

# Package ‘kidney.epi’

March 4, 2020

**Title** Kidney Functions: Clinical and Epidemiological

**Version** 1.2.0

**Maintainer** Boris Bikbov <boris@bikbov.ru>

**Description** Contains kidney care oriented functions.

Current version contains functions for calculation of:

- Kidney Donor Risk Index and Kidney Donor Profile Index for kidney transplant donors by Rao et al. (2009) <doi:10.1097/TP.0b013e3181ac620b>.

- Estimated glomerular filtration rate by CKD-EPI, MDRD and other equations.

Citation: Bikbov B. R open source programming code for calculation of the Kidney Donor Profile Index and Kidney Donor Risk Index. *Kidney Diseases* (2018) 4:269–272 <doi:10.1159/000492427> (the only citation for the whole package).

**Depends** R (>= 3.4.0)

**License** LGPL (>= 2)

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**NeedsCompilation** no

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egfr.ckdepi

*CKD-EPI*

**Description**

CKD-EPI

**Usage**

```
egfr.ckdepi(creatinine, age, sex, ethnicity,
  creatinine_units = "micromol/L",
  label_afroamerican = c("Afroamerican"), label_sex_male = c("Male",
  1), label_sex_female = c("Female", 0))
```

**Arguments**

creatinine	Numeric vector. Serum creatinine, could be expressed in "micromol/L", "mmol/L" or "mg/dL". Units of measurement should be defined in variable creatinine_units (if not defined explicitly by user, the default value is "micromol/L").
age	Numeric vector. Age, in years.
sex	Vector. The value of variable refers to the parameters label_sex_male and label_sex_female.
ethnicity	Vector. Ethnicity, specify in case of African-American patients. The value of variable refers to the parameter label_afroamerican.

creatinine\_units  
Character string. Units in which serum creatinine is expressed. Could be one of the following: "micromol/L", "mmol/L" or "mg/dL".

label\_afroamerican  
List. Label(s) for Afroamerican ethnicity.

label\_sex\_male  
List. Label(s) for definition(s) of male sex.

label\_sex\_female  
List. Label(s) for definition(s) of female sex.

## Details

Calculate estimated glomerular filtration rate (eGFR) by CKD-EPI equation Reference to the equation: Levey AS, Stevens LA, Schmid CH et al. A New Equation to Estimate Glomerular Filtration Rate. *Ann Intern Med* 2009;150:604–12.

Programming: Boris Bikbov <boris@bikbov.ru>. Citation: Bikbov B. R open source programming code for calculation of the Kidney Donor Profile Index and Kidney Donor Risk Index. *Kidney Diseases*, 2018. DOI: 10.1159/000492427 (citation for the whole package)

## Value

numeric eGFR expressed in ml/min/1.73m<sup>2</sup>.

## Examples

```
egfr.ckdepi (creatinine = 1.4, age = 60, sex = "Male", ethnicity = "White",
  creatinine_units = "mg/dl")
```

---

egfr.mdrd4	<i>Calculate estimated glomerular filtration rate (eGFR) by different equations</i>
------------	---

---

## Description

MDRD

## Usage

```
egfr.mdrd4(creatinine, age, sex, ethnicity,
  creatinine_units = "micromol/l", creatinine_method = "non-IDMS",
  label_afroamerican = c("Afroamerican"), label_sex_male = c("Male",
  1), label_sex_female = c("Female", 0))
```

**Arguments**

<code>creatinine</code>	Numeric vector. Serum creatinine, could be expressed in "micromol/L", "mmol/L" or "mg/dL". Units of measurement should be defined in variable <code>creatinine_units</code> (if not defined explicitly by user, the default value is "micromol/L").
<code>age</code>	Numeric vector. Age, in years.
<code>sex</code>	Vector. The value of variable refers to the parameters <code>label_sex_male</code> and <code>label_sex_female</code> .
<code>ethnicity</code>	Vector. Ethnicity, specify in case of African-American patients. The value of variable refers to the parameter <code>label_afroamerican</code> .
<code>creatinine_units</code>	Character string. Units in which serum creatinine is expressed. Could be one of the following: "micromol/L", "mmol/L" or "mg/dL".
<code>creatinine_method</code>	Character string. Creatinine standardisation method in a laboratory. Could be either "IDMS" or "non-IDMS". If not explicitly defined by user, the default assumption is "non-IDMS".
<code>label_afroamerican</code>	List. Label(s) for Afroamerican ethnicity.
<code>label_sex_male</code>	List. Label(s) for definition(s) of male sex.
<code>label_sex_female</code>	List. Label(s) for definition(s) of female sex.

