354	2.05

Nonblack Nonflying Officers

Group	Number at Risk	Number Dead	Rate (%)	Person-years	Rate Per 1000 Person-years
C1-C5	122	6	4.92	2522	2.38
C6-C10	43	1	2.33	897	1.11

Nonblack Enlisted Flyers

Group	Number at Risk	Number Dead	Rate (%)	Person-years	Rate Per 1000 Person-years
C1-C5	960	72	7.50	19295	3.73
C6-C10	723	72	9.96	14386	5.00

Nonblack Nonflying Enlisted Personnel

Group	Number at Risk	Number Dead	Rate (%)	Person-years	Rate Per 1000 Person-years
C1-C5	2655	152	5.73	53828	2.82
C6-C10	1420	65	4.58	29264	2.22

TABLE 8 (Cont'd)

Stratum-Specific Counts, Person-years and Death Rates  
for C1-C5 and C6-C10 Comparisons  
Person-years Computed from Tour Start Date

## Black Pilots

Group	Number at Risk	Number Dead	Rate (%)	Person- years	Rate Per 1000 Person-years
C1-C5	13	0	0.00	269	0.00
C6-C10	1	0	0.00	24	0.00

## Black Navigators

Group	Number at Risk	Number Dead	Rate (%)	Person- years	Rate Per 1000 Person-years
C1-C5	10	0	0.00	219	0.00
C6-C10	9	0	0.00	197	0.00

## Black Nonflying Officers

Group	Number at Risk	Number Dead	Rate (%)	Person- years	Rate Per 1000 Person-years
C1-C5	2	0	0.00	39	0.00
C6-C10	0	0	0.00	0	0.00

## Black Enlisted Flyers

Group	Number at Risk	Number Dead	Rate (%)	Person- years	Rate Per 1000 Person-years
C1-C5	75	11	14.67	1475	7.46
C6-C10	56	2	3.57	1162	1.72

## Black Nonflying Enlisted Personnel

Group	Number at Risk	Number Dead	Rate (%)	Person- years	Rate Per 1000 Person-years
C1-C5	260	14	5.38	5289	2.65
C6-C10	146	8	5.48	2933	2.73

TABLE 9

Logrank Test Results Comparing C1-C5 with C6-C10 on Cumulative Deaths Occurring on or Before 31 December 1987 and Verified as of 15 June 1988, Survival Measured from Birth and from Tour Start Date

Race	Occupation	Logrank				Mantel-Haenszel		
		From Birth Test	P-value	From Tour Test	P-value	Odds Ratio	95% C I	P-value
Non-black	Pilots	-2.24	0.02	-2.11	0.04	0.71	(0.32,1.57)	0.40
	Navigators	0.48	0.63	0.55	0.58	1.17	(0.37,3.70)	0.78
	Nonflying Officers	0.71	0.47	0.66	0.51	2.17	(0.25,18.5)	0.48
	Enlisted Flyers	-2.23	0.02	-2.12	0.03	0.71	(0.27,1.85)	0.49
	Nonflying Enlisted	1.57	0.11	1.42	0.16	1.26	(0.14,11.5)	0.83
Black	Pilots							
	Navigators							
	Nonflying Officers							
	Enlisted Flyers	2.05	0.04	2.09	0.04	4.64	(0.98,21.8)	0.05
	Nonflying Enlisted	-0.13	0.90	-0.17	0.86	0.93	(0.23,3.77)	0.92

It is noted that the previously statistically significant contrast for nonblack enlisted nonflying personnel is no longer significant although the C1-C5 to C6-C10 mortality odds ratio, 1.26, indicates a nonsignificant elevation of risk of death in the C1-C5 relative to the C6-C10 cohort in the nonblack nonflying enlisted personnel stratum. Additionally, the previously nonsignificant difference between C1-C5 and C6-C10 nonblack pilots is now statistically significant with logrank testing, whether survival is measured from birth ( $P=0.02$ ) or from tour start date ( $P=0.04$ ). Significant C1-C5 versus C6-C10 logrank differences are also seen in nonblack and black enlisted flyers. When only counts of death are considered, all rank and occupation-specific C1-C5 versus C6-C10 Mantel-Haenszel contrasts are not statistically significant, although the elevated C1-C5 versus C6-C10 odds ratio, 4.64, among black enlisted flyers is borderline significant ( $P=0.05$ ). The negative logrank tests and odds ratios less than unity among nonblack pilots, nonblack enlisted flyers and black nonflying enlisted personnel indicate that C1-C5 personnel in these categories are living longer and dying in fewer numbers than their C6-C10 counterparts. These results support the conclusion that the C1-C5 and C6-C10 mortality experiences are not comparable.

Based on these results, the mortality determination was expanded to the entire Comparison population.