Genstat 64-bit Release 18.1 (PC/Windows 8)

Registered to: Stephen Senn

Genstat Eighteenth Edition
Genstat Procedure Library Release PL26.1

Power calculations for n of 1 trials

Author: Stephen Senn

This work was partly supported by the European Union's 7th Framework Programme for research, technological development and demonstration under grant agreement no. 602552, IDEAL

Program settings

Parameters

Maximum number of cycles per patient
15

Number of cycles for plotting standard error of ratio
3

α Type I error rate
0.05000

β Type II error rate
0.2000

Δ Clinically relevant difference
1.000

Ψ SD of treatment-by-patient interaction
1.000

σ Within cycle SD
2.000

sides for test
2

Minimum number of patients for calculating variance of ratio
20

Maximum number of patients for calculating variance of ratio
100

Power calculations for testing overall effect of treatment

Target power is 80%

Note: Variance quoted is for the treatment effect per patient

Power calculations for fixed effects case

Variance = $2\sigma^2/k$

Note: Approximate solution based on simple Normal formula for sample size

Cycles, *k*	Variance	Patients	Total no of cycles	Exact Power
2	4.000	32	64	78.31
3	2.667	21	63	78.28
4	2.000	16	64	79.15
5	1.600	13	65	79.88
6	1.333	11	66	80.56
7	1.143	9	63	78.70
8	1.000	8	64	79.38
9	0.889	7	63	78.75
10	0.800	7	70	82.96
11	0.727	6	66	80.68
12	0.667	6	72	84.04
13	0.615	5	65	80.08
14	0.571	5	70	83.00
15	0.533	5	75	85.53

Note: Exact solution

Cycles, *k*	Variance	Patients (Exact)	Total no of cycles	Exact Power
2	4.000	34	68	80.85
3	2.667	22	66	80.21
4	2.000	17	68	81.60
5	1.600	14	70	82.82
6	1.333	11	66	80.56
7	1.143	10	70	82.91
8	1.000	9	72	83.99
9	0.889	8	72	84.01
10	0.800	7	70	82.96
11	0.727	6	66	80.68
12	0.667	6	72	84.04
13	0.615	5	65	80.08
14	0.571	5	70	83.00
15	0.533	5	75	85.53

Power calculations for random effects case

Variance = $\psi^2+2\sigma^2/k$

Cycles, *k*	Variance	Patients	Total no of cycles	Power
2	5.000	42	84	80.78
3	3.667	31	93	80.33
4	3.000	26	104	80.76
5	2.600	23	115	81.12
6	2.333	21	126	81.42
7	2.143	19	133	80.39
8	2.000	18	144	80.70
9	1.889	17	153	80.40
10	1.800	17	170	82.24
11	1.727	16	176	81.17
12	1.667	16	192	82.51
13	1.615	15	195	80.87

14	1.571	15	210	81.92
15	1.533	15	225	82.83

Expected precision of predictions

Standard errors of predictions for individual patients

Naive $\sqrt{(2\sigma^2/k)}$

Shrunk $\sqrt{[2\sigma^2\psi^2/(k\psi^2+2\sigma^2)]}$

Note: Random effects model assumed

Cycles, *k*	Naive SE	Shrunk SE
1	2.828	0.9428
2	2.000	0.8944
3	1.633	0.8528
4	1.414	0.8165
5	1.265	0.7845
6	1.155	0.7559
7	1.069	0.7303
8	1.000	0.7071
9	0.943	0.6860
10	0.894	0.6667
11	0.853	0.6489
12	0.816	0.6325
13	0.784	0.6172
14	0.756	0.6030
15	0.730	0.5898

End of output