Package ‘rspiro’

Type Package

Title Implementation of Spirometry Equations

Version 0.4

Date 2023-08-19

Author Theodore Lytras

Maintainer Theodore Lytras <thlytras@gmail.com>


Contains user-friendly functions to calculate predicted and LLN (Lower Limit of Normal) values for different spirometric parameters such as FEV1 (Forced Expiratory Volume in 1 second), FVC (Forced Vital Capacity), etc, and to convert absolute spirometry measurements to percent (%) predicted and z-scores.

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.2.3

Depends R (>= 2.10)

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation no

Repository CRAN

Date/Publication 2023-08-07 12:40:05 UTC
**R topics documented:**

- rspiro-package ................................................. 2
- LLN_GLI ......................................................... 3
- LLN_GLIgl ....................................................... 4
- LLN_NHANES3 .................................................... 5
- pctpred_GLII .................................................... 6
- pctpred_GLIIgl .................................................. 7
- pctpred_NHANES3 ................................................ 8
- pred_GLII ......................................................... 9
- pred_GLIIgl ...................................................... 10
- pred_NHANES3 ................................................... 11
- raw_GLII ......................................................... 12
- raw_GLIIgl ....................................................... 13
- zscore_GLII ..................................................... 14
- zscore_GLIIgl ................................................... 15
- zscore_NHANES3 ................................................ 16

**Index** 19

---

**rspiro-package**

**rspiro: Brief overview of the package**

---

**Description**

R package **rspiro** implements multiple spirometry equations: currently the GLI-2012 (Quanjer) and NHANES III (Hankinson), with potentially more to be added later. It offers a convenient interface to calculate predicted or LLN (Lower Limit of Normal) values given demographic data, or to convert absolute spirometry values to percent (predicted or z-scores).

**Details**

To ensure a consistent interface, package functions are named with a prefix indicating the functionality and a suffix indicating the spirometric equations used, for example `LLN_GLI` calculates Lower Limits of Normal using the GLI-2012 equations. The suffix is currently one of 'GLI' or 'NHANES3'. The prefix is one of 'LLN_', 'pred_', 'pctpred_' or 'zscore_'.

Functions prefixed 'LLN_' or 'pred_' accept as input demographic information (age, gender, height, ethnicity) and calculate the Lower Limit of Normal and the predicted value, respectively, for a given spirometry parameter (FEV1, FVC, etc). Functions prefixed 'pctpred_' or 'zscore_' accept absolute spirometry values (plus demographics) and convert those to percent (z-scores, respectively. Please note the difference between 'pred_' and 'pctpred_' above.

For detailed information, refer to the respective function documentations.

The development version of **rspiro** is available on GitHub [https://github.com/thlytras/rspiro](https://github.com/thlytras/rspiro). To report problems and bugs, or to request a feature, please go there and open an issue. Alternatively, send an email to Theodore Lytras <thlytras@gmail.com>.
### Calculate LLN of spirometry parameters using GLI-2012 equations

This function calculates LLNs (Lower Limits of Normal) for the various spirometry parameters, using the GLI-2012 equations. It accepts as input age, height, gender and ethnicity.

#### Usage

```r
LLN_GLI(age, height, gender = 1, ethnicity = 1, param = "FEV1")
```

#### Arguments

- `age`: Age in years
- `height`: Height in meters
- `gender`: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
- `ethnicity`: Ethnicity (1 = Caucasian, 2 = African-American, 3 = NE Asian, 4 = SE Asian, 5 = Other/mixed). Default is 1.
- `param`: A character vector, containing one of more of the following parameters (case insensitive): "FEV1", "FVC", "FEV1FVC", "FEF2575", "FEF75", "FEV075", "FEV075FVC"

#### Details

Arguments `age`, `height`, `gender` and `ethnicity` are vectors of equal length, or of length one, in which case the value is recycled; if the four vectors are not of equal length, the function stops with an error.

#### Value

If `param` has length one, the function returns a numeric vector. If `param` has length >1, it returns a data.frame with `length(param)` columns.

