Package 'admiralpeds'

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Type Package

Title Pediatrics Extension Package for ADaM in 'R' Asset Library

Version 0.4.0

Description A toolbox for programming Clinical Data Standards Interchange Consortium (CDISC) compliant Analysis Data Model (ADaM) datasets in R. ADaM datasets are a mandatory part of any New Drug or Biologics License Application submitted to the United States Food and Drug Administration (FDA). Analysis derivations are implemented in accordance with the ``Analysis Data Model Implementation Guide'' (CDISC Analysis Data Model Team, 2021, <https://www.cdisc.org/standards/foundational/adam>). The package is an extension package of the 'admiral' package for pediatric clinical trials.

License Apache License (>= 2)

URL https://pharmaverse.github.io/admiralpeds/, https://github.com/pharmaverse/admiralpeds

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adsl_peds *Subject Level Analysis Dataset-pediatrics*

Description

An updated ADaM ADSL dataset with pediatric patients

Usage

```
adsl_peds
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 5 rows and 35 columns.

cdc_bmiage *CDC BMI-for-age-chart*

Description

BMI-for-age charts, 2 to 20.5 years

Usage

```
cdc_bmiage
```

Format

A data frame with 438 rows and 7 variables:

`SEX` Sex: 1 = male, 2 = female

`AGE` Age in months

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

`Sigma` Sigma

`P95` 95th Percentile

Source

https://www.cdc.gov/growthcharts/percentile_data_files.htm

See Also

Metadata: `cdc_htage`, `cdc_wtage`, `derive_interp_records()`, `who_bmi_for_age_boys`, `who_bmi_for_age_girls`, `who_hc_for_age_boys`, `who_hc_for_age_girls`, `who_lgth_ht_for_age_boys`, `who_lgth_ht_for_age_girls`, `who_wt_for_age_boys`, `who_wt_for_age_girls`, `who_wt_for_lgth_boys`, `who_wt_for_lgth_girls`

cdc_htage *CDC Height-for-age-chart*

Description

Height-for-age charts, 2 to 20 years

Usage

```
cdc_htage
```

Format

A data frame with 436 rows and 5 variables:

`SEX` Sex: 1 = male, 2 = female

`AGE` Age in months

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.cdc.gov/growthcharts/percentile_data_files.htm

See Also

Metadata: `cdc_bmiage`, `cdc_wtage`, `derive_interp_records()`, `who_bmi_for_age_boys`, `who_bmi_for_age_girls`, `who_hc_for_age_boys`, `who_hc_for_age_girls`, `who_lgth_ht_for_age_boys`, `who_lgth_ht_for_age_girls`, `who_wt_for_age_boys`, `who_wt_for_age_girls`, `who_wt_for_lgth_boys`, `who_wt_for_lgth_girls`

cdc_wtage *CDC Weight-for-age-chart*

Description

Weight-for-age charts, 2 to 20 years

Usage

```
cdc_wtage
```

Format

A data frame with 436 rows and 5 variables:

`SEX` Sex: 1 = male, 2 = female

`AGE` Age in months

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.cdc.gov/growthcharts/percentile_data_files.htm

See Also

Metadata: `cdc_bmiage`, `cdc_htage`, `derive_interp_records()`, `who_bmi_for_age_boys`, `who_bmi_for_age_girls`, `who_hc_for_age_boys`, `who_hc_for_age_girls`, `who_lgth_ht_for_age_boys`, `who_lgth_ht_for_age_girls`, `who_wt_for_age_boys`, `who_wt_for_age_girls`, `who_wt_for_lgth_boys`, `who_wt_for_lgth_girls`

`derive_interp_records` *Derive interpolated rows for the CDC charts (>=2 yrs old)*

Description

Derive a linear interpolation of rows for the CDC charts (>=2 yrs old) by age in days for the following parameters: HEIGHT, WEIGHT and BMI

Usage

