

# CASAS: Cancer Survival Analysis Suite Tutorial

## Table of Contents

I. CASAS TUTORIAL .....	2
II. TROUBLESHOOTING GUIDE .....	14

# I. CASAS TUTORIAL

## TAB 1. STANDARD SURVIVAL ANALYSIS

CASAS: Cancer Survival Analysis Software

Standard Survival Analysis | Setting Risk Survival Analysis | Landmark Survival Analysis | Quantile Survival Analysis | Optimal Cutoff Point Finder | Grid for Summarized Significance | Tutorial | About Us

Read Me | KM Analysis and Plot | Univariate Survival Association (Cox Model)

**Input your file**  
Select an example ds or upload your own with 'Load my own'  
Example ds File  
Download Example data

**KM Analysis**  
Select a Variable of Interest as Cohort Group  
log2\_Gene1\_Plus 1  
The variable of interest is categorical or continuous  
Categorical Variable  
Select a Time Variable to Visualize KM Plot  
time  
Select a Censoring Variable to Visualize KM Plot  
status  
Time Unit:  
 Years  
 Months  
 Days  
Risk Table:  
 Yes  
 No

**NOTE:** In this tab, you are able to carry out standard survival analysis. On the left side panel, you have the options to upload data; select variables for univariate survival association analysis with cox proportional hazard model; meanwhile, select the variables for Kaplan Meier analysis; download the output table and plot accordingly.

**NOTE:** To carry out univariate survival association analysis, it is based on cox proportional hazards model with entering one variable in the model each time. Select the variables of interest to generate the output table. You can choose the option to be "Yes" if you want to test the proportional hazard assumption.

**NOTE:** To carry out Kaplan Meier Analysis, the variable of interest can be All Patients or a categorical variable. You also need to specify the time unit corresponding to the data in order for the plot to display correctly.

**DATA FORMAT**

1. Data should be input as a .txt or .xls or .csv file. The first row of the data file have information about the variables.
2. The remaining lines contain measurements one line per each subjects/sample. described in the format below.
3. The first column of the file contains the survivaltime 'time' (column 1); survival status 'status' (column 2); followed by the other variables of interest.
- 4) Column\_1 This should contain the survival time, for the user's reference.
- 5) Column\_2 This should contain the Survival status, input as 'censored' or 'Dead'.
- 6) Remaining Columns. These columns should contain information with variables of interest, such as age, race, gender and patient id (not as reference).

### Input your file

Select an example ds or upload your own with 'Load my own'

Example ds File

Download Example data

### Step 1:

Select the example dataset or upload your own.

To view example data and format, use download button to view .csv file.

### KM Analysis

Select a Variable of Interest as Cohort Group

log2\_Gene1\_Plus 1

The variable of interest is categorical or continuous

Continuous Variable

Choose Cutoff Point for Continuous Variable:

- Optimal Cutoff
- 25th Percentile
- 50th Percentile
- 75th Percentile

Select a Time Variable to Visualize KM Plot

OS\_SURTIME

Select a Censoring Variable to Visualize KM Plot

OS\_CENSOR

Time Unit:

- Years
- Months
- Days

Risk Table:

- Yes
- No

### Step 2:

The variables from the input file will be available as drop down for selection.

Choose variable of interest to divide the cohort. If continuous, a new set of parameters appear to dichotomize the continuous variable. The user can select an optimal cut-off based on the data, or either subset it by 25<sup>th</sup> or 50<sup>th</sup> or 75<sup>th</sup> percentile. Any sample with values above 25<sup>th</sup> percentile will be considered as "High" and remaining "Low". Similarly for the other groupings.

If this variable is categorical, change drop down to categorical and the cutoff choice will disappear.

Also, choose appropriate variable for survival time, censor status (0- Censor, 1- Event) variables from your uploaded dataset to carry out Kaplan Meier analysis. User can also select the appropriate time unit (Years, Months or Days). Years being the default here.

### Step 3:

User can opt to display the number at risk table under the KM curve in each categorical group.

### Univariate Association Analysis

Select a Time Variable for Survival Analysis

OS\_SURTIME

Select a Censoring Variable for Survival Analysis

OS\_CENSOR

Select multiple Variables to Generate Univariate Survival Association Table

log2\_Gene1\_Plus1 Group

Test for Proportional Hazards Assumption:

Yes

No

#### Downloads

Type the file name you would like to save as

survivaltable

Download Survival Report

#### Step 4:

Choose appropriate survival time, censor status (0- Censor, 1- Event) variables from your uploaded dataset for conducting the Univariate analysis.

Enter variable(s) to generate the univariate analysis table to test association between variable and survival using the Cox PH Model.

