Package 'icdpicr2'

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Type Package

Title Categorize Injury Diagnosis Codes

Version 2.1.2

Description Functions read a dataframe containing one or more International Classification of Diseases Tenth Revision codes per subject.
They return original data with injury categorizations and severity scores added.

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Encoding UTF-8

LazyData true

Depends R (>= 3.5)

Suggests knitr, rmarkdown

VignetteBuilder knitr

Imports dplyr, stringr, tidyr

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`cat_trauma2` *Categorize trauma data and calculate scores*

Description

This function adds Abbreviated Injury Scores (AIS), Injury Severity Scores (ISS), and other descriptors of injury to a dataframe. For each observation this function will

1. assign a severity (AIS) and ISS body region values to each valid ICD-10 injury diagnosis code,
2. add variables for maximum severity of each body region,
3. calculate ISS, "New ISS", maximum AIS, and regression-based mortality predictions,
4. select the first 4 mechanism (external cause) codes and categorize mechanism and intent following CDC guidelines

Usage

```
cat_trauma2(df, dx_pre, messages = TRUE)
```

Arguments

`df`	A dataframe in wide format containing ICD-10 diagnosis codes with a common column name prefix. Diagnosis codes should be character strings and may have a decimal or not.
`dx_pre`	Prefix for diagnosis code column names (example: dx1, dx2, etc.)
`messages`	Should the program report completion of each step? Must be TRUE or FALSE (default). • TRUE - Messages will report completion of each step (may be helpful for large data sets). • FALSE - Messages will not be reported.

Details

Data should be in wide format, as in the example below:

Value

A dataframe identical to the dataframe passed to the function with the following additional variables added:

- sev_1-sev_n: AIS severity for diagnosis codes 1..n
- issbr_1-issbr_n: ISS body region for diagnosis codes 1..n
- mxaisbr1-mxaisbr6: maximum AIS severity for each of the 6 ISS body regions
- maxais: maximum AIS severity over all ISS body regions
- riss: computed injury severity score

- niss: computed "new injury severity score"
- PmortTQP: TQP model predicted probability of mortality
- PmortNIS: NIS model predicted probability of mortality
- mechcode_1-mechcode_4: first 4 mechanism codes found in each row of data
- mech_1-mech_4: CDC external cause of injury major mechanism for each mechanism code captured
- intent_1-intent_4: intent for each mechanism code captured

Examples

```
df_in <- read.table(header = TRUE, text = "
    ident   dx1       dx2       dx3
    31416   S32110A   S3251     NA
    31417   S72141A   T07XXXA   D62
")
df_out <- cat_trauma2(df_in, "dx", TRUE)
```

`framework` *Categorize ICD-10 injury diagnosis codes similar to the "Barell Matrix" used for ICD-9*

Description

This function categorizes ICD-10 diagnosis codes according to the table given in Hedegaard H, Johnson RL, Garnett MF, Thomas KE. The 2020 International Classification of Diseases, 10th Revision, Clinical Modification injury diagnosis framework for categorizing injuries by body region and nature of injury. Nat Health Stat Reports 2020;150:1-26, and (if option selected) predicts mortality for each subject as described in Clark DE, Ahmad S. Estimating injury severity using the Barell matrix. Inj Prev 2006;12:111-116.

Usage

```
framework(df, dx_pre, severity = FALSE, messages = FALSE)
```

Arguments

`df`	A dataframe in wide format containing ICD-10 diagnosis codes with a common column name prefix. Diagnosis codes should be character strings and may have a decimal or not.
`dx_pre`	Prefix for diagnosis code column names (example: dx1, dx2, etc.)
`severity`	Should the program calculate a severity score? Must be TRUE or FALSE (default). • TRUE - Program will calculate the estimated survival for each diagnosis and the minimum overall.

- FALSE - No severity scores will be calculated.

`messages` Should the program report completion of each step? Must be TRUE or FALSE (default).

- TRUE - Messages will report completion of each step (may be helpful for large data sets).
- FALSE - Messages will not be reported.

Details

Data should be in wide format, as in the example below:

Value

A dataframe identical to the dataframe passed to the function with the following additional variables added:

- cell_1-cell_n: Cell assigned for diagnosis codes 1..n
- PsCell_1-PsCell_n: Survival in TQP and NIS for patients with a diagnosis in this cell
- bPSmin: The minimum of PsCell_1-PsCell_n for this subject

Examples

```
df_in <- read.table(header = TRUE, text = "
    ident   dx1       dx2       dx3
    31416   S32110A   S3251     NA
    31417   S72141A   T07XXXA   D62
")
df_out <- framework(df_in, "dx", TRUE, FALSE)
```

`i10_map_frame` *Table i10_map_frame*

Description

A dataset containing ICD-10 diagnosis codes and their properties for assignment to the CDC Framework.

Usage

```
i10_map_frame
```

Format

A data frame with 20,499 rows and 5 variables:

dx A valid ICD-10 diagnosis code.

cell The corresponding cell in the CDC Framework.

PmCell The observed mortality for subjects with a diagnosis in this cell.

PsCell The observed survival for subjects with a diagnosis in this cell.

version The most recent date when this dataset was revised. Encoded vyymmdd. ...

`i10_map_iciss` *Table i10_map_iciss*

Description

A dataset containing ICD-10 diagnosis codes and their properties for calculation of several versions of the ICD Injury Severity Score (ICISS).