#### Examples

```r
# Find LLN of FEV1 and FVC for Caucasian women aged 20 to 70 and with a height of 1.70 meters.
LLN_GLI(20:70, 1.7, 2, param=c("FEV1","FVC"))
```
LLN_GLIgl

Calculate LLN of spirometry parameters using GLI global (2022) equations

Description

This function calculates LLNs (Lower Limits of Normal) for the various spirometry parameters, using the GLI global (2022) equations. It accepts as input age, height, gender.

Usage

LLN_GLIgl(age, height, gender = 1, param = "FEV1")

Arguments

age    Age in years
height Height in meters
gender Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
param  A character vector, containing one of more of the following parameters (case insensitive): "FEV1", "FVC", "FEV1/FVC"

Details

Arguments age, height and gender are vectors of equal length, or of length one, in which case the value is recycled; if the four vectors are not of equal length, the function stops with an error.

Value

If param has length one, the function returns a numeric vector. If param has length >1, it returns a data.frame with length(param) columns.

Examples

# Find LLN of FEV1 and FVC for women aged 20 to 70 and with a height of 1.70 meters.
LLN_GLIgl(20:70, 1.7, 2, param=c("FEV1","FVC"))
LLN_NHANES3

Calculate predicted values of spirometry parameters using NHANES III equations

Description

This function calculates LLNs (Lower Limits of Normal) for the various spirometry parameters, using the NHANES III equations. It accepts as input age, height, gender and ethnicity.

Usage

LLN_NHANES3(age, height, gender = 1, ethnicity = 1, param = "FEV1")

Arguments

age  
Age in years

height  
Height in meters

gender  
Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.

ethnicity  
Ethnicity (1 = Caucasian, 2 = African-American, 3 = Mexican-American). Default is 1.

param  
A character vector, containing one of more of the following parameters (case insensitive): "FEV1", "FVC", "FEV1FVC", "PEF", "FEF2575", "FEV6", "FEV1FEV6"

Details

Arguments age, height, gender and ethnicity are vectors of equal length, or of length one, in which case the value is recycled; if the four vectors are not of equal length, the function stops with an error.

Value

If param has length one, the function returns a numeric vector. If param has length >1, it returns a data.frame with length(param) columns.

Examples

# Find LLN of FEV1 and FVC for Caucasian women aged 20 to 70 and with a height of 1.70 meters.
LLN_NHANES3(20:70, 1.7, 2, param=c("FEV1","FVC"))
pctpred_GLI

Convert spirometric values to % predicted using GLI-2012 equations

Description

This function takes absolute spirometry measurements (FEV1, FVC, etc) in Lt plus demographic data (age, height, gender and ethnicity) and converts them to percent (%) predicted based on the GLI-2012 equations.

Usage

pctpred_GLI(
  age,
  height,
  gender = 1,
  ethnicity = 1,
  FEV1 = NULL,
  FVC = NULL,
  FEV1FVC = NULL,
  FEF2575 = NULL,
  FEF75 = NULL,
  FEV075 = NULL,
  FEV075FVC = NULL
)

Arguments

age  Age in years
height Height in meters
gender Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
etnicity Ethnicity (1 = Caucasian, 2 = African-American, 3 = NE Asian, 4 = SE Asian, 5 = Other/mixed). Default is 1.
FEV1 Forced Expiratory Volume in 1 second (lt)
FVC Forced Vital Capacity (lt)
FEV1FVC FEV1 / FVC ratio
FEF2575 Forced Expiratory Flow between 25% and 75% of FVC (lt/s)
FEF75 Forced Expiratory Flow at 75% of FVC (lt/s)
FEV075 Forced Expiratory Volume in 0.75 sec (lt)
FEV075FVC FEV0.75 / FVC ratio
Details
At least one of the spirometric measurement arguments must be set (i.e. be non-NULL). Arguments age, height, gender and ethnicity must be vectors of length equal to the length of the spirometric measurement vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

Value
If only one spirometry argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

Examples
# Random data, 4 patients, one parameter supplied (FEV1)
pctpred_GLIgl(age=seq(25,40,5), height=c(1.8, 1.9, 1.75, 1.85),
              gender=c(2,1,2,1), FEV1=c(3.5, 4, 3.6, 3.9))

pctpred_GLIgl  Convert spirometric values to % predicted using GLI global (2022) equations

Description
This function takes absolute spirometry measurements (FEV1, FVC or FEV1FVC) in lt plus demographic data (age, height, gender and ethnicity) and converts them to percent (%) predicted based on the GLI global (2022) equations.

