

Package ‘compeir’

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Type Package

Title Event-specific incidence rates for competing risks data

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Description The package enables to compute event-specific incidence rates for competing risks data, to compute rate ratios, event-specific incidence proportions and cumulative incidence functions from these, and to plot these in a comprehensive multi-state type graphic.

License GPL-2

Depends grid, lattice, etm

LazyLoad yes

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compeir-package	<i>Competing events incidence rates and corresponding statistics</i>
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Description

The package enables to compute event-specific incidence rates for competing risks data, to compute rate ratios, event-specific incidence proportions and cumulative incidence functions from these, and to plot these in a comprehensive multistate-type graphic.

Details

Package:	compeir
Type:	Package
Version:	1.0
Date:	2010-12-20
License:	GPL-2
Depends:	grid, lattice, etm
LazyLoad:	yes

The most important function contained in this package is `irates`. `irates` returns an object with which further measures can be determined, e.g., incidence rate ratios (`irates.ratio`), incidence proportions (`iprop`) or the cumulative incidence function (`cif`). The latter can easily be plotted using `CIFplot`. Also, a multistate type graphic based on incidence rates can be plotted by `plot.irates`.

Author(s)

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References

Grambauer, N., Schumacher, M., Dettenkofer, M. and Beyersmann, J. (2010) Incidence densities in a competing events setting. *American Journal of Epidemiology* **172**,1077–1084. <http://aje.oxfordjournals.org/lookup/doi/10.1093/aje/kwq246>

Altman, D., Machin, D., Bryant, T., Gardner, S. (2000) *Statistics with Confidence: Confidence intervals and statistical guidelines*. Second edition. Bristol: BMJ Books.

cif *Parametrically estimating the cumulative incidence function*

Description

This function estimates the cumulative incidence function (CIF) for each respective event type using all competing events incidence rates.

Usage

```
cif(irates, t, event.code = NULL, covar.code = NULL, full.sample = FALSE)
```

Arguments

<code>irates</code>	irates object
<code>t</code>	A vector of timepoints for which the CIF shall be calculated
<code>event.code</code>	A character or numerical value that specifies the respective competing events for which the CIF shall be calculated. If <code>NULL</code> , <code>event.code</code> will be inherited from <code>irates</code>
<code>covar.code</code>	A character or numerical value that specifies the respective covariate values for which the CIF shall be calculated. If <code>NULL</code> , <code>covar.code</code> will be inherited from <code>irates</code>
<code>full.sample</code>	A logical value that specifies if the CIF shall also be calculated for the full sample, i.e., irrespective of any covariate value. Default is set to <code>FALSE</code>

Details

The cumulative incidence function is the expected proportion of type h events over the course of time.

Value

An object of class `cif`. This object is implemented as a list of the (besides pre-specified) following items:

<code>t</code>	Timepoints for which the CIF is calculated
<code>cif</code>	CIF estimates corresponding to <code>t</code> for each <code>event.code</code>

References

Grambauer, N., Schumacher, M., Dettenkofer, M. and Beyersmann, J. (2010) Incidence densities in a competing events setting. *American Journal of Epidemiology* **172**,1077–1084. <http://aje.oxfordjournals.org/lookup/doi/10.1093/aje/kwq246>

See Also

[irates](#), [CIFplot](#)

Examples

```

### Example data.frame with aggregated count data
dat <- data.frame(
  times = c(7948,2899),
  no.event = c(6,8),
  event.1 = c(589,68),
  event.2 = c(55,21),
  row.names = c("covar0","covar1"))

### Compute irates object from dat
ir <- irates(dat)

### Compute the cumulative incidence function from irates object, e.g.
cif(irates = ir, t = 1:10)

```

CIFplot

Plotting estimates of the cumulative incidence function

Description

Function for plotting parametric estimates of the cumulative incidence function based on incidence rates. If individual patient data is available, the function also enables to plot the non-parametric, Aalen-Johansen estimates using `etm`.

Usage

```

CIFplot(x, event.code = NULL, covar.code = NULL, indiv.times = NULL, indiv.events = NULL, indiv.covar
xlim = c(0, 30), ylim = NULL, xlab = "Time", ylab = "CIF", legend = TRUE, ...)