**Details**

Calculate estimated glomerular filtration rate (eGFR) by MDRD equation. Reference to the equation: Levey AS, Coresh J, Greene T, et al. Using standardized serum creatinine values in the modification of diet in renal disease study equation for estimating glomerular filtration rate. *Annals of Internal Medicine* 2006;145:247–54.

Programming: Boris Bikbov <boris@bikbov.ru>. Citation: Bikbov B. R open source programming code for calculation of the Kidney Donor Profile Index and Kidney Donor Risk Index. *Kidney Diseases*, 2018. DOI: 10.1159/000492427 (citation for the whole package)

**Value**

numeric eGFR expressed in ml/min/1.73m<sup>2</sup>.

**Examples**

```
egfr.mdrd4 (creatinine = 1.4, age = 60, sex = "Male", ethnicity = "White",
  creatinine_units = "mg/dl")
```

---

egfr.schwartz	<i>Schwartz (for children only)</i>
---------------	-------------------------------------

---

### Description

Schwartz (for children only)

### Usage

```
egfr.schwartz(creatinine, age, sex, height_cm = 0, height_ft = 0,
              height_inch = 0, creatinine_units = "micromol/l",
              equation_type = "classic", label_sex_male = c("Male", 1),
              label_sex_female = c("Female", 0))
```

### Arguments

creatinine	Numeric vector. Serum creatinine, could be expressed in "micromol/L", "mmol/L" or "mg/dL". Units of measurement should be defined in variable creatinine_units (if not defined explicitly by user, the default value is "micromol/L").
age	Numeric vector. Age, in years. Age does not accounted in Schwartz equation, but used in the function to check whether Schwartz equation could be applied to a given patient.
sex	Vector. The value of variable refers to the parameters label_sex_male and label_sex_female. Required only in case of quadratic Schwartz equation.
height_cm	Numeric vector. Could be defined either as height_cm if is measured in cm, or as height_ft and height_inch if is measured in feet and inches. If the parameter height_cm is greater than 0, the function uses cm, otherwise - feet and inches.
height_ft	see height_cm
height_inch	see height_cm
creatinine_units	Character string. Units in which serum creatinine is expressed. Could be one of the following: "micromol/L", "mmol/L" or "mg/dL".
equation_type	Character string. Define whether to calculate eGFR either by classic Schwartz or quadratic Schwartz equation. Could be one of the following: "classic", "quadratic". If not explicitly defined by user, the default assumption is "classic".
label_sex_male	List. Label(s) for definition(s) of male sex.
label_sex_female	List. Label(s) for definition(s) of female sex.

**Details**

Calculate estimated glomerular filtration rate (eGFR) by Schwartz equation Reference to the equation: Gao A, Cachat F, Faouzi M et al. Comparison of the glomerular filtration rate in children by the new revised Schwartz formula and a new generalized formula. *Kidney International* 2013;83:524–30.

Programming: Boris Bikbov <boris@bikbov.ru>. Citation: Bikbov B. R open source programming code for calculation of the Kidney Donor Profile Index and Kidney Donor Risk Index. *Kidney Diseases*, 2018. DOI: 10.1159/000492427 (citation for the whole package)

**Value**

numeric eGFR expressed in ml/min/1.73m<sup>2</sup>.

**Examples**

```
egfr.schwartz (creatinine = 1.4, age = 10, height_cm = 90, sex = "Male",
  creatinine_units = "mg/dl")
egfr.schwartz (creatinine = 1.4, age = 10, height_cm = 90, sex = "Male",
  creatinine_units = "mg/dl", equation_type = "quadratic")
```

---

kidney.epi

*Kidney functions for R: clinical and epidemiological*

---

**Description**

Package contains different functions for use in the field of kidney disease and general epidemiology Current version contains functions for calculation of estimated GFR by different equations, and calculation of KDPI and KDRI for kidney transplant donors. More functions are coming soon.

---

ktx

*Sample dataset with kidney transplant patients.*

---

**Description**

A dataset containing 10 records for kidney transplant patients, including information for deceased donors.