Usage
pctpred_GLIgl(age, height, gender = 1, FEV1 = NULL, FVC = NULL, FEV1FVC = NULL)

Arguments
- age: Age in years
- height: Height in meters
- gender: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
- FEV1: Forced Expiratory Volume in 1 second (lt)
- FVC: Forced Vital Capacity (lt)
- FEV1FVC: FEV1 / FVC ratio

Details
At least one of the spirometric measurement arguments must be set (i.e. be non-NULL). Arguments age, height and gender must be vectors of length equal to the length of the spirometric measurement vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.
Value

If only one spirometry argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

Examples

# Random data, 4 patients, one parameter supplied (FEV1)
pctpred_GLIsl(age=seq(25,40,5), height=c(1.8, 1.9, 1.75, 1.85),
   gender=c(2,1,2,1), FEV1=c(3.5, 4, 3.6, 3.9))

Description

This function takes absolute spirometry measurements (FEV1, FVC, etc) in lt plus demographic data (age, height, gender and ethnicity) and converts them to percent (%) predicted based on the NHANES III equations.

Usage

pctpred_NHANES3(
   age,
   height,
   gender = 1,
   ethnicity = 1,
   FEV1 = NULL,
   FVC = NULL,
   FEV1FVC = NULL,
   PEF = NULL,
   FEF2575 = NULL,
   FEV6 = NULL,
   FEV1FEV6 = NULL
)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>Age in years</td>
</tr>
<tr>
<td>height</td>
<td>Height in meters</td>
</tr>
<tr>
<td>gender</td>
<td>Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.</td>
</tr>
<tr>
<td>ethnicity</td>
<td>Ethnicity (1 = Caucasian, 2 = African-American, 3 = Mexican-American). Default is 1.</td>
</tr>
<tr>
<td>FEV1</td>
<td>Forced Expiratory Volume in 1 second (lt)</td>
</tr>
</tbody>
</table>
**pred_GLI**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC</td>
<td>Forced Vital Capacity (lt)</td>
</tr>
<tr>
<td>FEV1FVC</td>
<td>FEV1 / FVC ratio</td>
</tr>
<tr>
<td>PEF</td>
<td>Peak Expiratory Flow (lt)</td>
</tr>
<tr>
<td>FEF2575</td>
<td>Forced Expiratory Flow between 25% and 75% of FVC (lt/s)</td>
</tr>
<tr>
<td>FEV6</td>
<td>Forced Expiratory Volume in 6 seconds (lt)</td>
</tr>
<tr>
<td>FEV1FEV6</td>
<td>FEV1 / FEV6 ratio</td>
</tr>
</tbody>
</table>

**Details**

At least one of the spirometric measurement arguments must be set (i.e. be non-NULL). Arguments age, height, gender and ethnicity must be vectors of length equal to the length of the spirometric measurement vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

**Value**

If only one spirometry argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

**Examples**

```r
# Random data, 4 patients, one parameter supplied (FEV1)
pctpred_NHANES3(age=seq(25,40,5), height=c(1.8, 1.9, 1.75, 1.85),
               gender=c(2,1,2,1), FEV1=c(3.5, 4, 3.6, 3.9))
```

**Description**

This function calculates the mean normal (predicted) values for the various spirometry parameters, using the GLI-2012 equations. It accepts as input age, height, gender and ethnicity.

**Usage**

```r
pred_GLI(age, height, gender = 1, ethnicity = 1, param = "FEV1")
```

**Arguments**

- `age`: Age in years
- `height`: Height in meters
- `gender`: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
Calculate predicted values of spirometry parameters using GLI global (2022) equations

**Description**

This function calculates the mean normal (predicted) values for the various spirometry parameters, using the GLI global (2022) equations. It accepts as input age, height and gender.

