Package ‘survexp.fr’

February 20, 2015

Type Package
Title Relative survival, AER and SMR based on French death rates
Version 1.0
Date 2013-03-04
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Depends survival
LazyData Yes
Description Relative survival, AER and SMR based on French death rates
License GPL (>= 2)
NeedsCompilation no
Repository CRAN
Date/Publication 2013-03-04 20:36:59

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survexp.fr-package  Relative survival, AER and SMR based on French death rates

Description

Relative survival, AER and SMR based on French death rates

Details

Package: survexp.fr  
Type: Package  
Version: 1.0  
Date: 2013-03-04  
License: GPL (>= 2)

Author(s)

Jean-Philippe Jais and Hugo Varet  
Maintainer: Hugo Varet <varethugo@gmail.com>

AER  Absolute Excess Risk (AER)

Description

Computes the AER, its confidence interval and its associated p-value

Usage

AER(futime, status, age, sex, entry_date, PY.stand = 10000,  
ratetable = survexp.fr, alpha = 0.05)

Arguments

futime  follow-up time of the subjects in days  
status  0 if censored or 1 if dead at futime  
age  age in days  
sex  "male" or "female"  
entry_date  entry date in the study  
PY.stand  value to get the AER for stand person-years  
ratetable  a table of event rates, such as survexp.fr or survexp.us  
alpha  determines the confidence level (1-alpha) of the confidence interval
The Absolute Excess Risk (AER) is defined as:

\[ AER = O - E \]

where \( O \) is the observed number of deaths and \( E \) is the expected number based on the patients’ characteristics (sex, age and entry date in the study). This function uses an additive Poisson model to compute the AER.

Value

A list containing the AER with the corresponding number of person-years (PY.stand argument), its confidence interval, its p-value, the observed number of deaths, the expected number of deaths and the observed number of person-years

Author(s)

Jean-Philippe Jais and Hugo Varet

References


P. Dickman, A. Sloggett, M. Hills and T. Hakulinen, Regression models for relative survival, Statistics in Medicine, 2004

C. Elie, Y. De Rycke, J.-P. Jais and P. Landais, Appraising relative and excess mortality in population-based studies of chronic diseases such as end-stage renal disease, Clinical Epidemiology, 2011

Examples

```r
attach(data.example)
AER(futime, status, age, sex, entry_date)
```

```
data.example  Example data to illustrate the functions
```

Description

Example data to illustrate the functions

Usage

```r
data(data.example)
```
Format

A data frame with 200 observations on the following 5 variables.

- **sex**: "male" or "female"
- **age**: age in days
- **entry_date**: entry date in the study
- **status**: status at follow-up time: 0 if alive, 1 if dead
- **futime**: follow-up time in days

Examples

```r
data(data.example)
```

---

**LR**

*Log-Rank test between an observed and an expected survival curve*

Description

Log-Rank test between an observed and an expected survival curve

Usage

```r
LR(futime, status, age, sex, entry_date, ratetable = survexp.fr)
```

Arguments

- **futime**: follow-up time of the subjects in days
- **status**: 0 if censored or 1 if dead at futime
- **age**: age in days
- **sex**: "male" or "female"
- **entry_date**: entry date in the study
- **ratetable**: a table of event rates, such as survexp.fr or survexp.us

Details

The Log-Rank is calculated as:

\[ LR = \frac{(O - E)^2}{E} \]

where \( O \) is the observed number of deaths and \( E \) is the expected number based on the patients' characteristics (sex, age and entry date in the study). It follows a Khi-2 distribution with one degree of freedom, which allows to compute its p-value.

Value

A list containing the observed number of deaths, the expected number of deaths, the Log-Rank statistic and its p-value
**SMR**

**Author(s)**

Hugo Varet

**References**


**Examples**

```r
attach(data.example)
LR(futime, status, age, sex, entry_date)
```

---

**SMR**

*Standardized Mortality Ratio (SMR)*

**Description**

Computes the SMR, its confidence interval and its associated p-value

**Usage**

```r
SMR(futime, status, age, sex, entry_date, ratetable = survexp.fr, alpha = 0.05)
```

**Arguments**

- `futime`: follow-up time of the subjects in days
- `status`: 0 if censored or 1 if dead at `futime`
- `age`: age in days
- `sex`: "male" or "female"
- `entry_date`: entry date in the study
- `ratetable`: a table of event rates, such as `survexp.fr` or `survexp.us`
- `alpha`: determines the confidence level \((1-\alpha)\) of the confidence interval

**Details**

The SMR is estimated using two different methods.

