Table 12.4: Computations for the Kaplan-Meier and Nelson-Aalen survival curve estimates of the AML data.

	Maintenance						Non-Maintenance (control)					
t_i	n_i	d_i	$\hat{h}_i$	$\hat{S}(t_i)$	$\hat{H}_i$	$\widetilde{S}(t_i)$	n_i	d_i	$\hat{h}_i$	$\hat{S}(t_i)$	$\hat{H}_i$	$\widetilde{S}(t_i)$
5	11	0	0.00	1.00	0.00	1.00	12	2	0.17	0.83	0.17	0.85
8	11	0	0.00	1.00	0.00	1.00	10	2	0.20	0.67	0.37	0.69
9	11	1	0.09	0.91	0.09	0.91	8	0	0.00	0.67	0.37	0.69
12	10	0	0.00	0.91	0.09	0.91	8	1	0.12	0.58	0.49	0.61
13	10	1	0.10	0.82	0.19	0.83	7	0	0.00	0.58	0.49	0.61
18	8	1	0.12	0.72	0.32	0.73	6	0	0.00	0.58	0.49	0.61
23	7	1	0.14	0.61	0.46	0.63	6	1	0.17	0.49	0.66	0.52
27	6	0	0.00	0.61	0.46	0.63	5	1	0.20	0.39	0.86	0.42
30	5	0	0.00	0.61	0.46	0.63	4	1	0.25	0.29	1.11	0.33
31	5	1	0.20	0.49	0.66	0.52	3	0	0.00	0.29	1.11	0.33
33	4	0	0.00	0.49	0.66	0.52	3	1	0.33	0.19	1.44	0.24
34	4	1	0.25	0.37	0.91	0.40	2	0	0.00	0.19	1.44	0.24
43	3	0	0.00	0.37	0.91	0.40	2	1	0.50	0.10	1.94	0.14
45	3	0	0.00	0.37	0.91	0.40	1	1	1.00	0.00	2.94	0.05
48	2	1	0.50	0.18	1.41	0.24	0	0				