User can also test for PH assumption. An additional column will be added with the PH assumption p-value.

#### Step 6:

User can download the results from the univariate analysis association for the variable(s) of his/her interest.

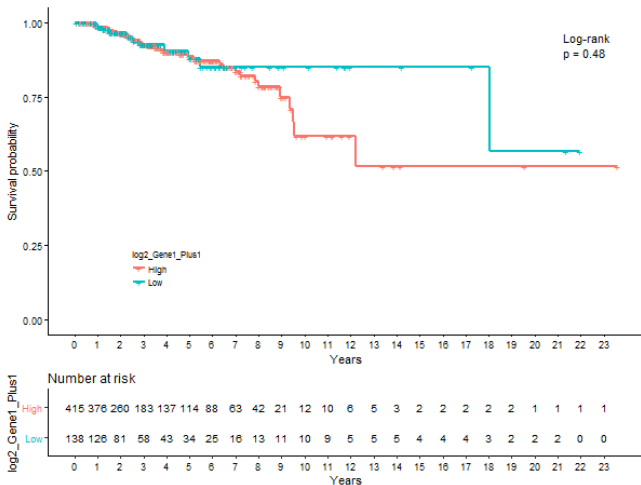
Similar, download is available on the KM Analysis and Plot tab.

#### Univariate Survival Association Analysis for Multiple Selected Variables

Variable	Level	N	Hazard Ratio (95% CI)	Type 3 P-value	Log-rank P-value
log2_Gene1_Plus1	Low	138	0.78 (0.4-1.54)	0.4796	0.4796
	High	415			
Group	Low	301	0.9 (0.51-1.55)	0.7014	0.7012
	High	252			

Read Me [KM Analysis and Plot](#) [Univariate Survival Association \(Cox Model\)](#)

#### To Visualize the Kaplan Meier Plot:



Univariate Survival Association analysis table is displayed for the single or multiple variables selected by the user. For example, here categorical variable Group and dichotomized continuous variable (based on 25<sup>th</sup> percentile cut point) are being tested.

KM plot stratified by the continuous variable log2\_Gene1\_Plus1. An at risk table is displayed under the KM plot. The time unit is years but can be changed using the options mentioned previously.

## TAB 2. COMPETING RISK SURVIVAL ANALYSIS

CASAS: Cancer Survival Analysis Suite   Standard Survival Analysis   **Competing Risk Survival Analysis**   Biomark: Survival Analysis   Quartile Survival Analysis   Optimal Cutoff Point Finder   Grid for Summarized Significance   Tutorial   About Us -

Recall Me   CIF Analysis and Plot   Univariate Survival Association (Fine and Gray Model)

**Input your file**  
 Select an example ds or upload your own with "Load my own"  
 Example ds File  
 Download Example data

**CIF Analysis**  
 Select a Variable of Interest as Cohort Group  
 Source  
 The variable of interest is categorical or continuous  
 Categorical Variable  
 Select a Time Variable to Visualize CIF Plot  
 time  
 Select a Censoring Variable to Visualize CIF Plot  
 Status  
 Input Time Points:  
 Yes  
 No  
 Time Points Input  
 0, 10, 20, 30  
 Time Unit:  
 Years  
 Months  
 Days

**NOTE1:** In this tab, you are able to carry out a competing risk survival analysis. The method is based on Fine and Gray's Model. On the left side panel, you have the options to upload data; select variables for univariate survival association analysis with Fine and Gray model; meanwhile, select the variables for cumulative incidence function analysis; download the output table and plot accordingly.

**NOTE2:** For Univariate analysis, choose variables of interest to enter the analysis. Meanwhile, you need to specify event code and censor code.

**NOTE3:** To generate a CIF plot and table, choose a categorical variable to compare or All Patient for overall. You can select the correct time unit based on the data. Also, you can choose to input time points of interest or not. Censor code is also need to be specified.

**DATA FORMAT**

1. Data should be input as a .txt or .xls or .csv file. The first row of the data file have information about the variables.
2. The remaining lines contain measurements one line per each subject/sample, described in the format below.
3. The first column contains survival time, the second column includes the survival status, followed by the other variables of interest.
  - a) Column\_1: This should contain the Survival time, for the user's reference.
  - b) Column\_2: This should contain the survival status, input as 0 for 'censored' vs 1 for 'dead'.
  - c) Remaining Columns: These columns should contain information with variables of interest, such as age, race, gender and patient id kept as reference.

### Step 1:

Select the example dataset or upload your own.

To view example data and format, use download button to view .csv file.