**Usage**

ktx

**Format**

A data frame with 10 rows and 12 variables:

**ptid** patient identifier  
**rec.age** age of the recipient, in years  
**don.age** age of the donor, in years  
**don.height** height of the donor, in cm  
**don.weight** weight of the donor, in kg  
**don.ethnicity** ethnicity of the donor  
**don.hypertension** history of hypertension for the donor  
**don.diabetes** history of diabetes for the donor  
**don.causeofdeath** cause of death for the donor  
**don.creatinine** serum creatinine of the donor, in mg/dL  
**don.hcv** hepatitis c virus status of the donor  
**don.dcdstatus** donation after circulatory death status of the donor  
**don.sex** sex of the donor

**Source**

Generation from different patients' records

---

ktx.kdpi.optn

*Calculate KDRI and KDPI for deceased kidney donor*


---

**Description**

Calculate KDRI and KDPI for deceased kidney donor

**Usage**

```
ktx.kdpi.optn(age, height_cm = 0, height_ft = 0, height_inch = 0,
  weight_kg = 0, weight_lb = 0, ethnicity, hypertension, diabetes,
  causeofdeath, creatinine, hcv, dcdstatus,
  creatinine_units = "micromol/l", return_output_type = "KDPI",
  mapping_values_year = "latest",
  label_afroamerican = c("Afroamerican"),
  label_hypertension_positive = c("yes"),
  label_hypertension_unknown = "NA",
  label_diabetes_positive = c("yes"), label_diabetes_unknown = "NA",
  label_causeofdeath = c("cva"), label_hcv_positive = c("positive"),
  label_hcv_unknown = "NA", label_dcdstatus = c("yes"))
```

**Arguments**

age	Numeric vector. Age, in years.
height_cm	Numeric vector. Could be defined either as height_cm if is measured in cm, or as height_ft and height_inch if is measured in feet and inches. If the parameter height_cm is greater than 0, the function uses cm, otherwise - feet and inches.
height_ft	see height_cm
height_inch	see height_cm
weight_kg	Numeric vector. Could be defined either as weight_kg if measured in kg, or as weight_lb if is measured in pounds. If the parameter weight_kg is greater than 0, the function uses kg, otherwise - pounds.
weight_lb	see weight_kg
ethnicity	Vector. Ethnicity, specify in case of African-American donors which have special coefficient in the regression equation. The value of variable refers to the parameter label_afroamerican.
hypertension	Vector. History of hypertension, specify in case of hypertensive donors which have special coefficient in the regression equation. The value of variable refers to the parameters label_hypertension_positive and label_hypertension_unknown.
diabetes	Vector. History of diabetes, specify in case of donors with diabetes which have special coefficient in the regression equation. The value of variable refers to the parameters label_diabetes_positive and label_diabetes_unknown.
causeofdeath	Vector. Cause of death, specify whether death was due to cerebrovascular disease, or other reasons.
creatinine	Numeric vector. Serum creatinine, could be expressed in "micromol/L", "mmol/L" or "mg/dL". Units of measurement should be defined in variable creatinine_units (if not defined explicitly by user, the default value is "micromol/L").
hcv	Vector. Hepatitis C virus status. The value of variable refers to the parameters label_hcv_positive and label_hcv_unknown.
dcdstatus	Vector. Donation after circulatory death status. Specify whether organ was from a donor after circulatory death or not. The value of variable refers to the parameter label_dcdstatus.
creatinine_units	Character string. Units in which serum creatinine is expressed. Could be one of the following: "micromol/L", "mmol/L" or "mg/dL".
return_output_type	Character string. Specify which calculated parameter to return from the function: "KDRI_Rao" - Raw Kidney Donor Risk Index, "KDRI_median" - scaled to the median Kidney Donor Risk Index, or "KDPI" - Kidney Donor Profile Index.
mapping_values_year	Numeric value or character string. Specify which year to take for the OPTN mapping table, as well as KDRI scaling factor and chances of hypertension and diabetes in case if they were unknown for donor. By default the value is "latest", and the function takes the latest available OPTN mapping table and coefficients from the internal dataframes ktx.kdpi_mapping_table and ktx.kdpi_coefficients_table.



But if necessary, a user could define the exact year (i.e. `mapping_values_year = 2015`).

For a list of available years run the following: `ktx.kdpi.optn.show.years()`.

`label_afroamerican`

List. Label(s) for Afroamerican ethnicity.

`label_hypertension_positive`

List. Label(s) for a positive history of hypertension.

`label_hypertension_unknown`

List. Label(s) for donors with unknown history of hypertension.