```
derive_interp_records(dataset, by_vars = NULL, parameter)
```

Arguments

`dataset`	Input metadataset The variables `AGE`, `AGEU`, `SEX`, `L`, `M`, `S` are expected to be in the dataset For BMI the additional variables `P95` and `Sigma` are expected to be in the dataset Note that `AGE` must be in days so that `AGEU` is equal to `"DAYS"` **Permitted values** a dataset, i.e., a `data.frame` or tibble **Default value** none
`by_vars`	Grouping variables The variable from `dataset` which identifies the group of observations to interpolate separately. **Permitted values** list of variables created by `exprs()`, e.g., `exprs(SEX)` **Default value** `NULL`

`parameter` CDC/WHO metadata parameter

Permitted values a character scalar, i.e., a character vector of length one . `"WEIGHT"`, `"HEIGHT"` or `"BMI"` only - Must not be `NULL` e.g. `parameter = "WEIGHT"`, `parameter = "HEIGHT"`, or `parameter = "BMI"`.

Default value none

Value

The input dataset plus additional interpolated records: a record for each day from the minimum age to the maximum age.

If any variables in addition to the expected ones are in the input dataset, LOCF (Last Observation Carried Forward) is applied to populate them for the new records.

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_boys, who_wt_for_lgth_girls

Examples

```
library(dplyr, warn.conflicts = FALSE)
library(rlang, warn.conflicts = FALSE)

cdc_htage <- admiralpeds::cdc_htage %>%
  mutate(
    SEX = case_when(
      SEX == 1 ~ "M",
      SEX == 2 ~ "F",
      TRUE ~ NA_character_
    ),
    # Ensure first that Age unit is "DAYS"
    AGE = round(AGE * 30.4375),
    AGEU = "DAYS"
  )

# Interpolate the AGE by SEX
derive_interp_records(
  dataset = cdc_htage,
  by_vars = exprs(SEX),
  parameter = "HEIGHT"
)
```

`derive_params_growth_age` *Derive Anthropometric indicators (Z-Scores/Percentiles-for-Age) based on Standard Growth Charts*

Description

Derive Anthropometric indicators (Z-Scores/Percentiles-for-Age) based on Standard Growth Charts for Height/Weight/BMI/Head Circumference by Age

Usage

```
derive_params_growth_age(
  dataset,
  sex,
  age,
  age_unit,
  meta_criteria,
  parameter,
  analysis_var,
  bmi_cdc_correction = FALSE,
  who_correction = FALSE,
  set_values_to_sds = NULL,
  set_values_to_pctl = NULL
)
```

Arguments

`dataset` Input dataset

The variables specified in `sex`, `age`, `age_unit`, `parameter`, `analysis_var` are expected to be in the dataset.

Permitted values a dataset, i.e., a `data.frame` or tibble

Default value none

`sex` Sex

Permitted values a character scalar, i.e., a character vector of length one . Expected Values: `M`, `F`.

Default value none

`age` Current Age

Permitted values a numeric scalar, i.e., a numeric vector of length one . Note that this is the actual age at the current visit.

Default value none

`age_unit` Age Unit

Permitted values a character scalar, i.e., a character vector of length one . Expected values: `days`, `weeks`, `months`.
Important: The age unit specified in this parameter must match the age unit in the metadata (`AGEU` variable). The function does NOT automatically convert age units. If mismatches occur between the data and metadata age units, records will not be matched and warnings will be issued.
Age Unit Conversion: If your data and metadata have different age units, you must standardize them before calling this function. The following conversion factors can be used:

- 1 week = 7 days
- 1 month = 30.4375 days
- 1 year = 365.25 days

Example: To convert months to days:

