Incorporating historic information in multi-arm clinical trials for pediatric cancers: drop the losers with historical control group

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13 November 2019

# Simulation study parameters

Here we report the operating characteristics of the design

**Design general parameters**

* 3 arms
* 2 years follow-up
* N\_1 patients per arms at stage 1
* N\_2 patients per arm at stage 2
* Family-wise error rate =0.1 #it is a phase II clinical trial

**Interim analysis**

* Decision rules: drop the losers
* bounds: none (keep with the arm giving the maximal LR statistic at interim)

**Final analysis**

* Decision rules: Log-rank test for historical control

**Hazard rates:**

* hazard.null=-log(0.4)/2
* hazard.exp (small effect): hr=-log(0.50)/2
* hazard.exp (great effect): hr=-log(0.65)/2

**Historical data**

* historic data distribution: Weibull
* parameter: kappa=0.9509

# Simulation results: Power

In a multi-arm setting the concept of power is complex due to multiplicity of hypotheses. The probability to reject all false null hypothese is called the conjunctive power. The probability to reject at least one false null hypothesis is called the disjunctive power. Usually, it is harder to obtain a high conjunctive power. Here the design do not allow to reject more than one null hypothesis, we report disjunctive power.

# Simulation results: Type 1 error rate

By design, the family-wise error rate is controlled at the global null hypothesis. Here we report the type 1 error rate per scenario. The scenario 1, considering only experimental arms with null effect (also called the global null hypothesis) reflects the empirical family-wise error rate.