```

Arguments

<code>x</code>	irates object
<code>event.code</code>	A character or numerical value that specifies the respective competing events for which the CIF shall be plotted. If <code>NULL</code> , <code>event.code</code> will be inherited from <code>irates</code>
<code>covar.code</code>	A character or numerical value that specifies the respective covariate values for which the CIF shall be plotted. If <code>NULL</code> , <code>covar.code</code> will be inherited from <code>irates</code>
<code>indiv.times</code>	Timepoints corresponding to event status for each individual (vector or factor). Only relevant if individual patient data is available. Defaults to <code>NULL</code>
<code>indiv.events</code>	Event status for each individual (vector or factor). Only relevant if individual patient data is available. Defaults to <code>NULL</code>
<code>indiv.covar</code>	Event status for each individual (vector or factor). Only relevant if individual patient data is available. Defaults to <code>NULL</code>
<code>xlim</code>	The x limits (<code>x1</code> , <code>x2</code>) of the plot. Defaults to <code>c(0, 30)</code>

ylim	The y limits (y1, y2) of the plot. If NULL, ylim will be determined automatically
xlab	A title for the x axis. Defaults to "Time"
ylab	A title for the y axis. Defaults to "CIF"
legend	Adds a legend to the plot. Defaults to TRUE
...	Further arguments for plot

See Also

[cif](#), [etm](#)

Examples

```
### Example data.frame with aggregated count data
dat <- data.frame(
  times = c(7948,2899),
  no.event = c(6,8),
  event.1 = c(589,68),
  event.2 = c(55,21),
  row.names = c("covar0","covar1"))

### Compute irates object from dat
ir <- irates(dat)

### Compute the cumulative incidence function from irates object
### here: timespan is specified by xlim (default: xlim = c(0,30))
CIFplot(x = ir)

### sir.adm: Individual patient data
data(sir.adm)

### aggregate data
agg.sir.adm <- data.reshape(
  times = sir.adm$time,
  events = sir.adm$status,
  covar = sir.adm$pneu,
  no.event.code= "0")

### Plot parametric and non-parametric CIF estimates
CIFplot(
  x = irates(agg.sir.adm),
  indiv.times = sir.adm$time,
  indiv.events = sir.adm$status,
  indiv.covar = sir.adm$pneu)

### okiss: Individual patient data
### here: e.g. just event of interest 1 (infection) is plotted
data(okiss)

### aggregate data
```

```
agg.okiss <- data.reshape(
  times = okiss$time,
  events = okiss$status,
  covar = okiss$allo,
  no.event.code= "11")

### Plot parametric and non-parametric CIF estimates
CIFplot(
  x = irates(agg.okiss),
  event.code = "1",
  indiv.times = okiss$time,
  indiv.events = okiss$status,
  indiv.covar = okiss$allo)
```

data.reshape

Reshaping individual patient data

Description

Aggregates individual patient data and combines it in a data.frame format required for irates

Usage

```
data.reshape(times, events, covar, no.event.code, event.code = NULL, covar.code = NULL)
```

Arguments

times	Timepoints corresponding to event status for each individual (vector or factor)
events	Event status for each individual (vector or factor)
covar	Event status for each individual (vector or factor)
no.event.code	A character or numerical value that specifies the value in events corresponding to “no event observed”.
event.code	A character or numerical value that specifies the respective competing events in events. If NULL, event.code will be automatically extracted from events
covar.code	A character or numerical value that specifies the respective covariate values in covar. If NULL, covar.code will be automatically extracted from covar

Value

An object of class data.frame of the form data.frame(time, no.event.code, event.code) with row.names given by covar.code and corresponding aggregated data entries.

Note

With individual patient data you may also perform non-parametric competing risks analyses, e.g., estimating the cumulative event-specific hazards by applying the package mvna or estimating the cumulative incidence function (CIF) by using the package etm. etm is also required as a diagnostic tool in CIFplot that enables to compare parametric and non-parametric CIF estimates.

See Also

[irates](#), [CIFplot](#), [mvna](#), [etm](#)

Examples

```
### Example data:
### Pneumonia on admission in intensive care unit patients

data(sir.adm)

data.reshape(
  times = sir.adm$time,
  events = sir.adm$status,
  covar = sir.adm$pneu,
  no.event.code = "0")

### Example data:
### Bloodstream infections in stem-cell transplanted patients

data(okiss)

data.reshape(
  times = okiss$time,
  events = okiss$status,
  covar = okiss$allo,
  no.event.code = "11")
```

iprop

Event-specific incidence proportions

Description

This function computes event-specific incidence proportions using the competing events incidence rates. Also, corresponding variances and confidence intervals are provided.