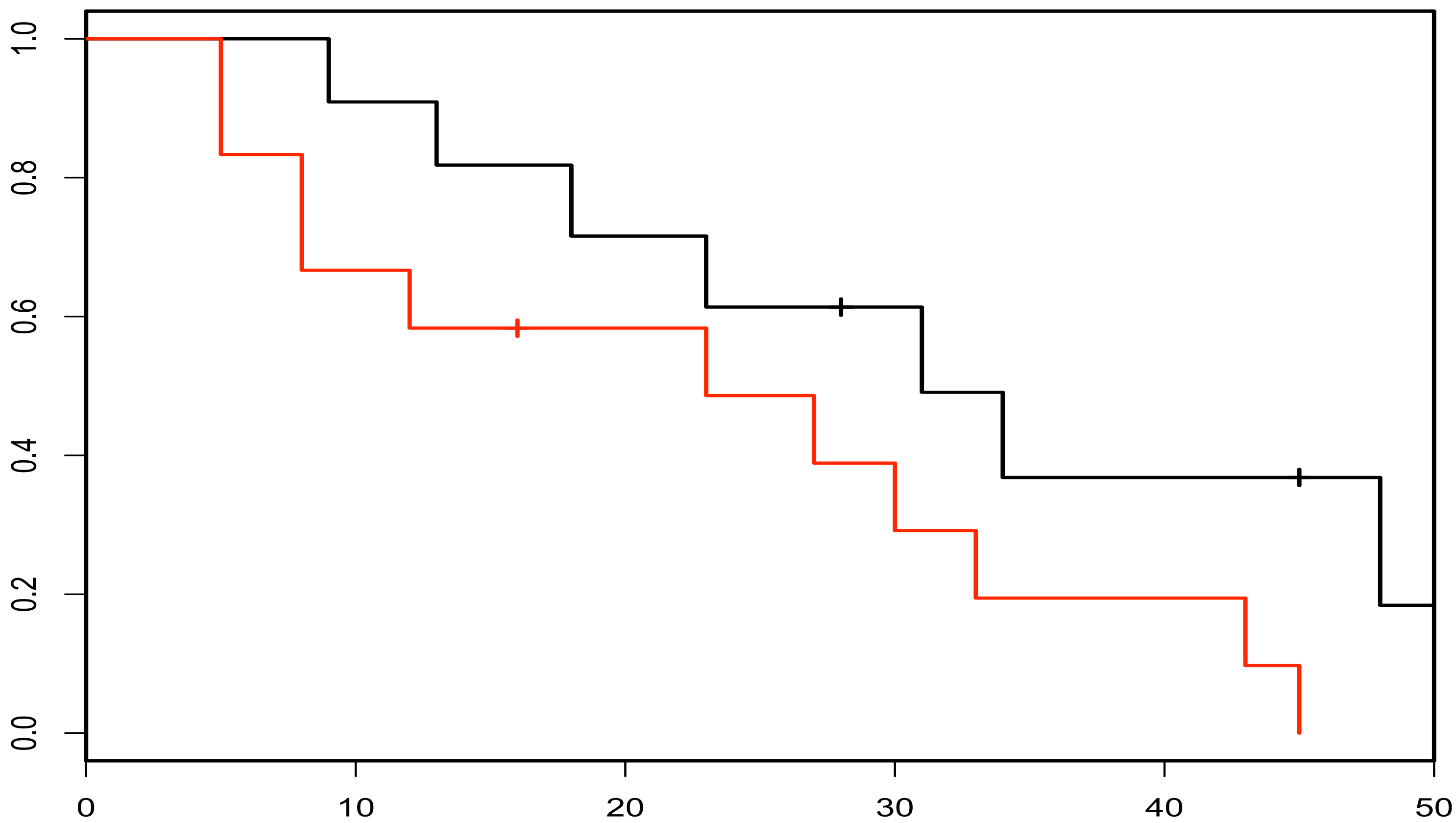

Figure 12.1: Kaplan-Meier estimates of survival in maintenance (black) and non-maintenance groups in the AML study.

Table 12.5: Computations for Greenwood's estimate of the standard error of the Kaplan-Meier survival curve from the maintenance population in the AML data. "lower" and "upper" are bounds for 95% confidence intervals, based on the log-normal distribution.

t_i	n_i	d_i	$\frac{d_i}{n_i(n_i-d_i)}$	$\mathrm{Var}(\log \hat{S}(t_i))$	lower	upper
9	11	1	0.009	0.009	0.754	1.000
13	10	1	0.011	0.020	0.619	1.000
18	8	1	0.018	0.038	0.488	1.000
23	7	1	0.024	0.062	0.377	0.999
31	5	1	0.050	0.112	0.255	0.946
34	4	1	0.083	0.195	0.155	0.875
48	2	1	0.500	0.695	0.036	0.944