**Input your file**  
 Select an example ds or upload your own with "Load my own"  
 Example ds File  
 Download Example data

**CIF Analysis**  
 Select a Variable of Interest as Cohort Group  
 Source  
 The variable of interest is categorical or continuous  
 Categorical Variable  
 Select a Time Variable to Visualize CIF Plot  
 time  
 Select a Censoring Variable to Visualize CIF Plot  
 Status  
 Input Time Points:  
 Yes  
 No  
 Time Points Input  
 0, 10, 20, 30  
 Time Unit:  
 Years  
 Months  
 Days  
 Event Code:  
 1  
 2  
 0  
 Censor Code:  
 1  
 2  
 0

### Step 2:

The variables from the input file will be available as drop down for selection.

Choose variable of interest to divide the cohort. If this variable is categorical, leave next drop down unchanged. If continuous, a new set of parameters will appear to dichotomize the continuous variable. The user can select an optimal cut-off based on the data, or either subset it by 25<sup>th</sup> or 50<sup>th</sup> or 75<sup>th</sup> percentile. Any sample with values above 25<sup>th</sup> percentile will be considered as "High" and remaining "Low". Similarly for the other groupings.

The variable of interest is categorical or continuous  
 Continuous Variable  
 Choose Cutoff Point for Continuous Variable:  
 Optimal Cutoff  
 25th Percentile  
 50th Percentile  
 75th Percentile

Choose appropriate survival time, censor status (0/1/2) variables from your uploaded dataset. For competing risk analysis, the user needs to select the code for the event and the censor. The third/last code would be the competing risk. User can also select the appropriate time unit (Years, Months or Days). Months being the default.

### Univariate Association Analysis

Select a Time Variable for Competing Risk Survival Analysis

ftime

Select a Censoring Variable for Competing Risk Survival Analysis

Status

Select multiple Variables to Generate Univariate Survival Association Table

Sex D Phase

Event Code:

1  
 2  
 0

Censor Code:

1  
 2  
 0



**Step 4:**

Choose the time points at which CIF Estimate is to be reported. User can input time points of their choice or use the predefined time points at 0, 10, 20, 30 days.



**Step 5:**

Choose appropriate survival time, censor status (0- Censor, 1- Event, 2- Competing Risk) variables from your uploaded dataset to carry out CIF analysis. The user can select different status codes based on their data.

Enter variable(s) to generate the univariate analysis table to test association between variable and survival using the Fine and Grey Model.

## Downloads

Type the file name you would like to save as

crrtable

Download Competing Risk Report



**Step 6:**

User can download the results from the univariate analysis association for the variable(s) of his/her interest.

Type the file name you would like to save as

cifplot

Download CIF Plot



**Step 7:**

User can download the CIF plot stratified by the categorical variable by event and competing risk. Gray's p-value is reported.

Type the file name you would like to save as

ciftable

Download CIF Report



**Step 8:**

User can download the CIF result table for the time points of interest based on the strata.

Read Me Univariate Survival Association (Fine and Gray Model) CIF Analysis and Plot

## Univariate Competing Risk Survival Association Analysis for Multiple Selected Variables

Show 10 entries

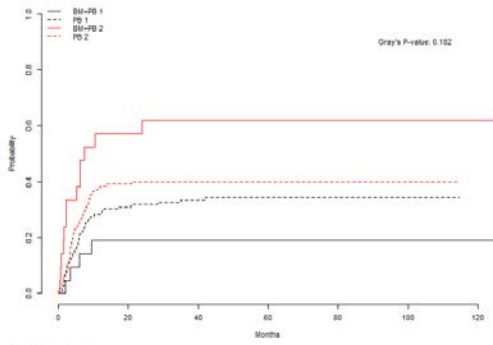
Variable	Level	N	Hazard Ratio (95% CI)	Type 3 P-value	Gray's P-value
Sex	M	100	1.08 (0.64-1.84)	0.77	0.7993
	F	77			
D	AML	104	0.64 (0.38-1.07)	0.088	0.0907
	ALL	73			
Phase	CR2	45	1.14 (0.48-2.74)	0.77	0.199
	CR3	12	1.38 (0.38-5.08)		
	Relapse	73	3.04 (1.47-6.29)		
	CR1	47		0.0027	

Showing 1 to 8 of 8 entries

Previous 1 Next

Univariate Survival Association analysis table is displayed for the single or multiple variables selected by the user. For example, here association of Sex, Disease type and Phase of the disease are being tested.