The classic method is:

\[
SMR = \frac{O}{E}
\]

where \(O\) is the observed number of deaths and \(E\) is the expected number based on the patients' characteristics (sex, age and entry date in the study).

The SMR is also estimated performing a Poisson model where \(O\) is the dependant variable and \(E\) is an offset.
Value

A list containing the observed number of deaths, the expected number of deaths, the "classic" SMR (with its confidence interval and its p-value) and the SMR calculated by a Poisson model (with its confidence interval and its p-value)

Author(s)

Jean-Philippe Jais and Hugo Varet

References


Examples

attach(data.example)
SMR(futime, status, age, sex, entry_date)

survexp.fr  French data for the expected survival and person years functions

Description

French data for the expected survival and person years functions

Usage

data(survexp.fr)

Details

Death rates are available from 1977 to 2010 for males and females aged from 0 to 99

Source


References

Institut National de la Statistique et des Etudes Economiques

Examples

is.ratetable(survexp.fr)
summary(survexp.fr)
survexp_plot

Observed Kaplan-Meier, expected and relative survival curves

Description

Displays the observed Kaplan-Meier, expected and relative survival curves

Usage

survexp_plot(futime, status, age, sex, entry_date, ratetable = survexp.fr,
    main = "Observed and expected survival",
    xlab = "Time (years)", ylab = "Survival",
    col.km = "black", lwd.km = 2, lty.km = 1, conf.int.km = TRUE,
    col.exp = "blue", lwd.exp = 2, lty.exp = 1,
    main.rel = "Relative survival", ylab.rel = "Relative survival",
    col.rel = "black", lwd.rel = 2, lty.rel = 1,
    times = seq(0,max(futime, na.rm = TRUE)/365.241,length=6)[-1], alpha = 0.05,
    xscale = 365.241, ...)

Arguments

- futime: follow-up time of the subjects in days
- status: 0 if censored or 1 if dead at futime
- age: age in days
- sex: "male" or "female"
- entry_date: entry date in the study
- ratetable: a table of event rates, such as survexp.fr or survexp.us
- main: main title of the Kaplan-Meier and expected survivals plot
- xlab: x-label of the plot
- ylab: y-label of the plot
- col.km: color of the observed survival curve
- lwd.km: line width of the observed survival curve
- lty.km: line type of the observed survival curve
- conf.int.km: TRUE to display the confidence interval of the observed survival
- col.exp: color of the expected survival curve
- lwd.exp: line width of the expected survival curve
- lty.exp: line type of the expected survival curve
- main.rel: main title of the relative survival plot
- ylab.rel: y-label of the relative survival plot
- col.rel: color of the relative survival curve
- lwd.rel: line width of the relative survival curve
survexp_plot

lty.rel  line type of the relative survival curve
times    times to draw the confidence intervals of the relative survival
alpha    determines the confidence level (1-alpha) of the confidence intervals for the relative survival
xscale   see the xscale argument in plot.survfit
...      other arguments to be passed in plot.survfit

Details
This function displays the observed and expected survivals, and the relative survival which is defined as:
\[ r(t) = \exp(-\exp(\beta) \times t) \]
where \(\exp(\beta)\) is the excess risk by time unit estimated by an additive Poisson model.

Value
A matrix containing the values of relative survivals and their confidence intervals for each time of times

Author(s)
Hugo Varet

References
M. Pohar and J. Stare, Making relative survival analysis relatively easy, Computers in Biology and Medicine, 2007
M. Pohar and J. Stare, Relative survival analysis in R, Computers Methods and Programs in Biomedicine, 2006

Examples
attach(data.example)
surexp_plot(futime, status, age, sex, entry_date)
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