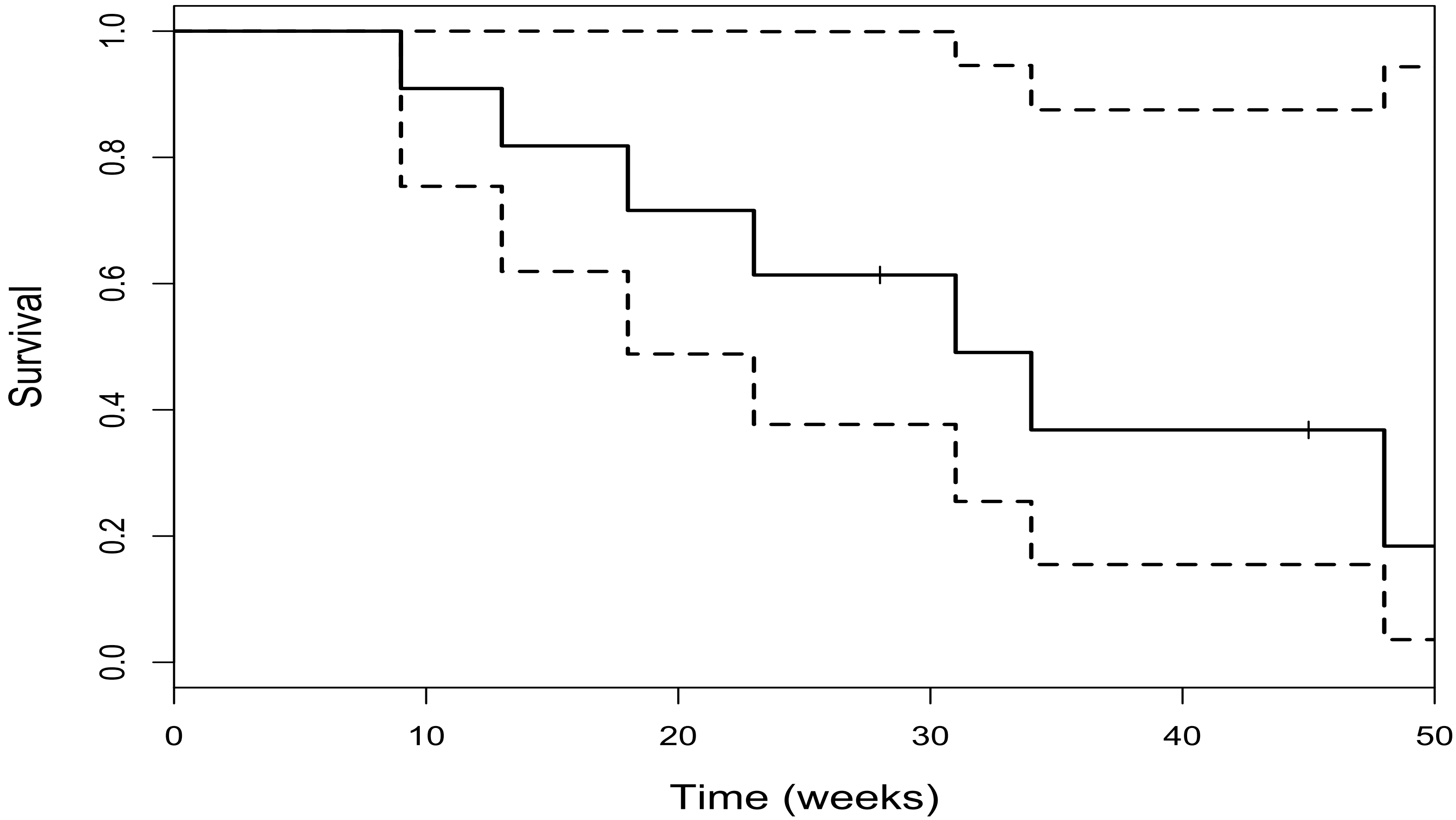

Figure 12.2: Greenwood's estimate of 95% confidence intervals for survival in maintenance group of the AML study.

