

# Package ‘physiology’

August 29, 2016

**Title** Calculate Physiological Characteristics of Adults and Children

**Version** 0.2.2

**Date** 2015-01-03

**Description** A variety of formulae are provided for estimation of height, weight and fluid compartments of adults and children. Each formula is referenced to the original publication. Warnings can be given for estimation based on input data outside of normal ranges. Future functions will cover more material with a focus on anaesthesia, critical care and peri-operative medicine.

**URL** <https://github.com/jackwasey/physiology>

**Depends** R (>= 3.0.2)

**Suggests** ggplot2, reshape2, testthat, knitr

**License** GPL-3

**BugReports** <https://github.com/jackwasey/physiology/issues>

**VignetteBuilder** knitr

**Author** Jack O. Wasey [aut, cre]

**Maintainer** Jack O. Wasey <jack@jackwasey.com>

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2015-01-06 19:49:31

## R topics documented:

physiology-package . . . . .	2
adj_weight_adult . . . . .	2
age_from_dates . . . . .	2
blood_vol_Nadler . . . . .	3
bmi_adult . . . . .	4
bsa_adult . . . . .	5
ideal_weight_Straub . . . . .	6
<b>Index</b>	<b>7</b>

---

physiology-package     *physiology*

---

### Description

physiology

---

adj\_weight\_adult     *adjusted body weight*

---

### Description

returns ideal weight + 40 actual weights. Ideal weight is calculated using default algorithm. TODO: is downward adjustment valid?

### Usage

```
adj_weight_adult(heightm, weightkg, male)
```

### Arguments

heightm	single numeric, height in meters
weightkg	weight in kg, may be a vector
male	logical value(s) whether patient is male. TRUE or FALSE.

### Examples

```
adj_weight_adult(1.6, 120, male = FALSE)
```

---

age\_from\_dates     *age from birth and reference dates*

---

### Description

age from birth and reference dates

### Usage

```
age_from_dates(birth.date, ref.date = Sys.Date(), unit = c("year", "day"))
```

**Arguments**

birth.date	Date of birth, either as a Date or something which will be converted to a Date
ref.date	Date at which to calculate age, defaults to current date, either as a Date or something which will be converted to a Date
unit	character of length, one of "year" or "day".

**Value**

integer vector

**Examples**

```
age_from_dates("2014-11-08", "2014-12-31", unit = "day")
age_from_dates("1981-07-09", "2014-06-29", unit = "year")
```

---

blood_vol_Nadler	<i>Estimate Blood Volume</i>
------------------	------------------------------

---

**Description**

estimate blood volume according to the classic 1960s paper by Nadler. Surgery. 1962 Feb;51(2):224-32. Prediction of blood volume in normal human adults. Nadler SB, Hidalgo JH, Bloch T.

This effectively reverses engineers an ideal weight from BMI of 22, then use the square root of its ratio to actual body weight to adjust the 70ml/kg of an ideal weight person. Age-dependent regression equations for indexed blood volume (InBV) at ideal body weight. (No adjustment made in obesity by Lemmens.)  $InBV = 90 - 0.4 \times \text{age}$  (males)  $InBV = 85 - 0.4 \times \text{age}$  (females). Sounds like he is saying either they are slim and old or younger and obese. he doesn't attempt to integrate the formulae.

TODO: include age as cut-off between the use of differing formulae.

applies to slim adults, but note that the age-related decline is not seen if high degree of physical activity is maintained. TODO: check BMI not elevated

**Usage**

```
blood_vol_Nadler(heightm, weightkg, male, warn = FALSE)
```

```
blood_vol_lemmens_sedentary(heightm, weightkg)
```

```
blood_vol_lemmens_indexed(heightm, weightkg)
```

```
blood_vol_lemmens_non_obese(weightkg, age, male)
```

**Arguments**

heightm	single numeric, height in meters
weightkg	numeric vector of weight(s) in kg
male	logical
warn	single logical, if TRUE, will produce warnings for very unrealistic physical measurements, and other minor problems
age	years

**Details**

Davy KP, Seals DR. Total blood volume in healthy young and older men. J Appl Physiol 1994; 76: 2059-62.