To Visualize the Cumulative Incidence Function Plot:



Show 100 entries

Search:

Source	Time (Months)	CIF Estimate (95% CI)
BM+PB 1	0	0 (NaN, NaN)
	20	0.1905 (0.055, 0.3874)
	40	0.1905 (0.055, 0.3874)
	60	0.1905 (0.055, 0.3874)
	80	0.1905 (0.055, 0.3874)
	100	0.1905 (0.055, 0.3874)
	120	0.1905 (0.055, 0.3874)

CIF plot stratified by the categorical variable source and further by the event and the

CIF estimate table at 10, 20, 30 days (Time points) chosen by the user.

## TAB 3. LANKMARK SURVIVAL ANALYSIS

Read Me   **Landmark Survival Plot**

NOTE1: In this tab, you are able to carry out landmark survival analysis. On the left side panel, you have the options to upload data; select variables for landmark analysis; you also need to specify the value for landmark analysis; download the output plot accordingly.

NOTE2: The analysis is based on the function from R package 'dympre' to generate the landmark dataset.

NOTE3: You also need to specify the time unit corresponding to the data in order for the plot to display correctly. You can choose to get KM curves or CIF curves per research interest.

DATA FORMAT

1. Data should be input as a .txt or .xlsx or .csv file. The first row of the data file have information about the variables.
2. The remaining lines contain measurements one line per each subjects/sample, described in the format below.
3. The first column of the file contains the survival time 'time' (column 1), survival status 'status' (column 2) followed by the other variables of interest.
  - a) Column\_1. This should contain the survival time, for the user's reference.
  - b) Column\_2. This should contain the Survival status, input as 'censored' vs 'dead'.
  - c) Remaining Columns. These columns should contain information with variables of interest, such as age, race, gender and patient id kept as reference.

**Input your file**  
Select an example ds or upload your own with 'Load my own'  
Example ds File  
Download Example data

**KM Analysis**  
Select a Variable of Interest as Cohort Group  
trans\_use  
The variable of interest is categorical or continuous  
Categorical Variable  
Select a Time Variable to Visualize Landmark Plot  
surv1  
Select a Censoring Variable to Visualize landmark Plot  
dead  
Select a Time Dependent Variable to Visualize landmark Plot  
wtime  
Input Time Point for Landmark Analysis  
200

**Step 1:**  
Select the example dataset or upload your own.  
To view example data and format, use download button to view .csv file.

**Step 2:**  
The variables from the input file will be available as drop down for selection.  
Choose variable of interest to divide the cohort. If this variable is categorical, leave next drop down unchanged. If continuous, a new set of parameters will appear to dichotomize the continuous variable. The user can select an optimal cut-off based on the data, or either subset it by 25<sup>th</sup> or 50<sup>th</sup> or 75<sup>th</sup> percentile. Any sample with values above 25<sup>th</sup> percentile will be considered as "High" and remaining "Low". Similarly for the other groupings.  
For Landmark analysis, additionally user needs to input the time point for landmark analysis and choose the time dependent variable. This should be in the same time unit as the survival time. Survival time unit also needs to be specified. By default, it is days.

**Step 3:**  
Choose to display either a KM curve or a CIF curve for the landmark analysis. If user selects a KM curve option, a combined KM curve for overall survival until the landmark time followed by a landmark KM curve is generated with their respective p-values.

**Input your file**  
Select an example ds or upload your own with 'Load my own'  
Example ds File  
Download Example data

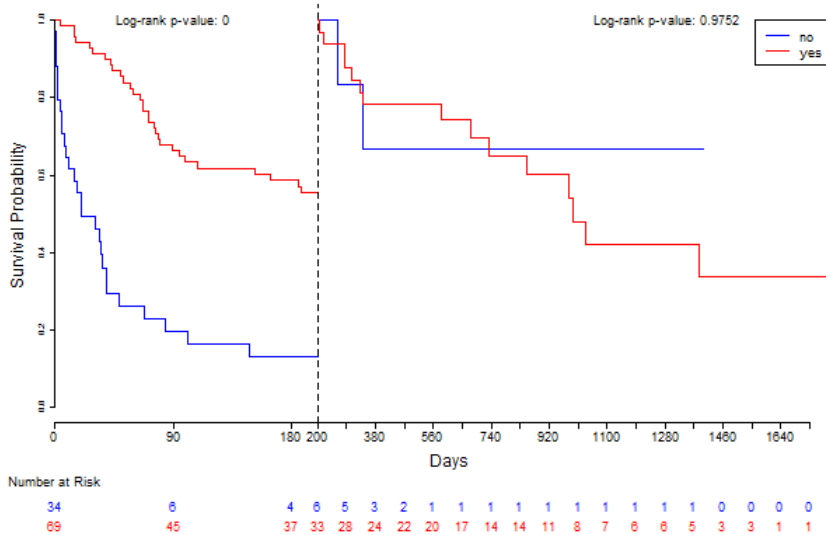
**KM Analysis**  
Select a Variable of Interest as Cohort Group  
trans\_use  
The variable of interest is categorical or continuous  
Categorical Variable  
Select a Time Variable to Visualize Landmark Plot  
surv1  
Select a Censoring Variable to Visualize landmark Plot  
dead  
Select a Time Dependent Variable to Visualize landmark Plot  
wtime  
Input Time Point for Landmark Analysis  
200  
Time Unit:  
 Years  
 Months  
 Days  
KM or CIF:  
 KM  
 CIF  
Risk Table:  
 Yes  
 No

