Maintenance therapy and time to relapse: a survival analysis

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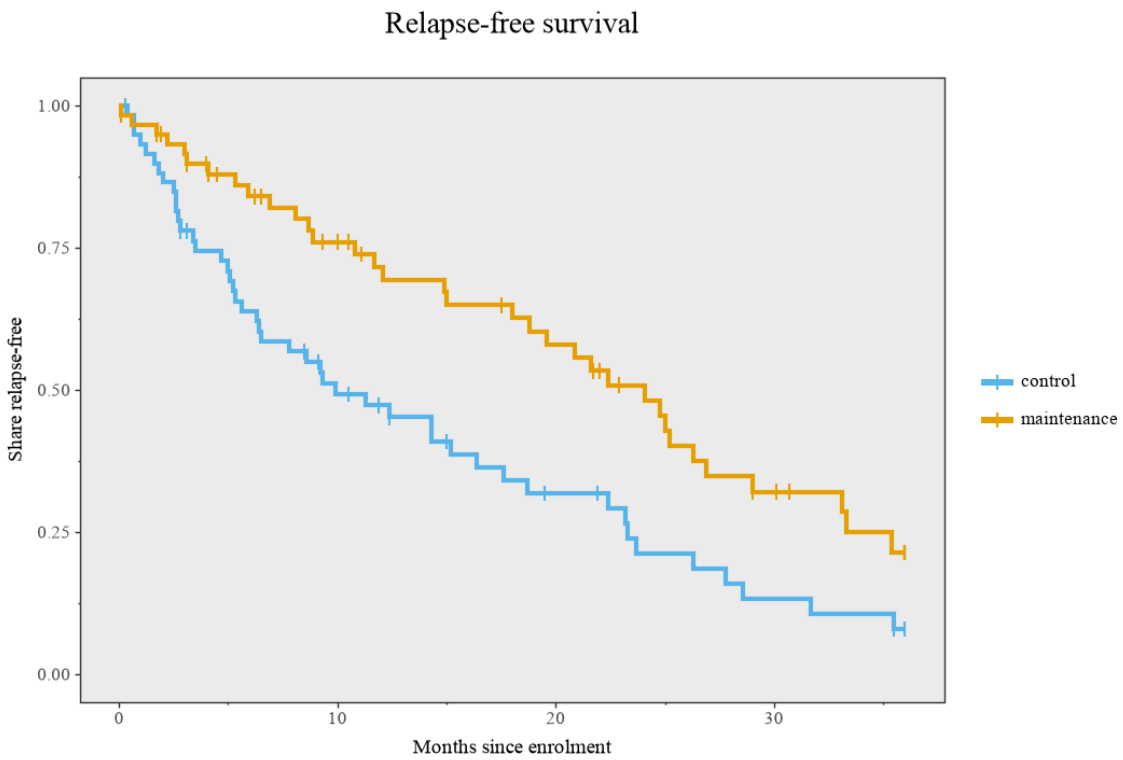
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1 Question and data

Does maintenance therapy delay relapse? The dataset follows 60 patients in each of two arms, control and maintenance, for up to 36 months. 46 control patients and 34 maintenance patients relapsed. The rest were still relapse-free when last seen, or left the study; they are censored, and the analysis keeps them in. The data are simulated, so the findings illustrate the method and are not a clinical result.

2 Survival curves



Relapse-free survival by arm. Tick marks show patients still relapse-free when last seen.

Median time to relapse was 24.1 months on maintenance and 9.9 months on control. The share relapse-free at 12 months was 71.6% on maintenance and 47.2% on control.

Measure	**Control**	**Maintenance**
Relapses	46 of 60	34 of 60
Median time to relapse (months)	9.9	24.1
Relapse-free at 12 months	47.2%	71.6%

3 Comparison

A log-rank test finds the two curves differ (chi-square = 8.59, p = .003). A Cox model puts the hazard of relapse on maintenance at 0.52 times the hazard on control (95% CI [0.33, 0.81]).

4 Diagnostics

The proportional-hazards test does not reject (p = 0.278), so one hazard ratio is a fair summary of the whole follow-up.

5 Interpretation

What the analysis tells us: Patients on maintenance therapy relapsed more slowly in this sample, and the difference is unlikely to be chance alone. The hazard ratio is a single summary of how much slower.

What the analysis does NOT tell us: This sample cannot show that maintenance therapy caused the longer relapse-free time, because nothing here says patients were assigned to an arm at random. The hazard ratio describes this sample only.

6 Limitations

- The data are simulated, with a fixed seed, so every number can be regenerated and none is a finding about real patients.
- Follow-up ends at 36 months, so survival beyond that is not estimated.
- A median from a censored curve depends on how many patients are still being followed near it.

7 Recommended next steps

1. Report the hazard ratio with its interval, not the p-value alone.
2. Check how the result changes if the earliest censored patients are removed.
3. If arm assignment was not randomized, adjust for the baseline differences that could drive both arm and relapse.