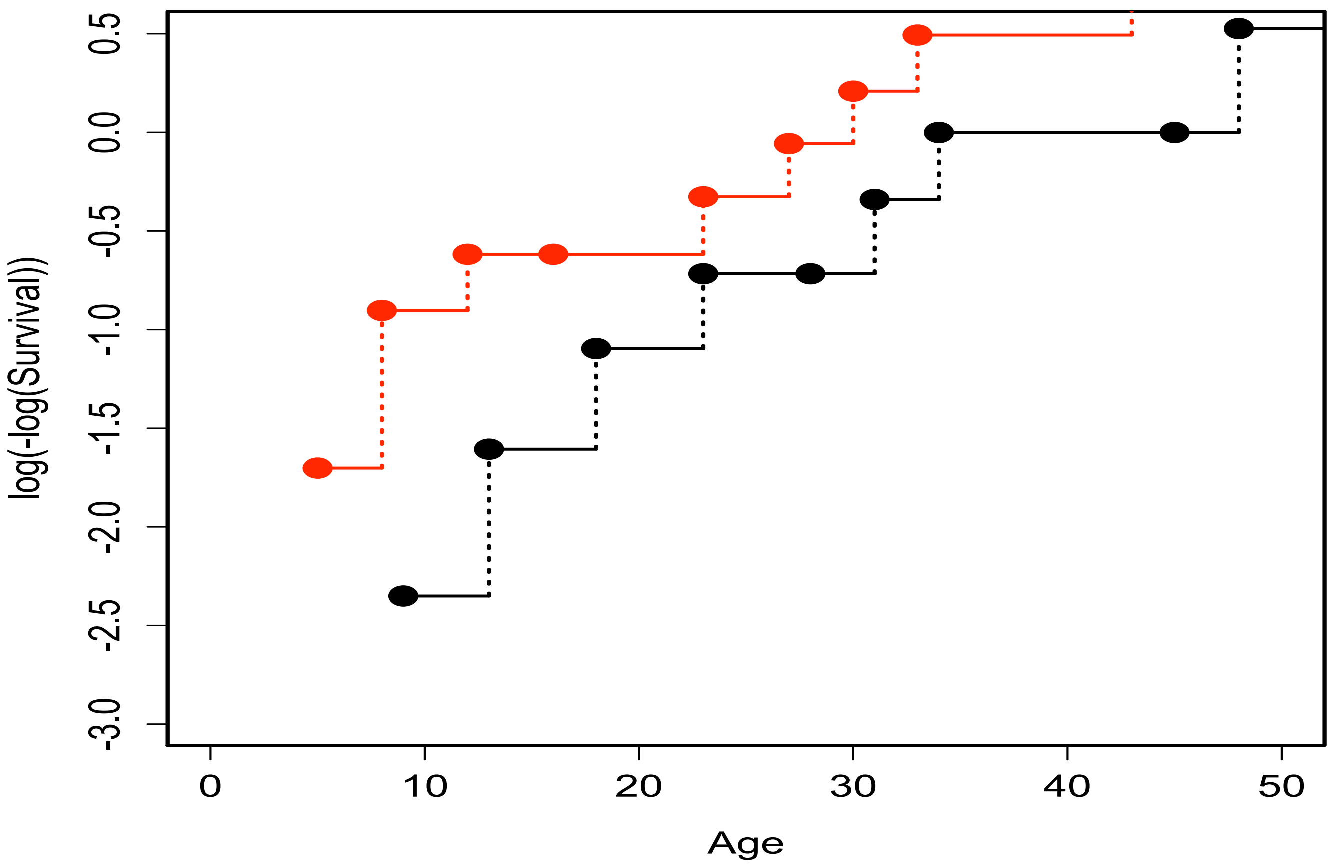

Figure 15.1: Iterated log plot of survival of two populations in AML study, to test proportional hazards assumption.