**Usage**

```r
pred_GLIGl(age, height, gender = 1, param = "FEV1")
```

**Arguments**

- **age**: Age in years
- **height**: Height in meters
- **gender**: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
- **param**: A character vector, containing one of more of the following parameters (case insensitive): "FEV1", "FVC", "FEV1FVC"
**pred_NHANES3**

**Details**

Arguments `age`, `height` and `gender` are vectors of equal length, or of length one, in which case the value is recycled; if the four vectors are not of equal length, the function stops with an error.

**Value**

If `param` has length one, the function returns a numeric vector. If `param` has length >1, it returns a data.frame with `length(param)` columns.

**Examples**

```r
# Find predicted FEV1 and FVC for women aged 20 to 70 and with a height of 1.70 meters.
pred_GL1g1(20:70, 1.7, 2, param=c("FEV1","FVC"))
```

---

**Description**

This function calculates the mean normal (predicted) values for the various spirometry parameters, using the NHANES III equations. It accepts as input age, height, gender and ethnicity.

**Usage**

```r
pred_NHANES3(age, height, gender = 1, ethnicity = 1, param = "FEV1")
```

**Arguments**

- `age`: Age in years
- `height`: Height in meters
- `gender`: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
- `ethnicity`: Ethnicity (1 = Caucasian, 2 = African-American, 3 = Mexican-American). Default is 1.
- `param`: A character vector, containing one of more of the following parameters (case insensitive): "FEV1", "FVC", "FEV1FVC", "PEF", "FEF2575", "FEV6", "FEV1FEV6"

**Details**

Arguments `age`, `height`, `gender` and `ethnicity` are vectors of equal length, or of length one, in which case the value is recycled; if the four vectors are not of equal length, the function stops with an error.
Value

If `param` has length one, the function returns a numeric vector. If `param` has length >1, it returns a data.frame with `length(param)` columns.

Examples

```r
# Find predicted FEV1 and FVC for Caucasian women aged 20 to 70 and with a height of 1.70 meters.
pred_NHANES3(20:70, 1.7, 2, param=c("FEV1","FVC"))
```

---

**raw_GLI**

Convert z-scores back to raw spirometric values using GLI-2012 equations

**Description**

This function takes z-scores based on the GLI-2012 equations, plus demographic data (age, height, gender and ethnicity), and converts them back into absolute spirometry measurements (FEV1, FVC, etc) in lt.

**Usage**

```r
raw_GLI(
  age,
  height,
  gender = 1,
  ethnicity = 1,
  FEV1 = NULL,
  FVC = NULL,
  FEV1FVC = NULL,
  FEF2575 = NULL,
  FEF75 = NULL,
  FEV075 = NULL,
  FEV075FVC = NULL
)
```

**Arguments**

- **age**: Age in years
- **height**: Height in meters
- **gender**: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
- **ethnicity**: Ethnicity (1 = Caucasian, 2 = African-American, 3 = NE Asian, 4 = SE Asian, 5 = Other/mixed). Default is 1.
- **FEV1**: Forced Expiratory Volume in 1 second (z-score)
- **FVC**: Forced Vital Capacity (z-score)
raw_GLIgl

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1FVC</td>
<td>FEV1 / FVC (as z-score)</td>
</tr>
<tr>
<td>FEF2575</td>
<td>Forced Expiratory Flow between 25% and 75% of FVC (z-score)</td>
</tr>
<tr>
<td>FEF75</td>
<td>Forced Expiratory Flow at 75% of FVC (z-score)</td>
</tr>
<tr>
<td>FEV075</td>
<td>Forced Expiratory Volume in 0.75 sec (z-score)</td>
</tr>
<tr>
<td>FEV075FVC</td>
<td>FEV0.75 / FVC (as z-score)</td>
</tr>
</tbody>
</table>