```
dataset <- dataset %>%
  mutate(age_days = if_else(age_unit == "months", age * 30.4375, age))
```

Default value none

`meta_criteria` Metadata dataset

A metadata dataset with the following expected variables: `AGE`, `AGEU`, `SEX`, `L`, `M`, `S`.

The dataset can be derived from CDC/WHO or user-defined datasets. The CDC/WHO growth chart metadata datasets are available in the package and will require small modifications.

If the `age` value from `dataset` falls between two `AGE` values in `meta_criteria`, then the `L`/`M`/`S` values that are chosen/mapped will be the `AGE` that has the smaller absolute difference to the value in `age`. e.g. If dataset has a current age of 27.49 months, and the metadata contains records for 27 and 28 months, the `L`/`M`/`S` corresponding to the 27 months record will be used.

- `AGE` - Age
- `AGEU` - Age Unit (must match the age unit in the input dataset)
- `SEX` - Sex
- `L` - Power in the Box-Cox transformation to normality
- `M` - Median
- `S` - Coefficient of variation

Permitted values a dataset, i.e., a `data.frame` or tibble

Default value none

`parameter` Anthropometric measurement parameter to calculate z-score or percentile

A condition is expected with the input dataset `VSTESTCD`/`PARAMCD` for which we want growth derivations:

e.g. `parameter = VSTESTCD == "WEIGHT"`.

There is CDC/WHO metadata available for Height, Weight, BMI, and Head Circumference available in the `admiralpeds` package.

Permitted values an unquoted condition, e.g., `parameter = VSTESTCD == "WEIGHT"`

Default value none

`analysis_var` Variable containing anthropometric measurement

Permitted values a numeric scalar, i.e., a numeric vector of length one e.g. `AVAL`, `VSSTRESN`.

Default value none

`bmi_cdc_correction`

Extended CDC BMI-for-age correction

CDC developed extended percentiles (>95%) to monitor high BMI values, if set to `TRUE` the CDC's correction is applied.

Permitted values a logical scalar, i.e., a logical vector of length one, i.e. TRUE/FALSE

Default value FALSE

who_correction WHO adjustment for weight-based indicators

WHO constructed a restricted application of the LMS method for weight-based indicators. More details on these exact rules applied can be found at the document page 302 of the WHO Child Growth Standards Guidelines. If set to TRUE the WHO correction is applied.

Permitted values a logical scalar, i.e., a logical vector of length one, i.e. TRUE/FALSE

Default value FALSE

set_values_to_sds

Variables to be set for Z-Scores

The specified variables are set to the specified values for the new observations. For example, set_values_to_sds(exprs(PARAMCD = "BMIASDS", PARAM = "BMI-for-age z-score")) defines the parameter code and parameter.

The formula to calculate the Z-score is as follows:

$$\frac{((\frac{obs}{M})^L - 1)}{L * S}$$

where "obs" is the observed value for the respective anthropometric measure being calculated.

Permitted values List of variable-value pairs .
If left as default value, NULL, then parameter not derived in output dataset.

Default value NULL

set_values_to_pctl

Variables to be set for Percentile

The specified variables are set to the specified values for the new observations. For example, set_values_to_pctl(exprs(PARAMCD = "BMIAPCTL", PARAM = "BMI-for-age percentile")) defines the parameter code and parameter.

Permitted values List of variable-value pairs .
If left as default value, NULL, then parameter not derived in output dataset.

Default value NULL

Details

Age Unit Matching:

This function requires that the age unit (age_unit parameter) in the input dataset matches the age unit (AGEU variable) in the metadata (meta_criteria). The function does NOT perform automatic age unit conversion.

If records from the input dataset cannot be matched to the metadata due to:

- Mismatched age units (e.g., data in days but metadata in months)
- Missing metadata for the specific age/sex combination

a warning (as shown in the example below) will be issued, listing the number of unmatched records. These records will NOT appear in the output dataset.

To resolve age unit mismatches, standardize your data before calling this function.

Value

The input dataset additional records with the new parameter added.

See Also

Vital Signs Functions for adding Parameters/Records: derive_params_growth_height()

Examples

```
library(dplyr, warn.conflicts = FALSE)
library(lubridate, warn.conflicts = FALSE)
library(rlang, warn.conflicts = FALSE)
library(admiral, warn.conflicts = FALSE)
library(pharmaversesdtm, warn.conflicts = FALSE)

advs <- pharmaversesdtm::dm_peds %>%
  select(USUBJID, BRTHDTC, SEX) %>%
  right_join(., pharmaversesdtm::vs_peds, by = "USUBJID") %>%
  mutate(
    VSDT = ymd(VSDTC),
    BRTHDT = ymd(BRTHDTC)
  ) %>%
  derive_vars_duration(
    new_var = AGECUR_D,
    new_var_unit = CURU_D,
    start_date = BRTHDT,
    end_date = VSDT,
    out_unit = "days",
    trunc_out = FALSE
  ) %>%
  derive_vars_duration(
    new_var = AGECUR_M,
    new_var_unit = CURU_M,
    start_date = BRTHDT,
    end_date = VSDT,
    out_unit = "months",
    trunc_out = FALSE
  ) %>%
  mutate(
    AGECUR = if_else(AGECUR_D >= 365.25 * 2, AGECUR_M, AGECUR_D),
    AGECURU = if_else(AGECUR_D >= 365.25 * 2, CURU_M, CURU_D)
  )