### Downloads

Type the file name you would like to save as  
landmarkplot  
Download Landmark Plot

**Step 4:**  
User can download the Landmark plot stratified by the categorical variable. Log rank p-values are also reported.

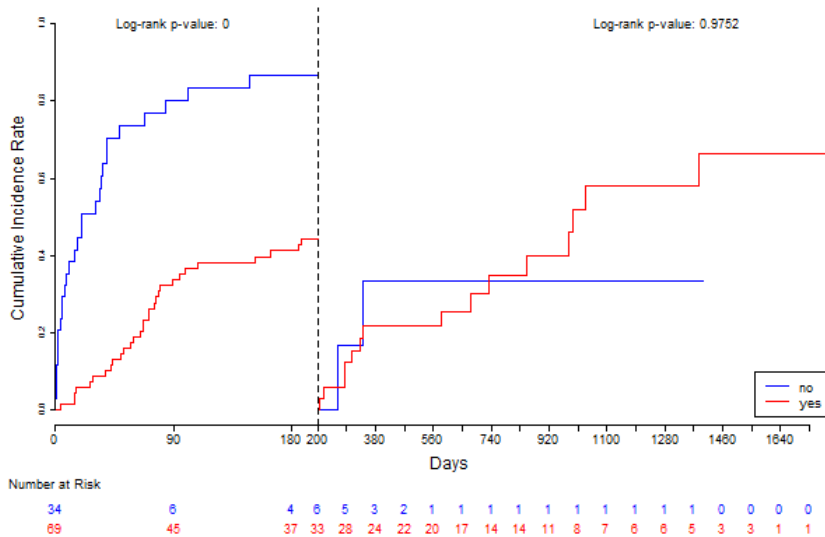
### To Visualize the Landmark Survival Plot:



A landmark analysis KM plot stratified by the time dependent categorical variable 'trans\_use'. Left side shows the overall survival curve and the right side represents the landmark survival plot.

User can optionally have the numbers of risk table under the plot.

### To Visualize the Landmark Survival Plot:



Alternatively, a landmark analysis CIF plot stratified by the categorical variable.

**KM or CIF:**

- KM
- CIF

Left side shows the overall survival curve and the right side represents the landmark survival plot.



## TAB 4. QUANTILE SURVIVAL ANALYSIS

CASAS: Cancer Survival Analysis Suite   Standard Survival Analysis   Competing Risk Survival Analysis   Landmark Survival Analysis   **Quantile Survival Analysis**   Cost of Cutoff Point Finder   Grid for Summarized Significance   Tutorial   About Us

**Input your file**  
Select an example ds or upload your own with 'Load my own'  
Example ds File  
Download Example data

**Quantile Survival Analysis**  
Select Variable of Interest  
Group  
The variable of interest is categorical or continuous  
Categorical Variable  
Select a Time Variable for Quantile Analysis  
OS\_SURTIME  
Select a Censoring Variable for Quantile Analysis  
OS\_CENSOR  
Time Unit:  
 Years  
 Months  
 Days  
Run & generate random numbers  
Hit Run & Generate random number button above to display output on main panel.

NOTE1: In this tab, you are able to carry out quantile survival analysis. The quantile survival analysis in this shiny app is based on the method developed by Hoang (2010 & 2016). For each quantile, the survival time difference will estimated with 95% CI. If it included 0, then that quantile is not significant. Otherwise, it is significant in that quantile.

NOTE2: On the left side panel, you have the options to upload data; select a continuous variable of interest to be dichotomized with optimal cutoff, 25 percentile, 50 percentile, 75 percentile; the option to choose reference level needs to be specified by the user with respect to interest; download the output table and plot accordingly.

NOTE3: Once you click the Run & Generate a random number button, the app will start to run the quantile survival analysis. You can then check the output plots and tables in the second subtab.