Details

At least one of the spirometric z-score arguments must be set (i.e. be non-NULL). Arguments age, height, gender and ethnicity must be vectors of length equal to the length of the z-score vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

Value

If only one spirometry z-score argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

Examples

```r
# Random data, 4 patients, one z-score parameter supplied (FEV1)
raw_GLI(age=seq(25,40,5), height=c(1.8, 1.9, 1.75, 1.85),
       gender=c(2,1,2,1), FEV1=c(-1.2, -1.9, 0, 0.5))
```

Description

This function takes z-scores based on the GLI global (2022) equations, plus demographic data (age, height and gender), and converts them back into absolute spirometry measurements (FEV1, FVC, or FEV1FVC) in lt.

Usage

```r
raw_GLIgl(age, height, gender = 1, FEV1 = NULL, FVC = NULL, FEV1FVC = NULL)
```

Arguments

- **age**: Age in years
- **height**: Height in meters
- **gender**: Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
- **FEV1**: Forced Expiratory Volume in 1 second (z-score)
- **FVC**: Forced Vital Capacity (z-score)
- **FEV1FVC**: FEV1 / FVC (as z-score)
Details

At least one of the spirometric z-score arguments must be set (i.e. be non-NULL). Arguments age, height and gender must be vectors of length equal to the length of the z-score vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

Value

If only one spirometry z-score argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

Examples

# Random data, 4 patients, one z-score parameter supplied (FEV1)
raw_GLIgl(age=seq(25,40,5), height=c(1.8, 1.9, 1.75, 1.85),
genender=c(2,1,2,1), FEV1=c(-1.2, -1.9, 0, 0.5))

zscore_GLI

Convert spirometric values to z-scores using GLI-2012 equations

Description

This function takes absolute spirometry measurements (FEV1, FVC, etc) in lt plus demographic data (age, height, gender and ethnicity) and converts them to z-scores based on the GLI-2012 equations.

Usage

zscore_GLI(
age,
height,
gender = 1,
ethnicity = 1,
FEV1 = NULL,
FVC = NULL,
FEV1FVC = NULL,
FEF2575 = NULL,
FEF75 = NULL,
FEV075 = NULL,
FEV075FVC = NULL
)
zscore_GLImg

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>Age in years</td>
</tr>
<tr>
<td>height</td>
<td>Height in meters</td>
</tr>
<tr>
<td>gender</td>
<td>Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.</td>
</tr>
<tr>
<td>ethnicity</td>
<td>Ethnicity (1 = Caucasian, 2 = African-American, 3 = NE Asian, 4 = SE Asian, 5 = Other/mixed). Default is 1.</td>
</tr>
<tr>
<td>FEV1</td>
<td>Forced Expiratory Volume in 1 second (lt)</td>
</tr>
<tr>
<td>FVC</td>
<td>Forced Vital Capacity (lt)</td>
</tr>
<tr>
<td>FEV1FVC</td>
<td>FEV1 / FVC</td>
</tr>
<tr>
<td>FEF2575</td>
<td>Forced Expiratory Flow between 25% and 75% of FVC (lt/s)</td>
</tr>
<tr>
<td>FEF75</td>
<td>Forced Expiratory Flow at 75% of FVC (lt/s)</td>
</tr>
<tr>
<td>FEV075</td>
<td>Forced Expiratory Volume in 0.75 sec (lt)</td>
</tr>
<tr>
<td>FEV075FVC</td>
<td>FEV0.75 / FVC</td>
</tr>
</tbody>
</table>

Details

At least one of the spirometric measurement arguments must be set (i.e. be non-NULL). Arguments age, height, gender and ethnicity must be vectors of length equal to the length of the spirometric measurement vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

Value

If only one spirometry argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

Examples

# Random data, 4 patients, one parameter supplied (FEV1)
zscore_GLImg(age=seq(25,40,4), height=c(1.8, 1.9, 1.75, 1.85),
             gender=c(2,1,2,1), ethnicity=rep(1,4), FEV1=c(3.5, 4, 3.6, 3.9))
Usage