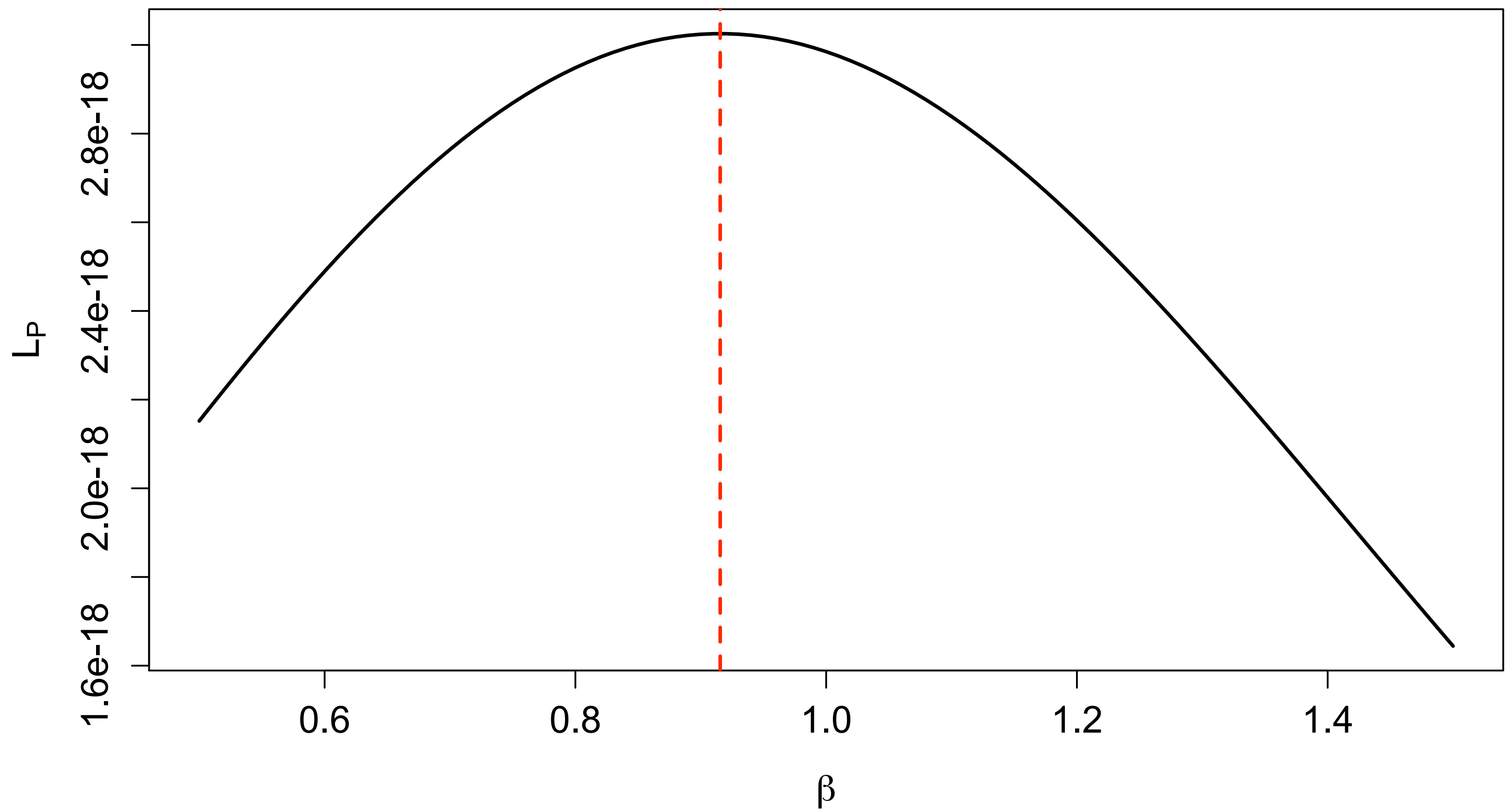

Figure 15.4: A plot of the partial likelihood from (15.1). Dashed line is at $\beta = 0.9155$.

Table 15.1: Output of the `coxph` function run on the `aml` data set.

coxph(formula = Surv(time, status) ∼ x, data = aml)					
	coef	exp(coef)	se(coef)	z	p
×Nonmaintained	0.916	2.5	0.512	1.79	0.074
Likelihood ratio test=3.38 on 1 df p=0.0658 n= 23					

The z is simply the Z-statistic for testing the hypothesis that $\beta = 0$, so $z = \hat{\beta}/SE(\hat{\beta})$. We see that $z = 1.79$ corresponds to a p-value of 0.074, so we would not reject the null hypothesis at level 0.05.

Table 15.2: Computations for the baseline hazard LME for the AML data, in the proportional hazards model, with maintained group as baseline, and relative risk $e^{\hat{\beta}} = 2.498$.

