

# Package ‘PKreport’

February 19, 2015

**Title** A reporting pipeline for checking population pharmacokinetic model assumption

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**Depends** R (>= 2.7.0), methods, lattice, ggplot2

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**Description** PKreport aims to 1) provide automatic pipeline for users to visualize data and models. It creates a flexible R framework with automatically generated R scripts to save time and cost for later usage; 2) implement an archive-oriented management tool for users to store, retrieve and modify figures. 3) offer powerful and convenient service to generate high-quality graphs based on two R packages: lattice and ggplot2.

**License** GPL (>= 2)

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PKreport-package	<i>An automatically pipeline for population pharmacokinetic models</i>
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## Description

This package provides an automatically pipeline, an R package called PKreport, for population pharmacokinetic models to test model assumptions, visualize data and diagnose models.

## Details

Package: PKreport  
 Type: Package  
 Version: 1.0  
 Date: 2010-06-28  
 License: GNU license

## Author(s)

Xiaoyong Sun Maintainer: johnsunx1<johnsunx1@gmail.com>

## Examples

```
# setup configuration
general.list <- list(save.format="bmp", width = 480, height = 480, package=2)
hist.list <- list(type=c("count"), layout=c(1,1), ind.layout=c(5,5))
scatter.list <- list(span=0.25, type=c("p", "smooth"), layout=c(1,1), ind.layout=c(5,5))

var.name <- list(ID="ID", DV="CONC", TIME="TIME", PRED="PRED", RES="RES",
WRES="WRES", IPRE="IPRE", IDV=c("CLCR", "WT"), COV=c("WT", "AGE"),
ETA=c("ETA1", "ETA2"), PARA=c("CL", "V"))

data(pdata)
# PKdata(data=pdata, match.term=var.name)

# PKconfig(general.list, hist.list, scatter.list)
# PKfigure(pdata, 1)
# PKshow()
# PKclean()
```

---

non.coi-methods

*Output coi file*

---

## Description

Methods for function non.coi in Package 'PKreport'

## Methods

**object = "nonmem"** Access coi content in the file.coi slot.

---

non.cor-methods

*Output cor file*

---

## Description

Methods for function non.cor in Package 'PKreport'

## Methods

**object = "nonmem"** Access cor content in the file.cor slot.

---

non.cov-methods      *Output cov file*

---

### Description

Methods for function non.cov in Package 'PKreport'

### Methods

**object = "nonmem"** Access cov content in the file.cov slot.

---

non.lst-methods      *Output lst content*

---

### Description

Methods for function non.lst in Package 'PKreport'

### Methods

**object = "nonmem"** Access lst content in the file.lst slot.

---

non.lst.meth-methods      *output method in lst file*

---

### Description

Methods for function non.lst.meth in Package 'PKreport'

### Methods

**object = "nonmem"** Access method section (\#meth tag) in the file.lst slot.

---

non.lst.objs-methods      *Output objective function standard deviation in lst file*

---

### Description

Methods for function non.lst.objs in Package 'PKreport'

### Methods

**object = "nonmem"** Access objective function standard deviation (\#OBS tag) in the file.lst slot.

---

non.lst.objt-methods    *Output objective function in lst file*

---

**Description**

Methods for function non.lst.objt in Package 'PKreport'

**Methods**

**object = "nonmem"** Access objective function (\#OBJT tag) in the file.lst slot.

---

non.lst.objv-methods    *Output objective function value in lst file*

---

**Description**

Methods for function non.objv in Package 'PKreport'

**Methods**

**object = "nonmem"** Access objective function value (\#OBJV tag) in the file.lst slot.

---

non.lst.term-methods    *output analysis section in lst file*

---

**Description**

Methods for function non.lst.term in Package 'PKreport'

**Methods**

**object = "nonmem"** Access analysis section (\#TERM, \#TERE tag) in the file.lst slot.

---

non.phi-methods        *Output phi file*

---

**Description**

Methods for function non.phi in Package 'PKreport'

**Methods**

**object = "nonmem"** Access phi content in the file.coi slot.

---

non.select-methods      *Output selected lines in lst files*

---

### Description

Methods for function non.select in Package 'PKreport'

### Methods

**object = "nonmem"** output the selected lines in lst files.

---

non.tab-methods      *Output tab content in tab file*

---

### Description

Methods for function non.tab in Package 'PKreport'

### Methods

**object = "nonmem"** Access tab content in the file.tab slot.

---

nonmem-class      *Class nonmem: contain and describe all nonmem output*

---

### Description

This is a class representation for nonmem output.

### Objects from the Class

Objects can be created by calls of the form `new("nonmem", output.lst, output.tab, output.dir, delim, ...)`.

This creates a nonmem object containing all nonmem output.