`label_diabetes_positive`

List. Label(s) for a positive history of diabetes.

`label_diabetes_unknown`

List. Label(s) for donors with unknown history of diabetes.

`label_causeofdeath`

List. Label(s) for a cause of death due to cerebrovascular/stroke.

`label_hcv_positive`

List. Label(s) for a positive HCV status.

`label_hcv_unknown`

List. Label(s) for an unknown, not done, indeterminate, or pending HCV status.

`label_dcdstatus`

List. Label(s) for a donor after circulatory death status.

## Details

Calculate Kidney Donor Risk Index (KDRI) and Kidney Donor Profile Index (KDPI) based on the algorithm of US Organ Procurement and Transplantation Network. The Kidney Donor Profile Index (KDPI) is a numerical measure that combines ten donor factors to summarize into a single number the quality of deceased donor kidneys relative to other recovered kidneys. *KDRI could be calculated only for a deceased donor!*

More reading:

- [OPTN web-based calculator](#)
- [Guide to calculating and interpreting KDPI](#)
- [Latest data for mapping table, scaling factor, etc](#)

Programming: Boris Bikbov <[boris@bikbov.ru](mailto:boris@bikbov.ru)>.

Citation: Bikbov B. R open source programming code for calculation of the Kidney Donor Profile Index and Kidney Donor Risk Index. *Kidney Diseases*, 2018. DOI: 10.1159/000492427

## Value

numeric One of the following values based on the `return_output_type` argument: Raw Kidney Donor Risk Index (KDRI), Scaled to the median Kidney Donor Risk Index (KDRI), or Kidney Donor Profile Index (KDPI).

**Examples**

```

ktx.kdpi.optn (age = 60, height_cm = 168, weight_kg = 93, ethnicity = "White",
  hypertension = "yes", diabetes = "no", causeofdeath = "roadinjury",
  creatinine = 1.4, hcv = "negative", dcdstatus = "no",
  creatinine_units = "mg/dl", return_output_type = "KDRI_Rao")
ktx.kdpi.optn (age = 30, height_cm = 176, weight_kg = 82, ethnicity = "White",
  hypertension = "NA", diabetes = "no", causeofdeath = "roadinjury",
  creatinine = 150, hcv = "negative", dcdstatus = "no", return_output_type = "KDPI")

```

---

```
ktx.kdpi.optn.show.years
```

*Shows which years are available in the R package for the OPTN mapping table, KDRI scaling factor, etc.*

---

**Description**

Shows which years are available in the R package for the OPTN mapping table, KDRI scaling factor, etc.

**Usage**

```
ktx.kdpi.optn.show.years()
```

**Details**

Service function which shows for user for which year(s) the OPTN mapping table, as well as KDRI scaling factor and chances of hypertension and diabetes in case if they were unknown for donor in the `ktx.kdpi_mapping_table` and `ktx.kdpi_coefficients_table`. This years could be used for the argument `mapping_values_year` of the `ktx.kdpi.optn` function.

This function has no arguments.

**Value**

numeric List of years which could be used for the argument `mapping_values_year` of the `ktx.kdpi.optn` function.

---

```
service.check_obligatory_params
```

*Check whether all obligatory parameters of a given function are present.*

---

**Description**

Check whether all obligatory parameters of a given function are present.

**Usage**

```
service.check_obligatory_params(fx_params, args,
  predefined_result = TRUE)
```

**Arguments**

fx_params	List. List of parameters required by function.
args	List. Arguments transferred to the function upon user call.
predefined_result	Logical. Required only in case if other checks were performed in the main script and the result of this check has to be processed to the function. For example, if in the parent script I've checked the presence of height parameter, and it is absent (while is obligatory), I transfer this info in the "predefined_result = FALSE", so in the function the fx_params_resulting become False and will lead to stop().

**Details**

Check whether all obligatory parameters of a given function are present.

Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

Character string. Returns a messages and stops function if any of the obligatory parameters are absent.

**Examples**

```
# could be run only inside function wich receives some parameters
# fx_params <- c("creatinine", "age", "ethnicity", "sex")
# args <- names(as.list(match.call())[-1])
# service.check_obligatory_params(fx_params, args)
```

---

```
service.check_params_numeric
```

*Check whether the following variables are numeric and stop function if at least one of them is not numeric*

---

**Description**

Check whether the following variables are numeric and stop function if at least one of them is not numeric

**Usage**

```
service.check_params_numeric(...)
```

**Arguments**

... Argument list. Argument list (arbitrary number of variables) with data to check.  
nothing to return

**Details**

Check whether the following variables are numeric and stop function if at least one of them is not numeric. Service function that will not be exported to user.