Usage

```
iprop(irates, ci.fun = NULL, ci.level = NULL)
```

Arguments

<code>irates</code>	irates object
<code>ci.fun</code>	A character value out of <code>c("lin", "score")</code> that specifies the confidence interval function, either linear or score. If <code>NULL</code> , <code>ci.fun</code> is set to "score"
<code>ci.level</code>	A numerical value between 0 and 1 that specifies the level for the two-sided confidence interval. If <code>NULL</code> , <code>ci.level</code> is inherited from <code>irates</code>

Details

The incidence proportion is defined as the number of new cases of disease in a sample divided by the sample without disease at baseline. It requires complete data. It is a non-parametric statistic, however, it does not account for time at risk.

Value

An object of class `iprop`. This object is implemented as a list of the (besides pre-specified) following items:

<code>ip</code>	Competing events incidence proportions
<code>var</code>	Variance estimates for competing events incidence proportions
<code>conf.lower</code>	Lower confidence interval corresponding to pre-specified function and level
<code>conf.upper</code>	Upper confidence interval corresponding to pre-specified function and level

References

Altman, D., Machin, D., Bryant, T., Gardner, S. (2000) *Statistics with Confidence: Confidence intervals and statistical guidelines*. Second edition. Bristol: BMJ Books.

See Also

[print.iprop](#), [irates](#), [cif](#)

Examples

```
### Example data.frame with aggregated count data
dat <- data.frame(
  times = c(7948,2899),
  no.event = c(6,8),
  event.1 = c(589,68),
  event.2 = c(55,21),
  row.names = c("covar0", "covar1"))

### Compute irates object from dat
ir <- irates(dat)

### Compute incidence proportions from irates object
iprop(ir)
```

irates

Competing events incidence rates

Description

This function computes event-specific incidence rates (a.k.a incidence densities) for competing risks data together with corresponding variances and confidence intervals. Incidence rates can be computed for separate covariate values of one binary or categorical covariate.

Usage

```
irates(data, time.code = NULL, no.event.code = NULL, no.event.lab = NULL, event.lab = NULL, covar.lab
full.sample.lab = "Full sample", ci.level = 0.95, ci.fun = "log")
```

Arguments

<code>data</code>	A <code>data.frame</code> , where columns contain the aggregated observation time (i.e., <code>time.code</code>), censored events (i.e., <code>no.event.code</code>) and aggregated count data for each event type (i.e., <code>event.code</code>); each row corresponds to a certain covariate value
<code>time.code</code>	A character or numerical value that specifies the <code>time.code</code> colname in <code>data</code> . If <code>NULL</code> , <code>time.code</code> is assumed to be the first colname in <code>data</code>
<code>no.event.code</code>	A character or numerical value that specifies the <code>no.event.code</code> colname in <code>data</code> . If <code>NULL</code> , <code>no.event.code</code> is assumed to be the second colname in <code>data</code>
<code>no.event.lab</code>	A character value that specifies a certain label for <code>no.event.code</code> column name in <code>data</code> . If <code>NULL</code> , <code>no.event.lab</code> equals <code>no.event.code</code>
<code>event.lab</code>	A character value (potentially vector with order and length according to order and number of competing events in <code>data</code>) that specifies a certain label for each event code in <code>data</code> . If <code>NULL</code> , <code>event.lab</code> equals the colname for each event code in <code>data</code>
<code>covar.lab</code>	A character value (potentially vector with order and length according to order and number of covariate values in <code>data</code>) that specifies a certain label for each event code (i.e. rowname) in <code>data</code> . If <code>NULL</code> , <code>covar.lab</code> equals the rowname for each covariate code in <code>data</code>
<code>full.sample.lab</code>	A character value that specifies a certain label for the full sample <code>irates</code> from <code>data</code> . Default is set to "Full sample"
<code>ci.level</code>	A numerical value between 0 and 1 that specifies the level for the two-sided confidence interval. Default is set to .95
<code>ci.fun</code>	A character value out of <code>c("lin", "log")</code> that specifies the confidence interval function, either linear or log-transformed. Default is set to "log"

Details

The incidence rate is defined as the number of new cases of disease in a sample divided by the sample-time at risk.