	Maintenance		Non-Maintenance (control)		Baseline		
t_i	n_i^M	d_i^M	n_i^N	d_i^N	$\hat{h}_0(t_i)$	$\hat{H}_0(t_i)$	$\widetilde{S}_0(t_i)$
5	11	0	12	2	0.050	0.050	0.951
8	11	0	10	2	0.058	0.108	0.898
9	11	1	8	0	0.032	0.140	0.869
12	10	0	8	1	0.033	0.174	0.841
13	10	1	7	0	0.036	0.210	0.811
18	8	1	6	0	0.043	0.254	0.776
23	7	1	6	1	0.095	0.348	0.706
27	6	0	5	1	0.054	0.403	0.669
30	5	0	4	1	0.067	0.469	0.625
31	5	1	3	0	0.080	0.549	0.577
33	4	0	3	1	0.087	0.636	0.529
34	4	1	2	0	0.111	0.747	0.474
43	3	0	2	1	0.125	0.872	0.418
45	3	0	1	1	0.182	1.054	0.348
48	2	1	0	0	0.500	1.554	0.211

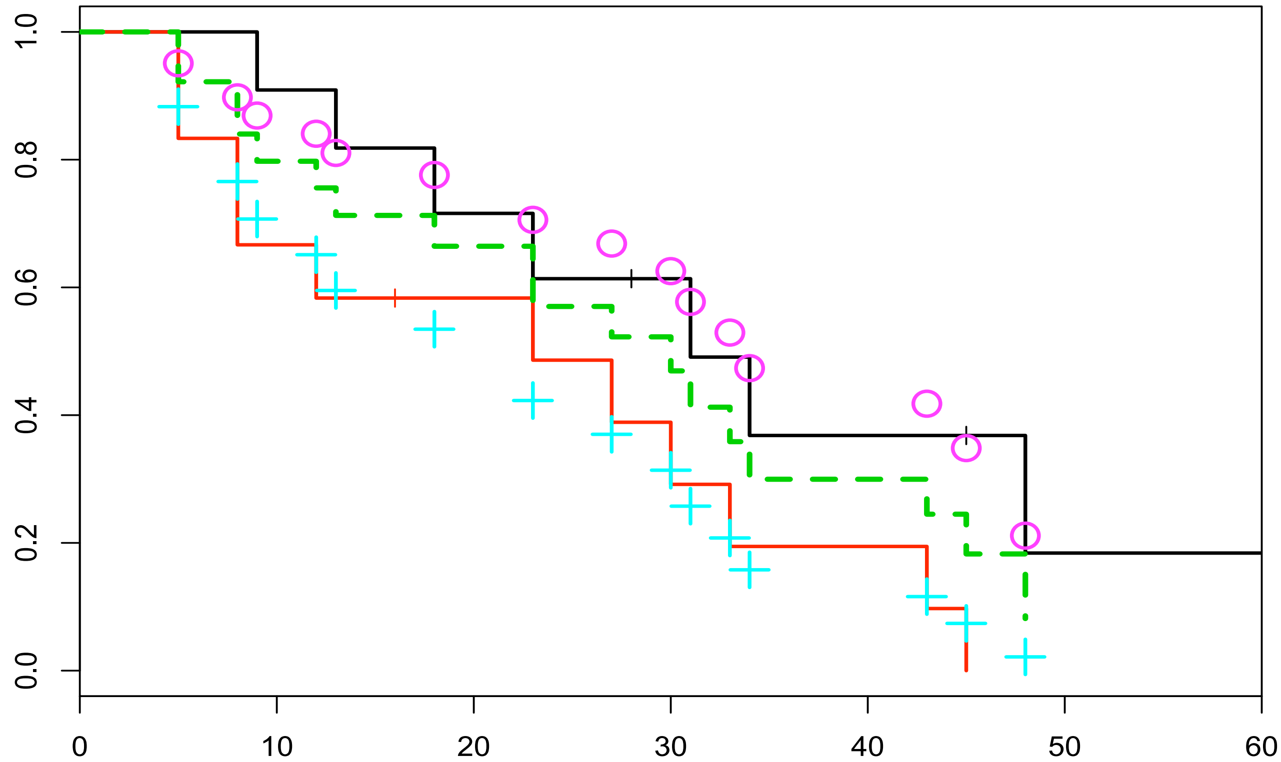

Figure 15.2: Estimated baseline hazard under the PH assumption. The purple circles show the baseline hazard; blue crosses show the baseline hazard shifted up proportionally by a multiple of $e^{\hat{\beta}} = 2.5$. The dashed green line shows the estimated survival rate for the mixed population (mixing the two estimates by their proportions in the initial population).

