Package 'nhs.predict'

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Type Package

Title Breast Cancer Survival and Therapy Benefits

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Description Calculate Overall Survival or Recurrence-
Free Survival for breast cancer patients, using 'NHS Predict'.
The time interval for the estimation can be set up to 15 years, with default at 10.
Incremental therapy benefits are estimated for hormone therapy, chemotherapy, trastuzumab, and bisphosphonates.
An additional function, suited for SCAN audits, features a more user-friendly version of the code, with fewer inputs, but necessitates the correct standardised inputs.
This work is not affiliated with the development of 'NHS Predict' and its underlying statistical model.
Details on 'NHS Predict' can be found at: <doi:10.1186/bcr2464>.
The web version of 'NHS Predict': <https://breast.predict.nhs.uk/>.
A small dataset of 50 fictional patient observations is provided for the purpose of running examples with the main two functions,
and an additional dataset is provided for running example with the dedicated SCAN function.

License GPL-2

Encoding UTF-8

LazyData True

RoxygenNote 7.1.0

NeedsCompilation no

Depends R (>= 3.5.0)

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`example_data` *Example patient data*

Description

Example of a brief list of breast cancer patient records with the necessary variables to calculate Predict v2.1 scores.

Usage

```
data(example_data)
```

Format

A dataframe with 50 patient observations and 13 variables.

`os.predict` *os.predict*

Description

Calculates 'NHS Predict' v2.1 Overall survival and therapy benefits

Usage

```
os.predict(
  data,
  year = 10,
  age.start,
  screen,
  size,
  grade,
  nodes,
  er,
  her2,
  ki67,
  generation,
  horm,
  traz,
  bis
)
```

Arguments

data	A dataframe containing patient data with the necessary variables.
year	Numeric, Specify the year since surgery for which the predictions are calculated, ranges between 1 and 15. Default at 10.
age.start	Numeric, Age at diagnosis of the patient. Range between 25 and 85.
screen	Numeric, Clinically detected = 0, Screen detected = 1, Unknown = 2.
size	Numeric, Tumor size in millimeters.
grade	Numeric, Tumor grade. Values: 1,2,3. Missing=9.
nodes	Numeric, Number of positive nodes.
er	Numeric, ER status, ER+ = 1, ER- = 0.
her2	Numeric, HER2 status, HER2+ = 1, HER2- = 0. Unknown = 9.
ki67	Numeric, ki67 status, KI67+ = 1, KI67- = 0, Unknown = 9.
generation	Numeric, Chemotherapy generation. Values: 0,2,3..
horm	Numeric, Hormone therapy, Yes = 1, No = 0.
traz	Numeric, Trastuzumab therapy, Yes = 1, No = 0.
bis	Numeric, Bisphosphonate therapy, Yes = 1, No = 0..

Value

The function attaches additional columns to the dataframe, matched for patient observation, containing Overall survival at the specified year, plus the additional benefit for each type of therapy.

Examples

```
data(example_data)

example_data <- os.predict(example_data,age.start = age,screen = detection,size = t.size,
                    grade = t.grade, nodes = nodes, er = er.status, her2 = her2.status,
                    ki67 = ki67.status, generation = chemo.gen, horm = horm.t,
                    traz = trastuzumab, bis = bis.t)

data(example_data)

example_data <- os.predict(example_data,year = 15, age,detection,t.size,t.grade,
                           nodes,er.status,her2.status,ki67.status,chemo.gen,horm.t,
                           trastuzumab,bis.t)
```

`rfs.predict` *rfs.predict*

Description

Calculates 'NHS Predict' v2.1 Recurrence-free survival and therapy benefits

Usage

```
rfs.predict(
  data,
  year = 10,
  age.start,
  screen,
  size,
  grade,
  nodes,
  er,
  her2,
  ki67,
  generation,
  horm,
  traz,
  bis
)
```

Arguments

`data`	A dataframe containing patient data with the necessary variables.
`year`	Numeric, Specify the year since surgery for which the predictions are calculated, ranges between 1 and 15. Default at 10.
`age.start`	Numeric, Age at diagnosis of the patient. Range between 25 and 85.
`screen`	Numeric, Clinically detected = 0, Screen detected = 1, Unknown = 2.
`size`	Numeric, Tumor size in millimeters.
`grade`	Numeric, Tumor grade. Values: 1,2,3. Missing=9.
`nodes`	Numeric, Number of positive nodes.
`er`	Numeric, ER status, ER+ = 1, ER- = 0.
`her2`	Numeric, HER2 status, HER2+ = 1, HER2- = 0. Unknown = 9.
`ki67`	Numeric, ki67 status, KI67+ = 1, KI67- = 0, Unknown = 9.
`generation`	Numeric, Chemotherapy generation. Values: 0,2,3. If value is missing, default=3.
`horm`	Numeric, Hormone therapy, Yes = 1, No = 0. If value is missing, default= er status.

traz	Numeric, Trastuzumab therapy, Yes = 1, No = 0. If value is missing, default= her2 status.
bis	Numeric, Bisphosphonate therapy, Yes = 1, No = 0. if value is missing, default=1.

Value

The function attaches additional columns to the dataframe, matched for patient observation, containing recurrence-free survival at the specified year, plus the additional benefit for each type of therapy.

Examples

```
data(example_data)

example_data <- rfs.predict(example_data,age.start = age,screen = detection,size = t.size,
                     grade = t.grade, nodes = nodes, er = er.status, her2 = her2.status,
                     ki67 = ki67.status, generation = chemo.gen, horm = horm.t,
                     traz = trastuzumab, bis = bis.t)

data(example_data)

example_data <- rfs.predict(example_data,year = 15, age,detection,t.size,t.grade,
                           nodes,er.status,her2.status,ki67.status,chemo.gen,horm.t,
                           trastuzumab,bis.t)
```

---

scan.predict *scan.predict*

Description

Calculates 'NHS Predict' v2.1 Overall survival and chemotherapy benefits in a simplified version with fewer inputs, suited for SCAN audit.

Usage

```
scan.predict(data, age.start)
```

Arguments

data	A dataframe containing patient data with the necessary variables.Except for age at diagnosis, the other variables must be named according to SCAN
age.start	Numeric, Age at diagnosis of the patient. Range between 25 and 85.

Value

The function attaches additional columns to the dataframe, matched for patient observation, containing Overall survival at the specified year, plus the additional benefit for chemotherapy at 5, 10, and 15 years interval. Observations containing missing values are moved to the bottom.

Examples

```
data(scan_example_data)

scan_example_data <- scan.predict(scan_example_data, age.start = diag_age)
```

`scan_example_data` *Example SCAN patient data*

Description

Example of a brief list of breast cancer patient records with the necessary variables to calculate Predict v2.1 scores, according to coding and naming conventions of SCAN.

Usage

```
data(scan_example_data)
```

Format

A dataframe with 20 patient observations and 8 variables.

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