

SurvivalGWAS Power Suite Example

The screenshot shows the 'SurvivalGWAS_Power' application window. The 'Data Generation Inputs' section includes:

- Number of simulations: 1000
- Number of Patients: 100
- Risk Allele Frequency: 0.4
- SNP effect size (β_1): 0.2
- Treatment Effect Size (β_2): 0.2
- SNP Treatment interaction (β_3): 0.1
- Proportion of patients on treatment: 0.5
- Survival Distribution: Weibull
- Shape parameter: 0.5
- Baseline Hazard (λ_0): 50
- Censoring before the end of study: 120
- Recruitment period: 0 to 25
- End of study time/Cutoff: 100

 The 'Analysis Model Inputs' section includes:

- Select Input Variables: SNP, Treatment, SNP x Treatment interaction
- Analysis Selection: Cox Proportional Hazards Model
- Type I error/Significance level: 0.05

 At the bottom right, there are buttons for 'Clear all' and 'Power Calculation', with a result of 9% displayed next to the latter.

Study design – 100 patients, 50 given test treatment and 50 given placebo, 100 day study, 25 day recruitment period, 75 day follow-up period, censoring within the sample occurs approximately 30%.

Effect size – SNP effect size 0.2 (moderate significance), Treatment effect size 0.2 (moderate significance) and SNP-Treatment interaction effect size 0.1 (below moderate significance).

Risk allele frequency 0.4.

Analysis is conducted using a Cox proportional hazards model for just the SNP. Each of the 1000 simulations are tested at a type 1 error of 0.05.

The screenshot shows the 'SurvivalGWAS_Power' application window displaying simulation results. The main table lists parameters for 1000 simulations (rows 1-1000). The columns are: SNP, Treatment, RecruitmentTime, SurvivalTime, CensoringTime, ObservedTime, and S. The first few rows are:

SNP	Treatment	RecruitmentTime	SurvivalTime	CensoringTime	ObservedTime	S
1	1	17	67.52452104...	369.631371797...	67.5245210405...	1
0	0	14	413.1562086...	76.3639038902...	76.3639038902...	0
0	1	10	338.9217936...	91.0905052205...	90	0
1	1	6	47.15011431...	23.8403427978...	23.8403427978...	0
1	1	15	28.70269057...	145.595891082...	28.7026905755...	1
1	0	22	225.5539707...	279.65455329...	78	0
2	0	8	13.19176169...	52.4998266636...	13.1917616907...	1
0	0	12	408.1569242...	39.5007192529...	39.5007192529...	0
1	1	12	0.529917306...	125.910456559...	0.52991730648...	1
1	0	22	1.889792579...	83.7980637503...	1.88979257977...	1
2	0	24	0.266234167...	190.512556631...	0.26623416787...	1
2	0	11	49.59585230...	18.5898367333...	18.5898367333...	0

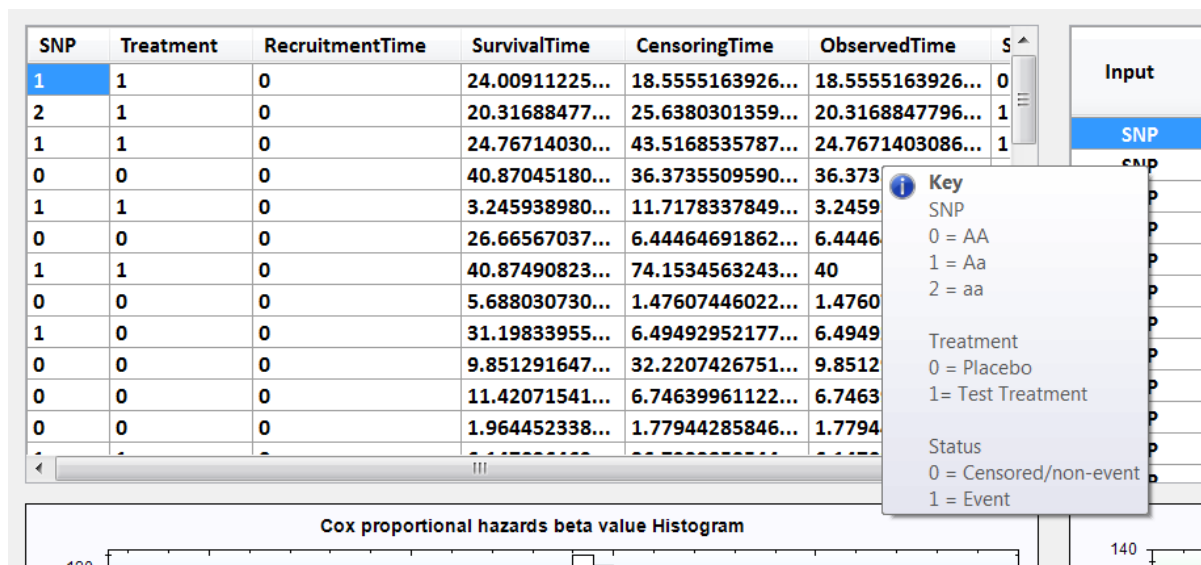
 Below the table are two histograms:

- 'Cox proportional hazards beta value Histogram': Shows the distribution of SNP effect Beta values, centered around 0.0.
- 'Cox proportional hazards -Math.Log(10) p-value Histogram': Shows the distribution of -Math.Log(10) p-values, centered around 0.0.

 To the right of the histograms is a table of simulation results:

Input	Coefficient	StandardError	HazardRatio	UpperCI	LowerCI	pvalue
SNP	0.0758168...	0.1730174...	1.0787649...	1.5142401...	0.7685265...	0.6612390...
SNP	-0.061319...	0.2148402...	0.9405228...	1.4329655...	0.6173094...	0.7753235...
SNP	-0.127430...	0.2215612...	0.8803545...	1.3590791...	0.5702567...	0.5651910...
SNP	-0.362647...	0.2065379...	0.6958313...	1.0430465...	0.4641990...	0.0791154...
SNP	0.1079633...	0.2143223...	1.1140069...	1.6955611...	0.7319178...	0.6144419...
SNP	-0.596380...	0.2324760...	0.5508017...	0.8687059...	0.3492350...	0.0103074...
SNP	-0.087866...	0.1852894...	0.9158835...	1.3169029...	0.6369814...	0.6353503...
SNP	-0.264823...	0.1942890...	0.7673410...	1.1229544...	0.5243420...	0.1728695...
SNP	0.1691534...	0.1887405...	1.1843018...	1.7144050...	0.8181094...	0.3701341...
SNP	-0.068228...	0.1579960...	0.9340468...	1.2730653...	0.6853092...	0.6658589...
SNP	0.0565635...	0.1775674...	1.0581938...	1.4986698...	0.7471787...	0.7500699...
SNP	-0.045607...	0.2222023...	0.9554167...	1.4768134...	0.6181019...	0.8373747...
SNP	-0.429007...	0.2184708...	0.6511547...	0.9991734...	0.4243532...	0.0495666...

Output from example power calculation. (Top left) sample dataset, (Top right) Cox proportional hazards output from each simulation run, (Bottom left) SNP coefficient beta values plot & (Bottom right) - $\log_{10} p$ - values plot for the SNP effect.



There is a key available to users to help interpret the sample dataset. The user must use the mouse cursor to hover over the dataset to bring up the key.



There are various help buttons and hints (?) within the program. All data files can be saved as text files.