**Slots**

- `file.cov`: Object of class "list". This list includes title (character) and data (data.frame) for cov file.
- `file.cor`: Object of class "list". This list includes title (character) and data (data.frame) for cor file.
- `file.coi`: Object of class "list". This list includes title (character) and data (data.frame) for coi file.
- `file.phi`: Object of class "list". This list includes title (character) and data (data.frame) for phi file.
- `file.lst`: Object of class "character". This character vector contains the information from NONMEM lst file.
- `method`: Object of class "character". This character vector matches `\#METH` tag in lst file and contains the estimation method.
- `analysis`: Object of class "list". This list matches text between `\#TERM` tag and `\#TERE` tag in lst file and contains the analysis information.
- `objt`: Object of class "character". This character vector matches `\#OBJT` tag in lst file and describes the objective function.
- `objv`: Object of class "character". This character vector matches `\#OBJV` tag in lst file and describes the objective function value.
- `objs`: Object of class "character". This character vector matches `\#OBJT` tag in lst file and describes the objective function standard deviation.
- `tabid`: Object of class "character". This character vector is from the first line of tab file and describes the title of tab file.
- `tabdata`: Object of class "data.frame". This data frame matches data in tab file and describes the title of tab file.

**Methods****Class-specific methods**

- `non.lst(nonmem)`: Access lst content in the `file.lst` slot.
- `non.lst.meth(nonmem)`: Access method section (`\#meth` tag) in the `file.lst` slot.
- `non.lst.term(nonmem)`: Access analysis section (`\#TERM`, `\#TERE` tag) in the `file.lst` slot.
- `non.lst.objt(nonmem)`: Access objective function (`\#OBJT` tag) in the `file.lst` slot.
- `non.lst.objv(nonmem)`: Access objective function value (`\#OBJV` tag) in the `file.lst` slot.
- `non.lst.objs(nonmem)`: Access objective function standard deviation (`\#OBS` tag) in the `file.lst` slot.
- `non.tab(nonmem)`: Access tab content in the `file.tab` slot.
- `non.cov(nonmem)`: Access cov content in the `file.cov` slot.
- `non.cor(nonmem)`: Access cor content in the `file.cor` slot.
- `non.coi(nonmem)`: Access coi content in the `file.coi` slot.
- `non.phi(nonmem)`: Access phi content in the `file.phi` slot.

`non.select(nonmem, lines, sep)`: Select the lines in the lst file.

### Standard generic methods

`initialize(object, output.lst, output.tab, output.dir)`: Object instantiation. `output.lst`: the file name for lst file from NONMEM 7; `output.tab`: the filename for tab file from any NONMEM version; `output.dir(optional)`: the output directory including cor, cov, coi and phi files from NONMEM 7. `output.lst` and `output.dir` only works for NONMEM 7.

`nonmem` instances are created through `new("nonmem", ...)`. The arguments to `new` should include `output.lst` and `output.tab`. If `output.dir` is missing, `NULL` will be assigned to proper slots.

### Author(s)

Xiaoyong Sun

### Examples

```
showClass("nonmem")
```

---

pdata

*A sample data*

---

### Description

A sample data.

### Usage

```
data(pdata)
```

### Author(s)

Xiaoyong Sun

### Examples

```
data(pdata)
```



---

PKadjust	<i>Update figures</i>
----------	-----------------------

---

**Description**

This function is to update or modify certain figures with figure ID for particular purpose.

**Usage**

```
PKadjust(figno, save=FALSE,...)
```

**Arguments**

figno	the figure number generated from PKshow().
save	logical. To only display the modified figure, users need chose FALSE; to save in the management system, users need choose TRUE.
...	All new figure configurations for this figure number.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

---

PKclean	<i>Clean related archives</i>
---------	-------------------------------

---

**Description**

This function is to delete all archives (file directories and figures) and clean global variables in R environment.

**Usage**

```
PKclean()
```

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKclean()
```

---

PKcode	<i>Generate R scripts</i>
--------	---------------------------

---

**Description**

This function is to generate R scripts. To improve efficiency and help users to generate high-quality figures, users have option to modify related R scripts to meet their specific requirements. All generated R scripts match the order of figures generated in PKshow().

**Usage**

```
PKcode(filename="PKcode.txt")
```

**Arguments**

filename            the file name to store the R scripts.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

---

PKconfig	<i>Data configuration</i>
----------	---------------------------

---

**Description**

This function is to configure data for analysis.

**Usage**

```
PKconfig(general.list, hist.list, scatter.list)
```

**Arguments**

general.list    a list. It includes figure configuration: save.format, width, height, and also graphic packages (0: use only lattice package. 1: use only ggplot2 package. 2: use both packages).

hist.list        a list. It includes histogram configuration: type, layout, ind.layout (for individual plots).

scatter.list    a list. It includes scatterplot configuration: type, layout, span, ind.layout (for individual plots).

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# setup configuration
general.list <- list(save.format="bmp", width = 480, height = 480, package=2)
hist.list <- list(type=c("count"), layout=c(1,1), ind.layout=c(5,5))
scatter.list <- list(span=0.25, type=c("p", "smooth"), layout=c(1,1), ind.layout=c(5,5))

PKconfig(general.list, hist.list, scatter.list)
```

---

PKdata

*Data input*

---

**Description**

This function is to read data, match default naming system to data variables, and setup global variables.