# metadata is in months
cdc_meta_criteria <- admiralpeds::cdc_htage %>%
  mutate(
    age_unit = "months",
    SEX = if_else(SEX == 1, "M", "F")
  )

# metadata is in days
who_meta_criteria <- bind_rows(
```

```
    (admiralpeds::who_lgth_ht_for_age_boys %>%
      mutate(
        SEX = "M",
        age_unit = "days"
      )
    ),
    (admiralpeds::who_lgth_ht_for_age_girls %>%
      mutate(
        SEX = "F",
        age_unit = "days"
      )
    )
  ) %>%
    rename(AGE = Day)

  criteria <- bind_rows(
    cdc_meta_criteria,
    who_meta_criteria
  ) %>%
    rename(AGEU = age_unit)

  derive_params_growth_age(
    advs,
    sex = SEX,
    age = AGECUR,
    age_unit = AGECURU,
    meta_criteria = criteria,
    parameter = VSTESTCD == "HEIGHT",
    analysis_var = VSSTRESN,
    set_values_to_sds = exprs(
      PARAMCD = "HGTSDS",
      PARAM = "Height-for-age z-score"
    ),
    set_values_to_pctl = exprs(
      PARAMCD = "HGTPCTL",
      PARAM = "Height-for-age percentile"
    )
  )
```

`derive_params_growth_height` *Derive Anthropometric indicators (Z-Scores/Percentiles-for-Height/Length) based on Standard Growth Charts*

Description

Derive Anthropometric indicators (Z-Scores/Percentiles-for-Height/Length) based on Standard Growth Charts for Weight by Height/Length

Usage

```
derive_params_growth_height(
  dataset,
  sex,
  height,
  height_unit,
  meta_criteria,
  parameter,
  analysis_var,
  who_correction = FALSE,
  set_values_to_sds = NULL,
  set_values_to_pctl = NULL
)
```

Arguments

dataset	Input dataset The variables specified in sex, height, height_unit, parameter, analysis_var are expected to be in the dataset. **Permitted values** a dataset, i.e., a data.frame or tibble **Default value** none
sex	Sex **Permitted values** a character scalar, i.e., a character vector of length one . Expected values: M, F. **Default value** none
height	Current Height/length **Permitted values** a numeric scalar, i.e., a numeric vector of length one . Note that this is the actual height/length at the current visit. **Default value** none
height_unit	Height/Length Unit **Permitted values** a character scalar, i.e., a character vector of length one . Expected values: cm. **Default value** none
meta_criteria	Metadata dataset A metadata dataset with the following expected variables: HEIGHT_LENGTH, HEIGHT_LENGTHU, SEX, L, M, S The dataset can be derived from WHO or user-defined datasets. The WHO growth chart metadata datasets are available in the package and will require small modifications. Datasets who_wt_for_lgth_boys/who_wt_for_lgth_girls are applicable for subject age < 730.5 days. If the height value from dataset falls between two HEIGHT_LENGTH values in meta_criteria, then the L/M/S values that are chosen/mapped will be the HEIGHT_LENGTH that has the smaller absolute difference to the value in height.

e.g. If dataset has a current age of 50.49 cm, and the metadata contains records for 50 and 51 cm, the L/M/S corresponding to the 50 cm record will be used.

- HEIGHT_LENGTH - Height/Length
- HEIGHT_LENGTHU - Height/Length Unit
- SEX - Sex
- L - Power in the Box-Cox transformation to normality
- M - Median
- S - Coefficient of variation

Permitted values a dataset, i.e., a data.frame or tibble

Default value none

parameter

Anthropometric measurement parameter to calculate z-score or percentile

A condition is expected with the input dataset VSTESTCD/PARAMCD for which we want growth derivations:

e.g. parameter = VSTESTCD == "WEIGHT".

There is WHO metadata available for Weight available in the admiralpeds package. Weight measures are expected to be in the unit "kg".

Permitted values an unquoted condition, e.g., parameter = VSTESTCD == "WEIGHT"

Default value none

analysis_var

Variable containing anthropometric measurement

Permitted values a numeric scalar, i.e., a numeric vector of length one e.g. AVAL, VSSTRESN.

Default value none

who_correction

WHO adjustment for weight-based indicators

WHO constructed a restricted application of the LMS method for weight-based indicators. More details on these exact rules applied can be found at the document page 302 of the WHO Child Growth Standards Guidelines. If set to TRUE the WHO correction is applied.

Permitted values a logical scalar, i.e., a logical vector of length one, i.e. TRUE/FALSE

Default value FALSE

set_values_to_sds

Variables to be set for Z-Scores

The specified variables are set to the specified values for the new observations. For example, set_values_to_sds(exprs(PARAMCD = "WGTHSDS", PARAM = "Weight-for-height z-score")) defines the parameter code and parameter.

The formula to calculate the Z-score is as follows:

$$\frac{((\frac{obs}{M})^L - 1)}{L * S}$$

where "obs" is the observed value for the respective anthropometric measure being calculated.

Permitted values List of variable-value pairs .

If left as default value, NULL, then parameter not derived in output dataset.

Default value NULL

set_values_to_pctl

Variables to be set for Percentile

The specified variables are set to the specified values for the new observations. For example, set_values_to_pctl(exprs(PARAMCD = "WGTHPCTL", PARAM = "Weight-for-height percentile")) defines the parameter code and parameter.

Permitted values List of variable-value pairs .

If left as default value, NULL, then parameter not derived in output dataset.

Default value NULL

Value

The input dataset additional records with the new parameter added.

See Also

Vital Signs Functions for adding Parameters/Records: derive_params_growth_age()

Examples

