

Package ‘basil’

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Type Package

Title Survival Prediction for Severe Limb Ischaemia (BASIL Model)

Version 0.1.0

Description Predicts survival for patients with severe limb ischaemia using the prognostic model developed from the Bypass versus Angioplasty in Severe Ischaemia of the Leg (BASIL) trial (Bradbury and others (2010) <[doi:10.1016/j.jvs.2010.01.077](https://doi.org/10.1016/j.jvs.2010.01.077)>). The model is an accelerated failure time Weibull regression. The package is intended for research and audit; it is not a substitute for clinical judgement and its predictions should not be used as the sole basis for clinical decisions.

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Encoding UTF-8

URL <https://github.com/chrislongros/basil>

BugReports <https://github.com/chrislongros/basil/issues>

Suggests tinytest

Config/roxygen2/version 8.0.0

NeedsCompilation no

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basil	<i>BASIL predicted survival</i>
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Description

Predicts the probability of survival at one or more time points for a patient with severe limb ischaemia, using the BASIL trial survival prediction model (Bradbury and others, 2010). The model is an accelerated failure time Weibull regression; coefficients are those of the official BASIL prognostic spreadsheet.

Usage

```
basil(
  age,
  tissue_loss,
  bmi,
  creatinine,
  bollinger,
  smoking,
  mi_angina,
  stroke_tia,
  ankle_pressures_n,
  max_ankle_pressure,
  times = c(0.5, 1, 2),
  shrunk = TRUE
)
```

Arguments

age	Age in years (clamped to 40-95).
tissue_loss	Logical; tissue loss present.
bmi	Body mass index category: "<20", "20-25", "25-30", "30+" or "unknown".
creatinine	Serum creatinine category: "low", "medium", "high" or "missing".
bollinger	Below-knee Bollinger angiogram score category: "<5", ">=5" or "unknown".
smoking	Smoking status: "non", "ex" or "current".
mi_angina	Logical; history of myocardial infarction or angina.
stroke_tia	Logical; history of stroke or transient ischaemic attack.
ankle_pressures_n	Number of below-knee ankle pressures measurable (0, 1, 2 or 3).
max_ankle_pressure	Maximum ankle pressure obtained, mmHg (clamped to 0-200).
times	Numeric vector of times in years at which to return survival (default 0.5, 1 and 2).
shrunk	Logical; if TRUE (default) apply the model's uniform shrinkage, as in the trial's primary output.

Details

Two composite variables are entered as categories rather than raw values, because their derivations are not fully specified in the spreadsheet: creatinine as "low", "medium", "high" or "missing", and bollinger (the below-knee Bollinger angiogram score) as "<5", ">=5" or "unknown". Age is clamped to 40-95 and maximum ankle pressure to 0-200, as in the deployed model.

Value

A named numeric vector of survival probabilities at times, with the linear predictor attached as attribute "lp".

Examples

```
# The BASIL spreadsheet's worked example
basil(age = 80, tissue_loss = TRUE, bmi = "30+", creatinine = "medium",
      bollinger = "<5", smoking = "ex", mi_angina = TRUE, stroke_tia = TRUE,
      ankle_pressures_n = 0, max_ankle_pressure = 0)
```

basil_creatinine_category

Categorise a serum creatinine value for BASIL

Description

Maps a raw serum creatinine value to the category used by the creatinine argument of [basil](#). The cut points are those of the BASIL model (Bradbury and others, 2010): below 88, 88-115, and above 115 $\mu\text{mol/L}$ for low, medium and high, respectively.

Usage

```
basil_creatinine_category(x, units = c("umol", "mgdl"))
```

Arguments

x	Numeric vector of serum creatinine values. NA maps to "missing".
units	Units of x: "umol" (micromoles per litre, the default) or "mgdl" (milligrams per decilitre, converted to $\mu\text{mol/L}$ at 1 mg/dL = 88.4 $\mu\text{mol/L}$ before categorising).

Value

A character vector of "low", "medium", "high" or "missing", suitable for the creatinine argument of [basil](#).

Examples

```
basil_creatinine_category(c(70, 100, 130, NA))
basil_creatinine_category(1.5, units = "mgdl") # 1.5 mg/dL -> 132.6 umol/L -> "high"
```

basil_risk	<i>BASIL predicted survival for a cohort</i>
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Description

Applies [basil](#) to each row of a data frame, appending the linear predictor and the predicted survival at each of times as columns.

Usage

```
basil_risk(data, times = c(0.5, 1, 2), shrunk = TRUE)
```

Arguments

data	A data frame with one row per patient and columns age, tissue_loss, bmi, creatinine, bollinger, smoking, mi_angina, stroke_tia, ankle_pressures_n and max_ankle_pressure.
times	Numeric vector of times in years (default 0.5, 1 and 2).
shrunk	Logical; passed to basil .

Value

data with an lp column and one surv_t<time> column for each entry in times.

Examples

```
patients <- data.frame(
  age = c(80, 65), tissue_loss = c(TRUE, FALSE),
  bmi = c("30+", "20-25"), creatinine = c("medium", "low"),
  bollinger = c("<5", ">=5"), smoking = c("ex", "non"),
  mi_angina = c(TRUE, FALSE), stroke_tia = c(TRUE, FALSE),
  ankle_pressures_n = c(0, 2), max_ankle_pressure = c(0, 80))
basil_risk(patients)
```

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