**DATA FORMAT**

1. Data should be input as a .txt or .xlsx or .csv file. The first row of the data file have information about the variables.
2. The remaining lines contain measurements one line per each subject/sample, described in the format below.
3. The first column of the file contains sample id, the second column includes the survival status 'os\_censor' (column 2), survival time 'os\_time' (column 3) followed by the other variables of interest.  
a) Column\_1. This should contain the Survival status, input as 0 for 'censored' vs 1 for 'dead'  
b) Column\_2. This should contain the survival time, for the user's reference.  
c) Remaining Columns. These columns should contain information with variables of interest, such as age, race, gender and patient id) ect as reference.

**Input your file**  
Select an example ds or upload your own with 'Load my own'  
Example ds File  
Download Example data

### Step 1:

Select the example dataset or upload your own.

To view example data and format, use download button to view .csv file.

**Quantile Survival Analysis**  
Select Variable of Interest  
Group  
The variable of interest is categorical or continuous  
Categorical Variable  
Select a Time Variable for Quantile Analysis  
OS\_SURTIME  
Select a Censoring Variable for Quantile Analysis  
OS\_CENSOR  
Time Unit:  
 Years  
 Months  
 Days  
Run & generate random numbers  
Hit Run & Generate random number button above EACH time to display output on main panel.

### Step 2:

The variables from the input file will be available as drop down for selection.

Choose variable of interest to divide the cohort. If this variable is categorical, leave next drop down unchanged. If continuous, a new set of parameters will appear to dichotomize the continuous variable. The user can select an optimal cut-off based on the data, or either subset it by 25<sup>th</sup> or 50<sup>th</sup> or 75<sup>th</sup> percentile. Any sample with values above 25<sup>th</sup> percentile will be considered as "High" and remaining "Low". Similarly for the other groupings.

Choose appropriate survival time, censor status (0/1) variables from your uploaded dataset. User can also select the appropriate time unit (Years, Months or Days). Years being the default.

### Step 3:

In order to run the analysis, user needs to hit 'Run & generate a random number' each time they select a new variable of interest.

# Downloads

Type the file name you would like to save as

Download Quantile Survival Plot

**Step 4:**

User can download the Quantile Survival plot. This includes the overall KM analysis plot and the plot of mean survival differences between the two groups for each quantile.

Type the file name you would like to save as

Download Forest Plot

**Step 5:**

User can download the Forest plot summary. This includes the overall KM analysis plot and the plot of mean survival differences between the two groups for each quantile.

Type the file name you would like to save as

Download grid Data

**Step 6:**

If a user is interested in multiple genes (variables) in the same dataset or multiple datasets (for example, numerous cancer types), they can download the table of mean difference estimates for a comparative grid in tab 6.

Read Me: Quantile Survival Plots and Output

The three plots from left to right are as following:

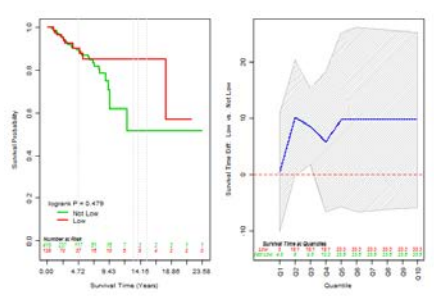
1. The first plot is KM plot with number at risk table for overall survival and log rank test p-value.
2. The second plot is the survival time difference with 95% CI between two dichotomized groups at 10 quantiles as Q1 to Q10 (defined as 10 percentile to 100 percentile by 10 percentile at mean survival time among all patients).
3. The third plot is the summary using forest plot for the survival time difference at 10 quantiles. The overall in forest plot corresponds to the transformed HR and 95% CI for overall survival (log(1/HR)). The transformed HR will be interpret as # 0 is included then it is not significant.

NOTE1: The first table contains hazard ratio and 95% CI with cox proportional hazard model for the overall survival with the variable of interest in the original scale.

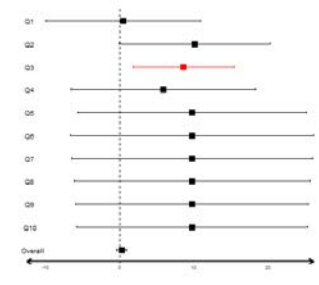
NOTE2: The second table 'Data for Forest Plot' contains information to generate the forest plot. For item 'overall', it shows the transformed HR and 95% CI. The last column in this table includes information of direction. It is also needed to generate a summarized Grid if you have multiple cancer types or subgroups.

NOTE3: To generate a summarized Grid if you have multiple cancer types or subgroups, you can download the data for Grid in the left side panel. You only need to keep the first two columns and transpose the data. Repeat this for different cancer types or subgroups and combine as a new dataset to generate a Grid in the tab: Grid for summarized significance'.