```
library(dplyr, warn.conflicts = FALSE)
library(lubridate, warn.conflicts = FALSE)
library(rlang, warn.conflicts = FALSE)
library(admiral, warn.conflicts = FALSE)
library(pharmaversesdtm, warn.conflicts = FALSE)

# derive weight for height/length only for those under 2 years old using WHO
# weight for length reference file
advs <- pharmaversesdtm::dm_peds %>%
  select(USUBJID, BRTHDTC, SEX) %>%
  right_join(., pharmaversesdtm::vs_peds, by = "USUBJID") %>%
  mutate(
    VSDT = ymd(VSDTC),
    BRTHDT = ymd(BRTHDTC)
  ) %>%
  derive_vars_duration(
    new_var = AAGECUR,
    new_var_unit = AAGECURU,
    start_date = BRTHDT,
    end_date = VSDT,
    out_unit = "days"
  )

heights <- pharmaversesdtm::vs_peds %>%
  filter(VSTESTCD == "HEIGHT") %>%
  select(USUBJID, VSSTRESN, VSSTRESU, VSDTC) %>%
  rename(
    HGTTMP = VSSTRESN,
    HGTTMPU = VSSTRESU
  )
```

```
advs <- advs %>%
  right_join(., heights, by = c("USUBJID", "VSDTC"))

advs_under2 <- advs %>%
  filter(AAGECUR < 730.5)

who_under2 <- bind_rows(
  (admiralpeds::who_wt_for_lgth_boys %>%
    mutate(
      SEX = "M",
      height_unit = "cm"
    )
  ),
  (admiralpeds::who_wt_for_lgth_girls %>%
    mutate(
      SEX = "F",
      height_unit = "cm"
    )
  )
) %>%
  rename(
    HEIGHT_LENGTH = Length,
    HEIGHT_LENGTHU = height_unit
  )

derive_params_growth_height(
  advs_under2,
  sex = SEX,
  height = HGTTMP,
  height_unit = HGTTMPU,
  meta_criteria = who_under2,
  parameter = VSTESTCD == "WEIGHT",
  analysis_var = VSSTRESN,
  who_correction = TRUE,
  set_values_to_sds = exprs(
    PARAMCD = "WGTHSDS",
    PARAM = "Weight-for-height/length z-score"
  ),
  set_values_to_pctl = exprs(
    PARAMCD = "WGTHPCTL",
    PARAM = "Weight-for-height/length percentile"
  )
)
```

`who_bmi_for_age_boys` *WHO BMI-for-age for boys*

Description

WHO BMI-for-age charts for boys from day 0 (birth) to day 1856

Usage

```
who_bmi_for_age_boys
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/toolkits/child-growth-standards/standards/body-mass-index-for-age-bmi-for-age