Programming: Boris Bikbov <boris@bikbov.ru>.

---

service.check\_param\_arguments

*Check the argument of a given parameter which set by user and stop function if the value set by user is not among the possible values of the argument*

---

**Description**

Check the argument of a given parameter which set by user and stop function if the value set by user is not among the possible values of the argument

**Usage**

```
service.check_param_arguments(param2check, possible_params,
    custom_message = "")
```

**Arguments**

param2check List, Character string, Number. Parameter used in a function.

possible\_params

List. List of possible values of the parameter arguments

custom\_message Character string. Custom message to be output. If not defined, the standart output message is provided. nothing to return

**Details**

Check the argument of a given parameter whichset by user and stop function if the value set by user is not among the possible values of the argument. Service function that will not be exported to user.

Programming: Boris Bikbov <boris@bikbov.ru>.

---

`service.check_param_number`

*Check number of parameters and stop function if it exceeds the expected number of parameters*

---

**Description**

Check number of parameters and stop function if it exceeds the expected number of parameters

**Usage**

```
service.check_param_number(param2check, acceptable_number = 1,  
    custom_message = "")
```

**Arguments**

`param2check` List, Character string, Number. Parameter used in a function.  
`acceptable_number` Numeric. Acceptable number of arguments in the list `param2check` (by default is "1")  
`custom_message` Character string. Custom message to be output. If not defined, the standart output message is provided. nothing to return

**Details**

Check number of parameters and stop function if it exceeds the expected number of parameters. Service function that will not be exported to user.

Programming: Boris Bikbov <boris@bikbov.ru>.

---

`service.check_plausibility.age`

*Service functions for data check on biological plausibility and bio-chemistry conversion which could be applied in any function of the package or externally*

---

**Description**

Check and modify if necessary the age values.

**Usage**

```
service.check_plausibility.age(age)
```

**Arguments**

`age` Numeric. The value to be checked.

**Details**

Service function which check whether age is in biologically plausible boundaries, shows to user warnings if any, and substitute unplausible values.

**Value**

numeric Vector with controlled values.

---

service.check\_plausibility.creatinine

*Check and modify if necessary the creatinine values.*

---

**Description**

Check and modify if necessary the creatinine values.

**Usage**

```
service.check_plausibility.creatinine(creatinine)
```

**Arguments**

creatinine      Numeric. The value to be checked.

**Details**

Service function which check whether creatinine is in biologically plausible boundaries, shows to user warnings if any, and substitute unplausible values.

**Value**

numeric Vector with controlled values.

---

service.convert\_creatinine

*Convert creatinine values if necessary (depending on the measurement units).*

---

**Description**

Convert creatinine values if necessary (depending on the measurement units).

**Usage**

```
service.convert_creatinine(creatinine, creatinine_units)
```

**Arguments**

creatinine        Numeric. The creatinine value from data set.  
creatinine\_units        Character. Creatinine measurement units defined by user.

**Details**

Service function which check measurement units and convert creatinine values if necessary.

**Value**

numeric Vector with converted values.

---

service.count\_greater\_threshold  
*Count how many values are greater than the defined threshold.*

---

**Description**

Count how many values are greater than the defined threshold.

**Usage**

```
service.count_greater_threshold(x, threshold)
```

**Arguments**

x                    the vector to be checked.  
threshold            numeric the threshold to compare with.

**Details**

Count how many values are greater than the defined threshold.

Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

numeric returns number of numeric values greater or equal to the threshold.

**Examples**

```
myvals <- c(1, 8, -5, "oggi", NA)  
myvals2 <- service.count_greater_threshold(myvals, 0)  
myvals2 # 2
```

```
service.count_lowerequal_threshold
```

*Count how many values are less or equal than the defined threshold.*

---

### Description

Count how many values are less or equal than the defined threshold.

### Usage

```
service.count_lowerequal_threshold(x, threshold)
```

### Arguments

x                    the vector to be checked.  
threshold            numeric the threshold to compare with.

### Details

Count how many values are less or equal than the defined threshold.

Programming: Boris Bikbov <boris@bikbov.ru>.

### Value

numeric returns number of numeric values less or equal to the threshold.