Value

An object of class `irates`. This object is implemented as a list of the (besides pre-specified) following items:

<code>ir</code>	Competing events incidence rates
<code>var</code>	Variance estimates for competing events incidence rates
<code>conf.lower</code>	Lower confidence interval corresponding to pre-specified function and level
<code>conf.upper</code>	Upper confidence interval corresponding to pre-specified function and level

N	Distribution of covariate values at baseline
n	data.frame with counts for each event according to covariate value as well as for the full sample

Note

If individual patient data is available and incidence rates shall be computed, the data can be easily reshaped to the required data.frame format by using the function `data.reshape`

References

Grambauer, N., Schumacher, M., Dettenkofer, M. and Beyersmann, J. (2010) Incidence densities in a competing events setting. *American Journal of Epidemiology* **172**,1077–1084. <http://aje.oxfordjournals.org/lookup/doi/10.1093/aje/kwq246>

See Also

[print.irates](#), [summary.irates](#), [plot.irates](#), [data.reshape](#), [grid](#)

Examples

```
### With individual patient data - sir.adm - using the function data.reshape
data(sir.adm)
dat1 <- data.reshape(
  times = sir.adm$time,
  events = sir.adm$status,
  covar = sir.adm$pneu,
  no.event.code = "0")

### With aggregated count data
dat2 <- data.frame(
  time = c(7948,2899),
  no.event = c(6,8),
  event.1 = c(589,68),
  event.2 = c(55,21),
  row.names = c("covar0", "covar1"))

### Compute incidence rates from dat1 or dat2 (here dat2)
irates(dat2)

### Specify columns with time and no.event information
irates(
  dat2,
  time.code = "time",
  no.event.code = "no.event")

### Set specific labels
irates(
  dat2,
  no.event.lab = "Admission",
  event.lab = c("Discharge", "Death"),
  covar.lab = c("No pneumonia", "Pneumonia"))
```

irates.ratio	<i>Ratio between two event-specific incidence rates</i>
--------------	---

Description

This function computes event-specific incidence rate ratios between two groups. Each group is given by a covariate value.

Usage

```
irates.ratio(irates, covar.code, ci.fun = NULL, ci.level = NULL)
```

Arguments

irates	irates object
covar.code	A vector of character or numerical values that specifies the covariate values in irates to be compared. The vector must contain two values, the order specifies the ratio
ci.fun	A character value out of c("lin", "log") that specifies the confidence interval function, either linear or log-transformed. If NULL, ci.fun is inherited from irates
ci.level	A numerical value between 0 and 1 that specifies the level for the two-sided confidence interval. If NULL, ci.level is inherited from irates

Value

An object of class `irates.ratio`. This object is implemented as a list of the (besides pre-specified) following items:

irr	Competing events incidence rate ratios
var	Variance estimates for competing events incidence rate ratios
conf.lower	Lower confidence interval corresponding to pre-specified function and level
conf.upper	Upper confidence interval corresponding to pre-specified function and level

See Also

[print.irates.ratio](#)

Examples

```
### Example data.frame with aggregated count data
dat <- data.frame(
  times = c(7948, 2899),
  no.event = c(6, 8),
  event.1 = c(589, 68),
  event.2 = c(55, 21),
```

```

row.names = c("covar0", "covar1"))

### Compute irates object from dat
ir <- irates(dat)

### Compute incidence rate ratios from irates object
irates.ratio(
  ir,
  covar.code = c("covar1", "covar0"))

```

okiss

*Bloodstream infections in stem-cell transplanted patients***Description**

A random subsample of 1000 patients from ONKO-KISS, part of the surveillance program of the German National Reference Centre for Surveillance of Hospital-Acquired Infections. Patients have been treated by peripheral blood stem-cell transplantation. After transplantation, patients are neutropenic. Occurrence of bloodstream infection during neutropenia is a severe complication.

Usage

```
data(okiss)
```

Format

A data frame with 1000 observations on the following 4 variables.

time Time of neutropenia until first event in days

status Event status indicator. 1: infection, 2: end of neutropenia, 7: death, 11: censored observation

allo Covariate transplant type indicator: 0: autologous transplants, 1: allogeneic transplants

sex Covariate sex indicator: f: female, m: male

Details

The challenge in this competing risks example is that autologous transplants in fact decreased the number of infections divided by the number of patients (i.e., iprop), but that they also increased the number of infections divided by the number of patient-days (i.e., irates).

Source

Beyersmann J., Dettenkofer M., Bertz H., Schumacher M. (2007) A competing risks analysis of bloodstream infection after stem-cell transplantation using subdistribution hazards and cause-specific hazards. *Statistics in Medicine*, **26**,5360–5369. <http://onlinelibrary.wiley.com/doi/10.1002/sim.3006/abstract>

Grambauer, N., Schumacher, M., Dettenkofer, M. and Beyersmann, J. (2010) Incidence densities in a competing events setting. *American Journal of Epidemiology* **172**,1077–1084. <http://aje.oxfordjournals.org/lookup/doi/10.1093/aje/kwq246>

Examples

```
data(okiss)
```

plot.irates	<i>Comprehensive multi-state graphic for competing risks incidence rates analysis</i>
-------------	---

Description

Function for plotting irates objects. For each covariate value, multistate-type graphics will be displayed, i.e., plots with transition arrows from the initial event to each competing event, where the thickness describes the particular amount of every incidence rate. Full sample graphics might also be plotted.

