

# Package ‘wcep’

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**Type** Package

**Title** Survival Analysis for Weighted Composite Endpoints

**Version** 1.0.2

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**URL** <https://github.com/sarah-0k/wcep>

**BugReports** <https://github.com/sarah-0k/wcep>

**Description** Analyze given data frame with multiple endpoints and return Kaplan-Meier survival probabilities together with the specified confidence interval. See Nabipoor M, Westerhout CM, Rathwell S, and Bakal JA (2023) <[doi:10.1186/s12874-023-01857-0](https://doi.org/10.1186/s12874-023-01857-0)>.

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**Encoding** UTF-8

**LazyData** true

**Language** en-us

**Depends** R (>= 3.6.0)

**Imports** coin (>= 1.3-1), dplyr (>= 1.1.0), graphics (>= 3.6.1),  
grDevices (>= 3.6.1), progress (>= 1.2.2), stats (>= 3.6.1),  
tidyr (>= 1.0.0)

**RoxygenNote** 7.2.3

**Suggests** testthat (>= 3.0.0)

**Collate** 'data.R' 'nam.R' 'plot.R' 'wcep-package.R' 'wcep\_core.R'  
'wcep.R'

**Config/testthat/edition** 3

**NeedsCompilation** no

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**Repository** CRAN

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plot.wcep	<i>wcep plot</i>
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### Description

Create a plot of Kaplan-Meier curve with its specified confidence interval

### Usage

```
## S3 method for class 'wcep'
plot(
  x,
  main = " ",
  type = "n",
  lty = NULL,
  lwd = NULL,
  xlab = " ",
  ylab = "Survival Probability",
  xlim = NULL,
  ylim = NULL,
  cex = NULL,
  ...
)
```

### Arguments

x	is an object of class "wcep"
main	title of plot
type	type of plot
lty	line type
lwd	line width
xlab	first axis label
ylab	second axis label
xlim	first axis limits
ylim	second axis limits
cex	legend font size
...	other parameters of generic "plot" have no use here setOldClass("wcep")

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 toyexample

*Toy example*


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### Description

A data set containing patient IDs, event types, event times, and gender of 100 patients.

### Usage

```
toyexample
```

### Format

A data frame with 104 rows and 4 columns

**PTID** ID number of patients

**EvTp** Event Types: SHK as Shock, CHF as Congestive Heart Failure, REMI as Recurrent Myocardial Infarction, DTH as Death; and N as No event

**EvTm** Event Time (day)

**sex** Gender of patients, M as Male, F as Female

### References

Armstrong P. W., Westerhout C. M., Van de Werf F., Califf R. M., Welsh R. C., Wilcox R. G., Bakal J. A. (2011) Refining clinical trial composite outcomes: an application to the Assessment of the Safety and Efficacy of a New Thrombolytic-3 (ASSENT-3) trial. *American Heart Journal*. **161**(5) 848-854.

### Source

It is a generated example based on ASSENT-3: <https://pubmed.ncbi.nlm.nih.gov/21570513>

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 wcep

*Analysis of weighted composite endpoints*


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### Description

Analyze given data frame and return Kaplan-Meier survival probabilities together with the specified confidence interval. wcep modifies Kaplan-Meier curve by taking into account severity weights of different event. Alternative methods are Anderson Gill model and win ratio of composite outcomes. The function takes event dataset and user-specified severity weights to generate a modified Kaplan-Meier curve and comparison statistics based on the weighted composite endpoint method. The user supplies the event data set, the weights, and the factor to split on . The package will generate the weighted survival curve, confidence interval and test the differences between the two groups.

**Usage**

```
wcep(x, EW, alpha = 0.05, split = FALSE)
```

**Arguments**

x	This data frame usually has 3 columns. The first column specifies patient ID, which is a character or numeric vector, the second column is a factor with character values of event types. The third column is a numeric vector of event times. If <code>split = TRUE</code> , then the fourth column is a character vector of split groups of at most two groups, like gender.
EW	This data frame has two columns. The first column specifies a character vector of event types. The second column specifies weights. The naming of event types in <code>x</code> and <code>EW</code> should be exactly similar.
alpha	A numeric value between 0-1 which specifies the confidence level, if it is not specified, by default is 0.05.
split	A logical value of T or F which allows to compare two groups.

**References**

Bakal J., Westerhout C. M., Armstrong P. W. (2015) Impact of weighted composite compared to traditional composite endpoints for the design of randomized controlled trials. *Statistical Methods in Medicine Research*. **24**(6) 980-988.

Nabipoor M., Westerhout C. M., Rathwell S., Bakal J. (2023) The empirical estimate of the survival and variance using a weighted composite endpoint, *BMC Medical Research Methodology*. **23**(35).

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**See Also**

[coxph](#) for Anderson Gill model

**Examples**

```
data(toyexample)
#event weights
EW <- data.frame(event = c('CHF', 'DTH', 'SHK', 'REMI'), weight = c(0.3,1,0.5,0.2))
res1 <- wcep(toyexample, EW)
str(res1)
res1$survival_probabilities
plot(res1)
#comparing two genders
res2 <- wcep(toyexample, EW, split=TRUE)
plot(res2)
#wilcox and t test
res2$Wilcoxon.test
res2$t.test
```

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