

A sample size program for n-stage trial designs by Friederike Barthel & Patrick Royston based on P Royston, M Parmar & W Qian 2003

OPERATING CHARACTERISTICS

DESIGN FOR 4 STAGES

	Al pha(1S)	Power	HR H0	HR H1	Cri t. HR	Length*	Time
STAGE 1	0.5000	0.950	1.000	0.750	1.000	9.744	9.744
STAGE 2	0.2500	0.951	1.000	0.750	0.924	4.480	14.224
STAGE 3	0.1000	0.951	1.000	0.750	0.886	4.363	18.588
STAGE 4	0.0250	0.900	1.000	0.750	0.844	8.702	27.290
Overall	0.0133	0.847				27.290	

* Length (duration of each stage) is expressed in one quarter (3 months) periods

SAMPLE SIZE AND NUMBER OF EVENTS

	-----STAGE 1-----			-----STAGE 2-----		
	Overall	Control	Exper.	Overall	Control	Exper.
Arms	6	1	5	6	1	5
Acc. rate	125	36	89	125	36	89
Patients*	1218	348	870	1778	508	1270
Events**	343	113	230	661	216	445

	-----STAGE 3-----			-----STAGE 4-----		
	Overall	Control	Exper.	Overall	Control	Exper.
Arms	6	1	5	6	1	5
Acc. rate	125	36	89	125	36	89
Patients*	2323	664	1660	3411	975	2437
Events**	1034	334	700	1228	403	825

0.5 patients allocated to each E arm for every 1 to control arm.

* Patients and events are cumulative over the stages

** Events are for I-outcome at stages 1 to 3, D-outcome at stage 4

Approx. prob. of k experimental arms reaching stage 2:

k (#arms)	0	1	2	3	4	5
Under H0	0.031	0.156	0.313	0.313	0.156	0.031
Under H1	0.000	0.000	0.001	0.021	0.204	0.774

Approx. prob. of k experimental arms reaching stage 3:

k (#arms)	0	1	2	3	4	5
Under H0	0.237	0.383	0.214	0.044	0.003	0.000
Under H1	0.000	0.000	0.001	0.021	0.196	0.601

Approx. prob. of k experimental arms reaching stage 4:

k (#arms)	0	1	2	3	4	5
Under H0	0.590	0.250	0.027	0.001	0.000	0.000
Under H1	0.000	0.000	0.001	0.021	0.197	0.603