See Also

Metadata: `cdc_bmiage`, `cdc_htage`, `cdc_wtage`, `derive_interp_records()`, `who_bmi_for_age_girls`, `who_hc_for_age_boys`, `who_hc_for_age_girls`, `who_lgth_ht_for_age_boys`, `who_lgth_ht_for_age_girls`, `who_wt_for_age_boys`, `who_wt_for_age_girls`, `who_wt_for_lgth_boys`, `who_wt_for_lgth_girls`

---

who_bmi_for_age_girls *WHO BMI-for-age for girls*

Description

WHO BMI-for-age charts for girls from day 0 (birth) to day 1856

Usage

```
who_bmi_for_age_girls
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/toolkits/child-growth-standards/standards/body-mass-index-for-age-bmi-for-age

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_boys, who_wt_for_lgth_girls

---

who_hc_for_age_boys *WHO Head circumference-for-age for boys*

Description

WHO Head circumference-for-age charts for boys from day 0 (birth) to day 1856

Usage

```
who_hc_for_age_boys
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/toolkits/child-growth-standards/standards/head-circumference-for-age

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_boys, who_wt_for_lgth_girls

who_hc_for_age_girls *WHO Head circumference-for-age for girls*

Description

WHO Head circumference-for-age charts for girls from day 0 (birth) to day 1856

Usage

```
who_hc_for_age_girls
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/toolkits/child-growth-standards/standards/head-circumference-for-age

See Also

Metadata: `cdc_bmiage`, `cdc_htage`, `cdc_wtage`, `derive_interp_records()`, `who_bmi_for_age_boys`, `who_bmi_for_age_girls`, `who_hc_for_age_boys`, `who_lgth_ht_for_age_boys`, `who_lgth_ht_for_age_girls`, `who_wt_for_age_boys`, `who_wt_for_age_girls`, `who_wt_for_lgth_boys`, `who_wt_for_lgth_girls`

who_lgth_ht_for_age_boys *WHO Length/height-for-age for boys*

Description

WHO Length/height-for-age charts for boys from day 0 (birth) to day 1856

Usage

```
who_lgth_ht_for_age_boys
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/tools/child-growth-standards/standards/length-height-for-age

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_boys, who_wt_for_lgth_girls

---

`who_lgth_ht_for_age_girls`

WHO Length/height-for-age for girls

Description

WHO Length/height-for-age charts for girls from day 0 (birth) to day 1856

Usage

```
who_lgth_ht_for_age_girls
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/tools/child-growth-standards/standards/length-height-for-age

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_boys, who_wt_for_lgth_girls

who_wt_for_age_boys *WHO Weight-for-age for boys*

Description

WHO Weight-for-age charts for boys from day 0 (birth) to day 1856

Usage

```
who_wt_for_age_boys
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/tools/child-growth-standards/standards/weight-for-age

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_girls, who_wt_for_lgth_boys, who_wt_for_lgth_girls

who_wt_for_age_girls *WHO Weight-for-age for girls*

Description

WHO Weight-for-age charts for girls from day 0 (birth) to day 1856

Usage

```
who_wt_for_age_girls
```

Format

A data frame with 1857 rows and 4 variables:

`Day` Age in days

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/tools/child-growth-standards/standards/weight-for-age

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_lgth_boys, who_wt_for_lgth_girls

---

who_wt_for_lgth_boys *WHO Weight-for-length for boys*

Description

WHO Weight-for-length charts for boys from 45cm to 110cm

Usage

```
who_wt_for_lgth_boys
```

Format

A data frame with 651 rows and 4 variables:

`Length` Length in cm

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/tools/child-growth-standards/standards/weight-for-length-height

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_girls

who_wt_for_lgth_girls *WHO Weight-for-length for girls*

Description

WHO Weight-for-length charts for girls from 45cm to 110cm

Usage

```
who_wt_for_lgth_girls
```

Format

A data frame with 651 rows and 4 variables:

`Length` Length in cm

`L` Box-Cox transformation for normality

`M` Median

`S` Coefficient of variation

Source

https://www.who.int/tools/child-growth-standards/standards/weight-for-length-height

See Also

Metadata: cdc_bmiage, cdc_htage, cdc_wtage, derive_interp_records(), who_bmi_for_age_boys, who_bmi_for_age_girls, who_hc_for_age_boys, who_hc_for_age_girls, who_lgth_ht_for_age_boys, who_lgth_ht_for_age_girls, who_wt_for_age_boys, who_wt_for_age_girls, who_wt_for_lgth_boys

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