Parker-Jones P, Davy KP, DeSouza CA et al. Absence of age-related decline in total blood volume in physically active females. Am J Physiol 1997; 272: H2534-40.

**Value**

numeric vector

**Examples**

```
blood_vol_Nadler(1.8, 80, male = TRUE)
blood_vol_Nadler(1.8, 160, male = TRUE)
blood_vol_Nadler(1.8, 80, male = FALSE)
blood_vol_lemmens_sedentary(1.8, 80)
blood_vol_lemmens_sedentary(1.8, 160)
blood_vol_lemmens_indexed(1.8, 80)
blood_vol_lemmens_indexed(1.8, 160)
blood_vol_lemmens_non_obese(80, age = 25, male = TRUE)
  blood_vol_lemmens_non_obese(80, age = 75, male = TRUE)
```

---

bmi\_adult

*Body Mass Index (BMI) for adults*


---

**Description**

Body Mass Index (BMI) for adults

**Usage**

```
bmi_adult(heightm, weightkg)
```

```
bmi_adult_ins_lbs(heightin, weightlb)
```

**Arguments**

heightm	single numeric, height in meters
weightkg	numeric vector of weight(s) in kg
heightin	height in inches
weightlb	weight in pounds

**Examples**

```
bmi_adult(1.6, 120)
bmi_adult(2, 75)
bmi_adult_ins_lbs(72, 200)
```

---

bsa_adult	<i>Estimate body surface area of an adult</i>
-----------	---

---

**Description**

bsa\_adult Estimate body surface area of an adult using  $\sqrt{wt*ht}/6$  TODO: reference for this.

**Usage**

```
bsa_adult(heightm, weightkg)
```

**Arguments**

heightm	single numeric, height in meters
weightkg	numeric vector of weight(s) in kg

**Value**

numeric vector

**Examples**

```
bsa_adult(2, 80)
bsa_adult(1.5, 80)
```

---

ideal\_weight\_Straub    *ideal weight for child per Straub*

---

### Description

<http://www.ncbi.nlm.nih.gov/pubmed/6823980> 2.396e0.01863(ht), where height is in cm. There is an argument for using another package to capture durations, of which age is a special case. However, I am resisting bringing in external dependencies, and for almost all use-cases I can imagine, the age will be captured as a single number of one type, not a mix of types. Note that gender does not appear to be important in this relationship.

See package AGD for CDC growth chart data.

### Usage

```
ideal_weight_Straub(heightm, age.years = NULL, age.months = NULL,
  age.days = NULL, warn = FALSE)
```

### Arguments

heightm	single numeric, height in meters
age.years	numeric vector, age(s) in years
age.months	numeric vector, age(s) in months
age.days	numeric vector, age(s) in days
warn	single logical, if TRUE, will produce warnings for very unrealistic physical measurements, and other minor problems

### Source

<http://www.ncbi.nlm.nih.gov/pubmed/6823980>

### Examples

```
# will warn if given age is not in validate range from publication:
## Not run:
  ideal_weight_child(0.5, age.years = 0, warn = TRUE)
  ideal_weight_child(0.8, age.months = 11, warn = TRUE)
  ideal_weight_child(0.5, age.days = 25, warn = TRUE)

## End(Not run)
  ideal_weight_child(0.5, age.days = 25, warn = FALSE)
  ideal_weight_child(1, age.years = 2)
  ideal_weight_child(0.75, age.months = 15)
```

# Index

\*Topic **misc**

    physiology-package, 2

\*Topic **utilities**

    physiology-package, 2

adj\_weight\_adult, 2

age\_from\_dates, 2

blood\_vol\_lemmens\_indexed  
    (blood\_vol\_Nadler), 3

blood\_vol\_lemmens\_non\_obese  
    (blood\_vol\_Nadler), 3

blood\_vol\_lemmens\_sedentary  
    (blood\_vol\_Nadler), 3

blood\_vol\_Nadler, 3

bmi\_adult, 4

bmi\_adult\_ins\_lbs (bmi\_adult), 4

bsa\_adult, 5

ideal\_weight\_Straub, 6

physiology (physiology-package), 2

physiology-package, 2