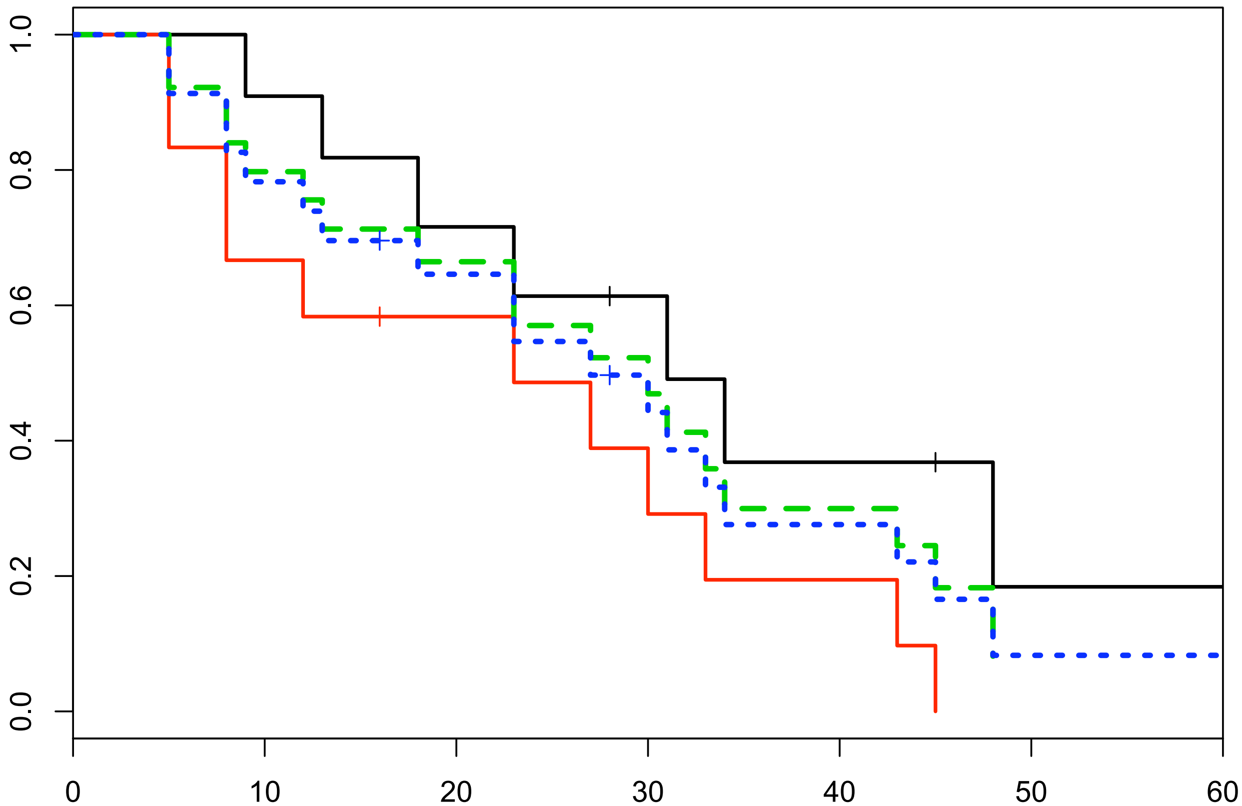

Figure 15.3: Comparing the estimated population survival under the PH assumption (green dashed line) with the estimated survival for the combined population (blue dashed line), found by applying the Nelson-Aalen estimator to the population, ignoring the covariate.