# Adaptive design with data-driven treatment arm selection

## Description

The simulation report presents key operating characteristics of an adaptive design for a multi-arm Phase III clinical trial with two interim analyses. The first interim analysis supports early stopping for futility and the second interim analysis enables adaptive treatment selection to identify the best performing treatments.

## Table 1. Number of enrolled patients

| **Trial arm** | **Sample size** |
| --- | --- |
| Control | 90 |
| Treatment 1 | 90 |
| Treatment 2 | 90 |
| Treatment 3 | 90 |
| Treatment 4 | 90 |

## Table 2. Primary efficacy endpoint

| **Parameter** | **Value** |
| --- | --- |
| Endpoint type | Binary |
| Direction of favorable outcome | A higher value of the endpoint indicates a more favorable outcome |

## Table 3. Treatment effect assumptions

| **Trial arm** | **Parameter** | **Value** |
| --- | --- | --- |
| Control | Rate (%) | 10 |
| Treatment 1 | Rate (%) | 30 |
| Treatment 2 | Rate (%) | 30 |
| Treatment 3 | Rate (%) | 35 |
| Treatment 4 | Rate (%) | 35 |

## Table 4. Number of patients at the interim and final analyses

| **Decision point** | **Total number of patients** | **Information fraction (%)** |
| --- | --- | --- |
| Interim analysis 1 | 75 | 20 |
| Interim analysis 2 | 190 | 50 |
| Final analysis | 380 | 100 |

The number of patients at the interim and final analyses may be reduced due to patient dropout.

## Table 5. Decision rule at Interim analysis 1

| **Parameter** | **PPS (%)** |
| --- | --- |
| Futility threshold | 30 |

PPS: Predicted probability of success at Interim analysis 1. The trial will be stopped for futility at Interim analysis 1 if the predicted probability of success is less than the futility threshold.

## Table 6. Decision rule at Interim analysis 2

| **Parameter** | **Value** |
| --- | --- |
| Number of selected treatments | 1 |
| Multiple testing procedure | Hochberg |

## Table 7. Other design parameters

| **Parameter** | **Value** |
| --- | --- |
| Dropout rate at the end of the treatment period (%) | 15 |

## Table 8. Simulation parameters

| **Parameter** | **Value** |
| --- | --- |
| One-sided Type I error rate | 0.025 |
| Number of simulations | 10000 |

## Table 9. Simulation results: Futility stopping at Interim analysis 1

| **Treatment arm** | **Probability of futility stopping (%)** |
| --- | --- |
| Treatment 1 | 23.2 |
| Treatment 2 | 22.6 |
| Treatment 3 | 15 |
| Treatment 4 | 14.3 |
| All treatments | 1.7 |

Probability of dropping each treatment due to futility. The trial is terminated at Interim analysis 1 if all treatments are dropped.

## Table 10. Simulation results: Treatment selection at Interim analysis 2

| **Treatment arm** | **Selection probability (%)** |
| --- | --- |
| Treatment 1 | 15.9 |
| Treatment 2 | 16.8 |
| Treatment 3 | 38 |
| Treatment 4 | 38.7 |
| No treatment | 1.7 |

Probability that each treatment is selected for the final analysis. No treatment is selected if the trial is terminated for futility at Interim analysis 1.

## Table 11. Simulation results: Traditional designs

| **Treatment arm** | **Power (%)** |
| --- | --- |
| Treatment 1 | 71.4 |
| Treatment 2 | 71.7 |
| Treatment 3 | 83.3 |
| Treatment 4 | 84.3 |

Power for two-arm traditional designs that compare each treatment to control.

## Table 12. Simulation results: Adaptive design

| **Design** | **Power (%)** |
| --- | --- |
| Adaptive design | 92 |