Quantile Survival Analysis Plots



Forest Plot for Survival Time Difference



Left to Right: Quantile Survival analysis plots stratified by the dichotomous groups, survival time difference with 95% CI between two dichotomized groups at 10 quantiles as Q1 to Q10 (defined as 10 percentile to 100 percentile by 10 percentile at mean survival time among all patients) based on method developed by Huang (2010 & 2016). The third plot is the summary using forest plot for the survival time difference at 10 quantiles. The overall in forest plot corresponds to the transformed HR and 95% CI for overall survival (log(1/HR)). The transformed HR will be interpret as if 0 is included then it is not significant.

### Univariate Cox Survival Analysis Table

Show  entries

	Hazard Ratio	95% CI Lower Limit	95% CI Upper Limit	Z Score	P-value
1	1.2757	0.390	1.5395	-0.707	0.4790

Showing 1 to 1 of 1 entries

Previous  Next

### Data for Forest Plot

Show  entries

	Quantiles	Mean Time Difference/Transformed Hazard Ratio(log(1+HR))	CI Lower Limit	CI Upper Limit	Significance(0: Non-sig, 1:Not Low Better, 2:Low Better, 3:Non-estimable)
1	Q1	0.4466	-10.0049	10.8981	0
2	Q2	10.0877	-0.1158	20.2911	0
3	Q3	8.5806	1.7771	15.3845	2
4	Q4	5.8548	-6.6139	18.3235	0
5	Q5	9.7315	-5.7029	25.1659	0
6	Q6	9.7315	-6.6399	26.1029	0
7	Q7	9.7315	-5.4055	25.9499	0
8	Q8	9.7315	-5.1721	25.6201	0
9	Q9	9.7315	-5.9719	25.4335	0
10	Q10	9.7315	-5.8856	25.3487	0
11	Overall	0.2435	0.5187	-0.4316	0

Showing 1 to 11 of 11 entries

Previous  Next

Univariate Survival Association analysis table is displayed for the variable of interest.

Quantile wise mean survival time estimates with 95% CI limits with significance. This is useful for combining data from different cancer types or different variables (genes) in the same dataset.

# TAB 5. OPTIMAL CUT-OFF FINDER

**Input your file**  
 Select an example ds or upload your own with 'Load my own'

Example ds File

Download Example data

---

**Choose Variable**  
 Select a Continuous Variable of Interest

log2\_Gene1\_Plus1

Select a Time Variable

OS\_SURTIME

Select a Censoring Variable

OS\_CENSOR

**Downloads**

Type the file name you would like to save as

MRplot

Download Martingale Residual Plot

Read Me   Optimal Cutoff Point Finder Output

NOTE1: In this tab, you are able to search for optimal cutpoint for a continuous variable of interest. The method is based on Contal and O'Quigley (1999) and has also been implemented in SAS by Mandrekar et al. (2003).

NOTE2: In the output, a martingale residual plot is included. In the following table, you can find the cutpoint value of the variable and corresponding percentile.

**DATA FORMAT**

1. Data should be input as a .txt or .xlsx or .csv file. The first row of the data file have information about the variables.
2. The remaining lines contain measurements one line per each subject/sample, described in the format below.
3. The first column of the file contains sample id, the second column includes the survival status 'os\_censor' (column 2), survival time 'os\_time' (column 3) followed by the other variables of interest.
  - a) Column\_1. This should contain the Survival status, input as 0 for 'censored' vs 1 for 'dead'.
  - b) Column\_2. This should contain the survival time, for the user's reference.
  - c) Remaining Columns. These columns should contain information with variables of interest, such as age, race, gender and patient id kept as reference.

**Input your file**  
 Select an example ds or upload your own with 'Load my own'

Example ds File

Download Example data

**Choose Variable**  
 Select a Continuous Variable of Interest

log2\_Gene1\_Plus1

Select a Time Variable

OS\_SURTIME

Select a Censoring Variable

OS\_CENSOR

**Downloads**

Type the file name you would like to save as

MRplot

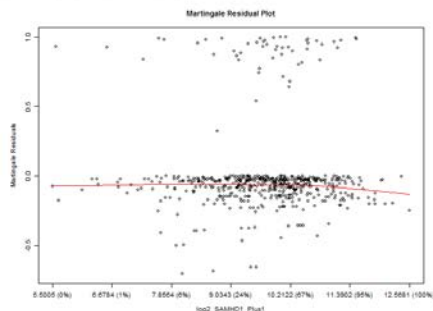
Download Martingale Residual Plot

**Step 1:**  
 Select the example dataset or upload your own.  
 To view example data and format, use download button to view .csv file.