Usage

```
## S3 method for class 'irates'
plot(x, covar.code = NULL, full.sample = FALSE, n.row = 1, viewport.size = list(w = 3.5, h = 2.5),
     box.size = list(w = NULL, h = NULL), dist = 0.5, irates.vbw = NULL, arrow.maxlwd = 10, display.digits =
     main.gp = gpar(cex = 1.2), ...)
```

Arguments

x	irates object
covar.code	A character or numerical value that specifies the respective covariates value(s) for which the result of irates shall be printed. If NULL, covar.code will be inherited from irates
full.sample	A logical value that specifies if results of irates shall also be printed for the full sample, i.e., irrespective of any covariate value. Default is set to FALSE
n.row	An integer value that specifies the number of rows to display the plots for each covariate value. Default is set to 1
viewport.size	A list with 2 numerical values list(w, h) to set the width (w) and height (h) of the viewport. Default is w= 3.5, h = 2.5
box.size	A list with 2 numerical values list(w, h) to set the width (w) and height (h) of the box(es) for each event. If NULL, w and h will be determined automatically corresponding to the specified event.lab in irates
dist	A numerical value to set the distance between plots in a row. Default is 0.5
irates.vbw	A numerical value to set the width of the background box for the incidence rate values to be displayed. If NULL, irates.vbw will be determined automatically corresponding to display.digits

arrow.maxlwd	A numerical value to set the maximum arrow width for the transition with the highest incidence rate. Default is 10.
display.digits	An integer value specifying the number of decimal place for all incidence rates that shall be plotted. Default is 2
cex	A numerical value giving the amount by which plotting the incidence rate values should be magnified relative to the default
show.values	A logical value specifying if incidence rate values shall be plotted or not. Default is TRUE
mark	A vector of length event.code with logical values specifying if and which transition arrow shall be marked with a certain color. Defaults to NULL
mark.col	The color to be used for marking transition arrows. Defaults to "red"
main	An overall title for the plot
main.dist	A numerical value to set the distance between the overall title and the plots
main.gp	A numerical value giving the amount by which plotting the title values should be magnified relative to the default
...	Further arguments for plot

References

Grambauer, N., Schumacher, M., Dettenkofer, M. and Beyersmann, J. (2010) Incidence densities in a competing events setting. *American Journal of Epidemiology* **172**,1077–1084. <http://aje.oxfordjournals.org/lookup/doi/10.1093/aje/kwq246>

See Also

[irates](#)

Examples

```
#####
### Pneumonia on admission data: sir.adm
data(sir.adm)
agg.sir <- data.reshape(
  times = sir.adm$time,
  events = sir.adm$status,
  covar = sir.adm$pneu,
  no.event.code = "0")

### Compute irates object from dat
ir1 <- irates(agg.sir)

### Plot multistate-type graphic from irates object
plot(ir1)

#####
### Compute irates object with certain labels
ir2 <- irates(
  agg.sir,
```

```

no.event.lab = "Admission",
event.lab = c("Discharge","Death"),
covar.lab = c("No pneumonia","Pneumonia"))

### Plot multistate-type graphic from irates object
plot(ir2)

#####
### ONKO-KISS data: okiss
data(okiss)
### Aggregate individual patient data
agg.okiss <- data.reshape(
  times = okiss$time,
  events = okiss$status,
  covar = okiss$allo,
  no.event.code = "11")

### Plot multistate-type graphic from irates object
plot(irates(agg.okiss,
  no.event.lab = "Neutropenia",
  event.lab = c("Infection","End of\n Neutropenia","Death"),
  covar.lab = c("Autologous","Allogenic")
),
viewport.size = list(w = 4.5, h = 2.5)
)

```

```
print.iprop          Print method for 'iprop' object
```

Description

Print method for an object of class `iprop`. By default it prints all competing events incidence proportions contained in `iprop`. It is also possible to select specific events or covariate values to be printed. Full sample incidence proportions might also be printed.