### Examples

```
myvals <- c(1, 8, -5, "oggi", NA)
myvals2 <- service.count_lowerequal_threshold(myvals, 0)
myvals2 # 1
```

---

```
service.is.param_possible
```

*Service functions for data check which could be applied in any function of the package or externally*

---

### Description

Service functions for data check which could be applied in any function of the package or externally

### Usage

```
service.is.param_possible(param2check, possible_params)
```



**Arguments**

param2check      Numeric value or character string. The single value to be verified.  
 possible\_params      Vector. The vector of values which contains all possible values.

**Details**

Verifies whether the single value is among the values of the vector. Function is useful to check whether the argument of the function defined by the user is among the possible arguments recognized inside the function.

Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

logic returns TRUE if argument param2check is found in possible values possible\_params, and FALSE if it is not.

**Examples**

```
possible_params = c("KDPI", " KDRI_Rao", "KDRI_median")
service.is.param.possible("KDZO", possible_params) # return FALSE
service.is.param.possible("KDPI", possible_params) # return TRUE
```

---

service.is\_numeric      *Check whether a vector is numeric.*

---

**Description**

Check whether a vector is numeric.

**Usage**

```
service.is_numeric(x)
```

**Arguments**

x                      the vector to be checked.

**Details**

Check whether a vector is numeric.

Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

logic whether vector x is numeric or not.

service.output\_message

*Produce message for warning or cat*

---

### Description

Produce message for warning or cat

### Usage

```
service.output_message(x, custom_phrase, warning_type)
```

### Arguments

x	Numeric. The value to be checked (usually a counter of some variable).
custom_phrase	Character string. Custom message to be inserted in the middle of standard message.
warning_type	Character string. The type of message: warning (with substitution to NA) or cat (with leave as is).

### Details

Produce message that is used by warning or cat in the ktx.kdpi.optn function. Service function that will not be exported to user, and used only in the ktx.kdpi.optn function.

Programming: Boris Bikbov <boris@bikbov.ru>.

### Value

Character string. Returns a phrase.

---

service.singular\_or\_plural

*Form output message in singular or plural.*

---

### Description

Form output message in singular or plural.

### Usage

```
service.singular_or_plural(x, singular, plural)
```

**Arguments**

x	Numeric. The value to be checked (usually a counter of some variable).
singular	Character string. The value to be returned in case of singular form (usually a string, but could be any type).
plural	Character string. The value to be returned in case of plural form (usually a string, but could be any type).

**Details**

Provide different output for constructing messages in singular or plural.

Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

Character string. Returns a value for constructing messages in singular or plural form.

**Examples**

```
service.singular_or_plural(1, "This value was", "These values were") # "This value was"
service.singular_or_plural(99, "This value was", "These values were") # "These values were"
```

---

```
service.strict_to_numeric_threshold_greater
      Select only numeric values lower than defined threshold
```

---

**Description**

Select only numeric values lower than defined threshold

**Usage**

```
service.strict_to_numeric_threshold_greater(x, threshold)
```

**Arguments**

x	the vector to be checked.
threshold	numeric the threshold to compare with.

**Details**

Select only numeric values lower than defined threshold, and substitute other values with NA.

Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

numeric returns only numeric values lower than threshold.

**Examples**

```
myvals <- c(1, 8, -5, "oggi", NA)
# return to myvals2 only numeric values lower than threshold (3 in this case)
# substitute non-numeric or negative values with NA
myvals2 <- service.strict_to_numeric_threshold_greater(myvals, 3)
myvals2 # 1, NA, -5, NA, NA
```

---

```
service.strict_to_numeric_threshold_lower
```

*Select only numeric values greater than defined threshold.*

---

**Description**

Select only numeric values greater than defined threshold.

**Usage**

```
service.strict_to_numeric_threshold_lower(x, threshold)
```

**Arguments**

x	the vector to be checked.
threshold	numeric the threshold to compare with.

**Details**

Select only numeric values greater than defined threshold, and substitute other values with NA.  
Programming: Boris Bikbov <boris@bikbov.ru>.

**Value**

numeric returns only numeric values greater than threshold.

**Examples**

```
myvals <- c(1, 8, -5, "oggi", NA)
# return to myvals2 only numeric values greater than defined threshold (0 in this case)
# and substitute non-numeric or negative values with NA
myvals2 <- service.strict_to_numeric_threshold_lower(myvals, 0)
myvals2 # 1, 8, NA, NA, NA
```

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