**Step 2:**  
 The variables from the input file will be available as drop down for selection.  
 Choose appropriate continuous variable (eg. gene expression) for which you wish to determine optimal cut – point based on Contal and O'Quigley (1999). Also select the appropriate time and the censor variable.

**Step 3:**  
 User can download the Martingale residual plot.

Read Me   Optimal Cutoff Point Finder Output



**Optimal Cut Point Output**

Show 1 of 1 entries

	log2_SAMHG1_Plus1	M	G	p-value	Percentile
1	9.5344	0.0729	0.8906	0.4056	0.29

Showing 1 to 1 of 1 entries

Martingale residual plot along with cut point value of the variable and corresponding percentile.

# TAB 6. GRID FOR SUMMARIZED SIGNIFICANCE

CASAS: Cancer Survival Analysis Suite | Standard Survival Analysis | Competing Risk Survival Analysis | Landmark Survival Analysis | Quantile Survival Analysis | Optimal Cutoff Point Finder | **Grid for Summarized Significance** | Tutorial | About Us

Read Me | Summarized Significance Grid

**NOTE1:** In this tab, you are able to generate a grid if you have multiple cancer or groups of interest to run multiple quantile survival analysis separately.

**NOTE2:** On the left side panel, you have the options to upload data; select the reference level corresponding to the reference level chosen in quantile survival analysis; download the output plot accordingly.

**NOTE3:** To generate the input data, you can refer to the 'Quantile Survival Analysis' tab for more information.

**DATA FORMAT**

1. Data should be input as a .txt or .xlsx or .csv file. The first row of the data file have information about the variables.
2. The remaining lines contain measurements one line per each cancer type or subgroup, described in the format below.
3. The data is designed to have 13 columns:
  - a) Column\_1: The column contains names of different cancer types or subgroups.
  - b) Column\_13: This should contain the percentile for each subgroup you used in quantile survival analysis.
  - c) Column\_2 to Column 12: from 2nd to 12th column, the significance indications are included for 10 quantiles and overall.

**Input your file**  
 Select an example ds or upload your own with 'Load my own'  
 Example ds File  
 Download Example data

**Choose Reference Level:**  
 Not Low  
 Low

**Downloads**  
 Type the file name you would like to save as  
 Grid  
 Download Grid Plot

**Step 1:**  
 Select the example dataset or upload your own.  
 To view example data and format, use download button to view .csv file. This tab can combined results from various cancers of genes in the same cancer types.

**Step 2:**  
 Based on all the combined data, select the reference level. All data should have the same reference.

**Step 3:**  
 User can download the comparison grid to access the different cancers or genes within the same cancer type.

**Input your file**  
 Select an example ds or upload your own with 'Load my own'  
 Example ds File  
 Download Example data

**Choose Reference Level:**  
 Not Low  
 Low

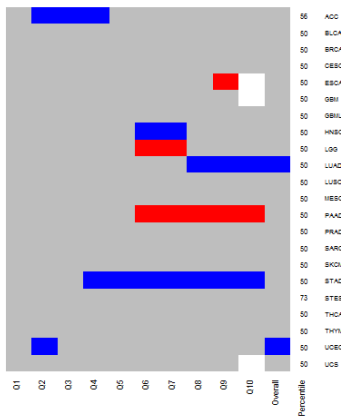
**Downloads**  
 Type the file name you would like to save as  
 Grid  
 Download Grid Plot

Read Me | Summarized Significance Grid

## Summarized Significance conclusion over all cancer types

**Color Key**

- Non-significant
- Low Expression Better Survival
- Not Low Expression Better Survival
- Non-estimate



Comparison grid for various cancer types along with the percentiles used as cut-off in each case provided in the example data.

## II. TROUBLESHOOTING GUIDE

- **Error: An error has occurred. Check your logs or contact the app author for clarification.**

This error is likely when:

- User has selected a categorical variable where a continuous variable was required
  - User has selected a continuous variable where a categorical variable was required
  - The appropriate time variable in the data was not selected
  - The appropriate censor variable in the data was not selected
  - When changing/ entering new time points for CIF analysis, a “ , ” a space was not entered after the comma
  - In appropriate symbols are present in the data such as: [./#@!\\$%^&\\*;,;](#)
  - Censor variable has missing values or in appropriate symbols
  - For landmark analysis, the time point is not within the range of the survival time variable.
- **Images are not updating**
    - For Quantile analysis, make sure to hit the “Run and generate Random numbers” button each time you choose a new variable.
  - **Images are not displaying**
    - User chose the variable of interest that was continuous but forgot to update the dropdown under from categorical to continuous.