\texttt{zscore\_GLI\_gl(age, height, gender = 1, FEV1 = NULL, FVC = NULL, FEV1\_FVC = NULL)}

Arguments

\begin{itemize}
  \item \texttt{age} \hspace{1cm} Age in years
  \item \texttt{height} \hspace{1cm} Height in meters
  \item \texttt{gender} \hspace{1cm} Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
  \item \texttt{FEV1} \hspace{1cm} Forced Expiratory Volume in 1 second (lt)
  \item \texttt{FVC} \hspace{1cm} Forced Vital Capacity (lt)
  \item \texttt{FEV1\_FVC} \hspace{1cm} FEV1 / FVC
\end{itemize}

Details

At least one of the spirometric measurement arguments must be set (i.e. be non-NULL). Arguments \texttt{age}, \texttt{height}, and \texttt{gender} must be vectors of length equal to the length of the spirometric measurement vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

Value

If only one spirometry argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.

Examples

\begin{verbatim}
# Random data, 4 patients, one parameter supplied (FEV1)
zscore\_GLI(age=seq(25,40,4), height=c(1.8, 1.9, 1.75, 1.85),
           gender=c(2,1,2,1), FEV1=c(3.5, 4, 3.6, 3.9))
\end{verbatim}

\hline
\texttt{zscore\_NHANES3} \hspace{1cm} \textit{Convert spirometric values to z-scores using NHANES III equations}
\hline

Description

This function takes absolute spirometry measurements (FEV1, FVC, etc) in lt plus demographic data (age, height, gender and ethnicity) and converts them to z-scores based on the NHANES III equations.
zscore_NHANES3

Usage

zscore_NHANES3(
  age,
  height,
  gender = 1,
  ethnicity = 1,
  FEV1 = NULL,
  FVC = NULL,
  FEV1FVC = NULL,
  PEF = NULL,
  FEF2575 = NULL,
  FEV6 = NULL,
  FEV1FEV6 = NULL
)

Arguments

age  Age in years
height  Height in meters
gender  Gender (1 = male, 2 = female) or a factor with two levels (first = male). Default is 1.
ethnicity  Ethnicity (1 = Caucasian, 2 = African-American, 3 = Mexican-American). Default is 1.
FEV1  Forced Expiratory Volume in 1 second (lt)
FVC  Forced Vital Capacity (lt)
FEV1FVC  FEV1 / FVC ratio
PEF  Peak Expiratory Flow (lt)
FEF2575  Forced Expiratory Flow between 25% and 75% of FVC (lt/s)
FEV6  Forced Expiratory Volume in 6 seconds (lt)
FEV1FEV6  FEV1 / FEV6 ratio

Details

At least one of the spirometric measurement arguments must be set (i.e. be non-NULL). Arguments age, height, gender and ethnicity must be vectors of length equal to the length of the spirometric measurement vector(s), or of length one, in which case their value is recycled. If any input vector is not of equal length, the function stops with an error.

Normal distributions are assumed for all parameters, even though per the NHANES III equations paper (Hankinson et al) this was observed only for FEV1, FVC, PEF and FEV6.

Value

If only one spirometry argument is supplied, the function returns a numeric vector. If more are supplied, the function returns a data.frame with the same number of columns.
Examples

# Random data, 4 patients, one parameter supplied (FEV1)
zscore_NHANES3(age=seq(25,40,4), height=c(1.8, 1.9, 1.75, 1.85),
gender=c(2,1,2,1), ethnicity=rep(1,4), FEV1=c(3.5, 4, 3.6, 3.9))
Index

* package
  rspirö-package, 2

LLN_GLI, 2, 3
LLN_GLIGl, 4
LLN_NHANES3, 5
pctpred_GLI, 6
pctpred_GLIGl, 7
pctpred_NHANES3, 8
pred_GLI, 9
pred_GLIGl, 10
pred_NHANES3, 11

raw_GLI, 12
raw_GLIGl, 13
rspirö (rspirö-package), 2
rspirö-package, 2

zscore_GLI, 14
zscore_GLIGl, 15
zscore_NHANES3, 16