**Usage**

```
PKdata(data, match.term=NULL)
```

**Arguments**

data	a data frame to analyze.
match.term	a list. It matches the package metrics to the variable names in the data.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```

# setup configuration
general.list <- list(save.format="bmp", width = 480, height = 480, package=2)
hist.list <- list(type=c("count"), layout=c(1,1), ind.layout=c(5,5))
scatter.list <- list(span=0.25, type=c("p", "smooth"), layout=c(1,1), ind.layout=c(5,5))

var.name <- list(ID="ID", DV="CONC", TIME="TIME", PRED="PRED", RES="RES",
WRES="WRES", IPRE="IPRE", IDV=c("CLCR", "WT"), COV=c("WT", "AGE"),
ETA=c("ETA1", "ETA2"), PARA=c("CL", "V"))

data(pdata)
# PKdata(data=pdata, match.term=var.name)

# PKconfig(general.list, hist.list, scatter.list)
# PKfigure(pdata, 1)
# PKshow()
# PKclean()

```

---

 PKfigure

*Diagnose model and generate figures*


---

**Description**

This function is for diagnosing specific models and generate figures.

**Usage**

```
PKfigure(pdata, methods, clean)
```

**Arguments**

pdata	a data frame to analyze. Generally it is from tab file generated from NONMEM.
methods	a numeric vector. It includes all diagnostics methods according to Census, 1: Exploratory data analysis; 2: Individual plots; 3: Goodness-of-fit plots; 4: Structural model diagnostics; 5: Residual model diagnostics; 6: Parameters diagnostics; 7: Covariate model; 8: Random effects.
clean	a logical value indicating whether or not to keep results from previous PKreport for final report.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKfigure(pdata, c(3,6,8))
```

---

PKnum	<i>Output numerical value</i>
-------	-------------------------------

---

**Description**

This function is to convert data frame or matrix (the output from non.select) to number.

**Usage**

```
PKnum(exp.data)
```

**Arguments**

exp.data            a data frame or matrix selected from lst file.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# exp.data <- non.select(myclass, c(50:56))
# options(scipen=100)
# PKnum(exp.data)
# options(scipen=-100)
# PKnum(exp.data)
```

---

PKoutput	<i>Output all results to folders and files</i>
----------	--

---

**Description**

This function is to translate analysis from PKreport() to folders and files in the current working directory.

**Usage**

```
PKoutput(nonmemObj, table.Rowv, table.Colv)
```

**Arguments**

nonmemObj	a object of class NONMEM.
table.Rowv	determine whether the row dendrogram should be reordered in the heatmap-like table.
table.Colv	determine whether the column dendrogram should be reordered in the heatmap-like table.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKoutput(nonmemObj)
```

---

PKreport.1

*Exploratory data analysis*

---

**Description**

This function is for exploratory data analysis.

**Usage**

```
PKreport.1(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.1(pdata)
```

---

PKreport.2

*Individual plots*

---

**Description**

This function is for individual plots.

**Usage**

```
PKreport.2(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.2(pdata)
```

---

PKreport.3

*Goodness-of-fit plots*

---

**Description**

This function is for goodness-of-fit plots.

**Usage**

```
PKreport.3(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.3(pdata)
```

---

PKreport.4

*Structural model diagnostics*

---

**Description**

This function is for structural model diagnostics.

**Usage**

```
PKreport.4(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.4(pdata)
```



---

PKreport.5

*Residual model diagnostics*

---

**Description**

This function is for residual model diagnostics.

**Usage**

```
PKreport.5(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.5(pdata)
```

---

PKreport.6

*Parameters diagnostics*

---

**Description**

This function is for parameters diagnostics.

**Usage**

```
PKreport.6(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.6(pdata)
```

---

PKreport.7

*Covariate model diagnostics*

---

**Description**

This function is for covariate model diagnostics.

**Usage**

```
PKreport.7(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.7(pdata)
```

---

PKreport.8	<i>Random effects diagnostics</i>
------------	-----------------------------------

---

**Description**

This function is for random effects diagnostics.

**Usage**

```
PKreport.8(pdata)
```

**Arguments**

pdata            a data frame.

**Value**

Input is a data frame.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKreport.8(pdata)
```

---

PKshow	<i>Display results</i>
--------	------------------------

---

**Description**

This function is to display results from analysis.

**Usage**

```
PKshow(nonmemObj, table.Rowv, table.Colv)
```

**Arguments**

nonmemObj        a object of class NONMEM.  
table.Rowv       determine whether the row dendrogram should be reordered in the heatmap-like table.  
table.Colv       determine whether the column dendrogram should be reordered in the heatmap-like table.

**Details**

Please see vignettes for details.

**Author(s)**

Xiaoyong Sun

**Examples**

```
# PKshow(nonmemObj, table.Rowv=TRUE, table.Rowv=TRUE)

# Only generate figure report
# PKshow()
```

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