Usage

```
## S3 method for class 'iprop'
print(x, event.code = NULL, covar.code = NULL, full.sample = FALSE, display.digits = 4, ...)
```

Arguments

<code>x</code>	<code>iprop</code> object
<code>event.code</code>	A character or numerical value that specifies the respective competing events for which the result of <code>iprop</code> shall be printed. If <code>NULL</code> , <code>event.code</code> will be inherited from <code>iprop</code>
<code>covar.code</code>	A character or numerical value that specifies the respective covariates value(s) for which the result of <code>iprop</code> shall be printed. If <code>NULL</code> , <code>covar.code</code> will be inherited from <code>iprop</code>

<code>full.sample</code>	A logical value that specifies if results of <code>iprop</code> shall also be printed for the full sample, i.e., irrespective of any covariate value. Default is set to <code>FALSE</code>
<code>display.digits</code>	An integer value specifying the number of decimal place for all incidence proportions that shall be printed. Default is set to 4
<code>...</code>	Other arguments for print method

Value

No value is returned.

See Also

[iprop](#)

<code>print.irates</code>	<i>Print method for 'irates' object</i>
---------------------------	---

Description

Print method for an object of class `irates`. By default it prints all competing events incidence rates contained in `irates`. It is also possible to select specific events or covariate values to be printed. Full sample incidence rates might also be printed.

Usage

```
## S3 method for class 'irates'
print(x, event.code = NULL, covar.code = NULL, full.sample = FALSE, display.digits = 4, ...)
```

Arguments

<code>x</code>	<code>irates</code> object
<code>event.code</code>	A character or numerical value that specifies the respective competing events for which the result of <code>irates</code> shall be printed. If <code>NULL</code> , <code>event.code</code> will be inherited from <code>irates</code>
<code>covar.code</code>	A character or numerical value that specifies the respective covariates value(s) for which the result of <code>irates</code> shall be printed. If <code>NULL</code> , <code>covar.code</code> will be inherited from <code>irates</code>
<code>full.sample</code>	A logical value that specifies if results of <code>irates</code> shall also be printed for the full sample, i.e., irrespective of any covariate value. Default is set to <code>FALSE</code>
<code>display.digits</code>	An integer value specifying the number of decimal place for all incidence rates that shall be printed. Default is set to 4
<code>...</code>	Other arguments for print method

Value

No value returned.

See Also[irates](#)

print.irates.ratio *Print method for 'irates.ratio' object*

Description

Print method for an object of class `irates.ratio`. By default it prints all competing events incidence rates contained in `irates`. It is also possible to select specific events to be printed.

Usage

```
## S3 method for class 'irates.ratio'  
print(x, event.code = NULL, display.digits = 4, ...)
```

Arguments

<code>x</code>	<code>irates.ratio</code> object
<code>event.code</code>	A character or numerical value that specifies the respective competing events for which the result of <code>irates.ratio</code> shall be printed. If <code>NULL</code> , <code>event.code</code> will be inherited from <code>irates.ratio</code>
<code>display.digits</code>	An integer value that specifies the number of digits that shall be printed. Default is set to 4
<code>...</code>	Other arguments for print method

Value

No value is returned.

See Also[irates.ratio](#)

`sir.adm`*Pneumonia on admission in intensive care unit patients*

Description

Pneumonia status on admission for intensive care unit (ICU) patients, a random sample from the SIR-3 study (also contained in package [mvna](#)).

Usage

```
data(sir.adm)
```

Format

A data frame with 747 observations on the following 4 variables.

`id` Randomly generated patient id

`pneu` Covariate Pneumonia indicator. 0: No pneumonia, 1: Pneumonia

`status` Event status indicator. 0: censored observation, 1: discharged, 2: dead

`time` Follow-up time in days

Source

Beyersmann, J., Gastmeier, P., Grundmann, H., Baerwolff, S., Geffers, C., Behnke, M., Rueden, H., and Schumacher, M. (2006) Use of multistate models to assess prolongation of intensive care unit stay due to nosocomial infection. *Infection Control and Hospital Epidemiology*, **27**,493–499.

See Also

[mvna](#)

Examples

```
data(sir.adm)
```

`summary.irates`*Summary method for 'irates' object*

Description

Summary method for an object of class `irates`. It prints all competing events incidence rates contained in `irates`, including full sample incidence rates. It also prints the baseline covariate characteristics.

Usage

```
## S3 method for class 'irates'  
summary(object, ...)
```

Arguments

object	irates object
...	Further arguments

Value

No value is returned

See Also

[irates](#), [print.irates](#)

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