Usage

```
i10_map_iciss
```

Format

A data frame with 20,551 rows and 12 variables:

dx A valid ICD-10 diagnosis code.

digits1234 The 4-digit version of dx.

tot_int The number of cases in international data from which the observed survival was calculated.

dsp_int The observed survival in international data for subjects with this diagnosis.

dsp_int_c Same as above, but NA if tot_int < 5.

tot_TQP The number of cases in TQP data from which the observed survival was calculated.

dsp_TQP The observed survival in TQP data for subjects with this diagnosis.

dsp_TQP_c Same as above, but NA if tot_TQP < 5.

tot_NIS The number of cases in NIS data from which the observed survival was calculated.

dsp_NIS The observed survival in NIS data for subjects with this diagnosis.

dsp_NIS_c Same as above, but NA if tot_NIS < 5.

version The most recent date when this dataset was revised. Encoded vyymmdd. ...

i10_map_mech *Table i10_map_mech*

Description

A dataset containing ICD-10 diagnosis codes and their properties for determination of injury mechanism.

Usage

```
i10_map_mech
```

Format

A data frame with 8,117 rows and 5 variables:

dx A valid ICD-10 diagnosis code.

mechmaj The CDC major mechanism category.

intent The CDC intent category.

mechmin The CDC minor mechanism category, if any.

version The most recent date when this dataset was revised. Encoded vyymmdd. ...

i10_map_sev *Table i10_map_sev*

Description

A dataset containing ICD-10 diagnosis codes and their properties for determination of ISS and other injury severity scores.

Usage

```
i10_map_sev
```

Format

A data frame with 20,551 rows and 8 variables:

dx A valid ICD-10 diagnosis code.

severity The associated Abbreviated Injury Score for this diagnosis.

issbr The associated ISS body region for this diagnosis.

TQIPeffect The coefficient for this diagnosis in the TQP regression model.

TQIPint The intercept in the TQP regression model.

NISeffect The coefficient for this diagnosis in the NIS regression model.

NISint The intercept in the NIS regression model.

version The most recent date when this dataset was revised. Encoded vyymmdd. ...

`iciss` *Compute International Classification of Diseases-Based Injury Severity Score (ICISS)*

Description

This function adds Diagnosis-specific Survival Probabilities (DSP) to a dataframe, based on the table provided by Gedeborg and colleagues (J Trauma Acute Care Surgery 2014) and also TQP and NIS. ICD-10-CM codes longer than four digits are treated as if they were four-digit ICD-10 codes as published by the World Health Organization. Thus, an ICD-10-CM code like S00552A is considered the same as S005. For each observation this function will

1. assign a severity (DSP) to each valid ICD-10 injury diagnosis code,
2. calculate one version of ICISS as the product of these DSP, and
3. calculate another version of ICISS as the minimum of these DSP.
4. It repeats the above using international data, TQP, and NIS as reference data.

Usage

```
iciss(df, dx_pre, conservative = TRUE, messages = TRUE)
```

Arguments

`df`	A dataframe in wide format containing ICD-10 diagnosis codes with a common column name prefix. Diagnosis codes should be character strings and may have a decimal or not.
`dx_pre`	Prefix for diagnosis code column names (example: dx1, dx2, etc.)
`conservative`	Should the program exclude DSP based on fewer than 5 observations? Must be TRUE (default) or FALSE. • TRUE - DSP based on fewer than 5 observations in the reference database will be excluded. • FALSE - DSP based on fewer than 5 observations in the reference database will be included.
`messages`	Should the program report completion of each step? Must be TRUE or FALSE (default). • TRUE - Messages will report completion of each step (may be helpful for large data sets). • FALSE - Messages will not be reported.

Details

Data should be in wide format, as in the example below

Value

A dataframe identical to the dataframe passed to the function with the following additional variables added:

- dsp_int1-dsp_intn: DSP for diagnosis codes 1..n, from international data
- dsp_TQP1-dsp_TQPn: DSP for diagnosis codes 1..n, from TQP data
- dsp_TQP1-dsp_NISn: DSP for diagnosis codes 1..n, from NIS data
- PS_int_prod: ICISS calculated as the product of dsp_int1-dsp_intn
- PS_int_min: ICISS calculated as the minimum of dsp_int1-dsp_intn
- PS_TQP_prod: ICISS calculated as the product of dsp_TQP1-dsp_TQPn
- PS_TQP_min: ICISS calculated as the minimum of dsp_TQP1-dsp_TQPn
- PS_NIS_prod: ICISS calculated as the product of dsp_NIS1-dsp_NISn
- PS_NIS_min: ICISS calculated as the minimum of dsp_NIS1-dsp_NISn

Examples

```
df_in <- read.table(header = TRUE, text = "
    ident   dx1       dx2       dx3
    31416   S32110A   S3251     NA
    31417   S72141A   T07XXXA   D62
")
df_out <- iciss(df_in, "dx", TRUE, FALSE)
```

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testdata *Test Data*

Description

A dataset containing a sample of trauma registry data for use in examples and tests.

Usage

```
testdata
```

Format

A data frame with 20,000 rows and 13 variables:

temp_id A sequential number to identify individual subjects.

died A binary indicator variable for death. 1 = died. 0 = survived.

I10_DX1 1st ICD-10-CM injury code recorded on an encounter.

I10_DX2 2nd ICD-10-CM injury code recorded on an encounter.

I10_DX3 3rd ICD-10-CM injury code recorded on an encounter.

I10_DX4 4th ICD-10-CM injury code recorded on an encounter.

I10_DX5 5th ICD-10-CM injury code recorded on an encounter.

I10_DX6 6th ICD-10-CM injury code recorded on an encounter.

I10_DX7 7th ICD-10-CM injury code recorded on an encounter.

I10_DX8 8th ICD-10-CM injury code recorded on an encounter.

I10_DX9 9th ICD-10-CM injury code recorded on an encounter.

I10_DX10 10th ICD-10-CM injury code recorded on an encounter.

version The most recent date when this dataset was revised. Encoded vyymmdd. ...

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