Package 'mapnhanespa'

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Title Map Quantiles for Physical Activity from 'NHANES'

Version 0.3.0

Description Maps physical activity from the National Health and Nutrition Examination Survey ('NHANES') study into population-based quantiles, using the NHANES 2011-2014 step count and physical activity summaries described in Koffman, Crainiceanu, and Muschelli (2025) <doi:10.1249/MSS.0000000000003616>, with minute-level data from Koffman and Muschelli (2025) <doi:10.13026/9n0r-tv02>.

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Encoding UTF-8

Depends R (>= 4.1.0)

LazyData true

LazyDataCompression xz

URL https://github.com/jhuwit/mapnhanespa

BugReports https://github.com/jhuwit/mapnhanespa/issues

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`map_nhanes_pa_quantiles`

Map physical activity values to NHANES population quantiles

Description

`map_nhanes_pa_quantiles()` adds a population-level quantile column and the NHANES age category used for each row to a participant-level data frame. Quantiles are evaluated from NHANES accelerometer cumulative distribution functions stratified by age category, sex/gender, measure, and optionally survey wave. Accepted measure names and their CDF summaries are listed by `nhanes_pa_measure_map()`. Unmapped names return missing quantiles and are listed in a warning.

Usage

```
map_nhanes_pa_quantiles(
  data,
  id = NULL,
  age = "age",
  sex = "sex",
  measure = "measure",
  value = "value",
  wave = NULL,
  age_category = NULL,
  quantile_col = "nhanes_quantile"
)
```

Arguments

`data`	A data frame with one row per participant-measure observation.
`id`	Optional participant identifier column name. The column is checked when supplied, but otherwise left unchanged.
`age`, `sex`, `measure`, `value`	Column names in `data` containing age in years, sex/gender, physical activity measure, and observed value. Set `age = NULL` to use the age-overall CDFs. Set `sex = NULL` to use the sex/gender-overall CDFs. Setting both to `NULL` uses the overall CDF across both dimensions.

wave	Optional NHANES wave column name or scalar value. Supported values are 7, 8, "2011-2012", and "2013-2014". If NULL, the combined wave CDFs are used.
age_category	Optional column name containing NHANES age categories such as "[20,30)" or "Overall". When supplied, it is used instead of age.
quantile_col	Name of the output quantile column.

Value

data with an added quantile column and age_category_pa_map, the NHANES age category used to select the CDF. The category is "Overall" when age = NULL and is taken directly from age_category when supplied.

Examples

```
example_data <- data.frame(
  id = 1:2,
  age = c(25, 62),
  sex = c("Female", "Male"),
  measure = c("mims", "ssl_steps"),
  value = c(15000, 7500)
)

map_nhanes_pa_quantiles(example_data)

map_nhanes_pa_quantiles(example_data, sex = NULL)

map_nhanes_pa_quantiles(example_data, age = NULL, wave = "2011-2012")
map_nhanes_pa_quantiles(example_data, age = NULL, sex = NULL)
```

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nhanes_measure_data *NHANES PA data*

Description

NHANES PA data

Usage

```
nhanes_measure_data
```

Format

A data frame with 87619 rows and 9 variables:

SEQN ID variable

data_release_cycle wave/data release cycle

cat_age age category

gender sex/gender designation

wtmec4yr_adj_norm normalized weight for surveys

masked_variance_pseudo_psu PSU - sampling unit

masked_variance_pseudo_stratum sampling stratum

num_valid_days number of valid days of wear >= 1396 minutes

measure measure that was calculated

value value for the measure

Source

NHANES 2011-2012 and 2013-2014 accelerometer data.

`nhanes_pa_age_category` *Convert ages to NHANES physical activity CDF age categories*

Description

Ages are grouped into 10-year bins from `[0,10)` through `[70,80)`. Ages greater than or equal to 80 are assigned to the oldest available CDF category, `"[80,85)"`. Ages greater than 85 also map to `"[80,85)"`, with a warning by default.

Usage

```
nhanes_pa_age_category(age, warn = TRUE)
```

Arguments

`age`	Numeric age in years.
`warn`	Logical. If `TRUE`, warn when non-missing ages greater than 85 are mapped into the `"[80,85)"` category.

Value

A character vector of NHANES age category labels.

Examples

```
nhanes_pa_age_category(c(8, 25, 84, 90))
```

nhanes_pa_measure_cdf *Select the NHANES CDF for a measure*

Description

Uses the explicit aliases in `nhanes_pa_measure_map()` to select the CDF calculated from the corresponding summary in `nhanes_measure_data`.

Usage

```
nhanes_pa_measure_cdf(
  measure,
  age = NULL,
  sex = NULL,
  wave = NULL,
  age_category = NULL
)
```

Arguments

`measure`	A single supported measure name.
`age`	Age in years, or `NULL` for the overall age CDF.
`sex`	Sex/gender, or `NULL` for the overall sex/gender CDF.
`wave`	Optional NHANES wave (`7`, `8`, `"2011-2012"`, or `"2013-2014"`).
`age_category`	Optional NHANES age category, used instead of `age`.

Value

A CDF function, or `NA_real_` if no CDF is available.

nhanes_pa_measure_map *Supported physical activity measure names*

Description

Returns every accepted measure name and the NHANES summary used to build its CDF. Matching ignores case, spaces, underscores, and punctuation. Measures absent from this table have no supported CDF.

Usage

```
nhanes_pa_measure_map()
```

Value

A data frame with `measure` (accepted name) and `summary` (the measure in `nhanes_measure_data` used for its CDF).

`nhanes_pa_quantile` *Evaluate a single NHANES physical activity quantile*

Description

Evaluate a single NHANES physical activity quantile

Usage

```
nhanes_pa_quantile(
  value,
  age = NULL,
  sex = NULL,
  measure,
  wave = NULL,
  age_category = NULL
)
```

Arguments

`value`	Observed physical activity value.
`age`	Age in years. Set to `NULL` to use the age-overall CDFs. Ignored when `age_category` is supplied.
`sex`	Sex/gender. Common values such as `"M"`, `"male"`, `"F"`, and `"female"` are normalized. Set to `NULL` to use the sex/gender-overall CDFs.
`measure`	Physical activity measure. See `nhanes_pa_measure_map()` for every supported name and its CDF summary.
`wave`	Optional NHANES wave. Supported values are `7`, `8`, `"2011-2012"`, and `"2013-2014"`.
`age_category`	Optional NHANES age category such as `"[20,30)"` or `"Overall"`.

Value

A numeric quantile in `[0, 1]`, or `NA_real_` when no matching CDF is available.

Examples

```
nhanes_pa_quantile(
  value = 15000,
  age = 25,
  sex = "Female",
  measure = "mims"
)

nhanes_pa_quantile(
  value = 15000,
  age = 25,
  sex = NULL,
```

```
  measure = "mims",
  wave = "2013-2014"
)
```

`precompute_nhanes_pa_cdfs` *Precompute and cache NHANES PA CDFs*

Description

Builds every supported CDF combination and stores the result in the internal cache. This covers combined and by-wave CDFs, age-specific and age-overall strata, sex/gender-specific and sex/gender-overall strata, and the overall-overall combination for each supported measure.

Usage

```
precompute_nhanes_pa_cdfs()
```

Value

Invisibly returns a list with the cached combined and by-wave tables.

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