

# Package ‘coveffectsplot’

May 30, 2022

**Title** Produce Forest Plots to Visualize Covariate Effects

**Version** 1.0.2

**Description** Produce forest plots to visualize covariate effects using either the command line or an interactive 'Shiny' application.

**URL** <https://github.com/smouksassi/coveffectsplot>

**BugReports** <https://github.com/smouksassi/coveffectsplot/issues>

**Depends** R (>= 3.6.0), data.table (>= 1.9.8)

**Imports** colourpicker, egg, grid, ggplot2 (>= 3.3.2), shiny, stats, utils

**Suggests** markdown, dplyr, tidyr, shinyjs, shinymeta, table1, clipr, formatR, MASS, knitr, rmarkdown, mrgsolve, GGally, ggridges, ggrepel, ggstance, patchwork, plotly, scales, shinyAce, Rcpp, gamlss.dist, ggh4x, ggpmisc, quantreg

**License** MIT + file LICENSE

**SystemRequirements** pandoc with https support

**LazyData** true

**VignetteBuilder** knitr

**RoxygenNote** 7.2.0

**Encoding** UTF-8

**NeedsCompilation** no

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**Repository** CRAN

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covdatasim	<i>Correlated Covariates data</i>
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### Description

A example dataset used to illustrate multivariate joint covariate effects.

### Usage

```
covdatasim
```

### Format

A dataset with 2000 rows and 5 variables

**ID** Subject ID

**AGE** Age in years

**WT** Weight in kg

**Sex** 0=male; 1=female

**ALB** Albumin in g/dL

### Source

simulated based on a real dataset

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draw_key	<i>Horizontal key drawing functions from ggstance in case it is deprecated</i>
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**Description**

Horizontal key drawing functions from ggstance in case it is deprecated

**Usage**

```
draw_key_hpath(data, params, size)
```

```
draw_key_pointrangeh(data, params, size)
```

**Arguments**

data	A single row data frame containing the scaled aesthetics to display in this key
params	A list of additional parameters supplied to the geom.
size	Width and height of key in mm.

**Value**

A grid grob.

---

forest_plot	<i>Forest plot</i>
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---

**Description**

Produce forest plots to visualize covariate effects

**Usage**

```
forest_plot(
  data,
  facet_formula = "covname~paramname",
  xlabel = "",
  ylabel = "",
  x_facet_text_size = 13,
  y_facet_text_size = 13,
  x_facet_text_angle = 0,
  y_facet_text_angle = 0,
  x_facet_text_vjust = 0.5,
  y_facet_text_vjust = 0.5,
  x_facet_text_hjust = 0.5,
```

```

y_facet_text_hjust = 0.5,
xy_facet_text_bold = TRUE,
x_label_text_size = 16,
y_label_text_size = 16,
break_ylabel = FALSE,
y_label_text_width = 25,
table_text_size = 7,
base_size = 22,
theme_benrich = FALSE,
table_title = "",
table_title_size = 15,
ref_legend_text = "",
area_legend_text = "",
interval_legend_text = "",
legend_order = c("pointinterval", "ref", "area", "shape"),
combine_area_ref_legend = TRUE,
combine_interval_shape_legend = FALSE,
legend_position = "top",
show_ref_area = TRUE,
ref_area = c(0.8, 1.25),
show_ref_value = TRUE,
ref_value = 1,
ref_area_col = "#BEBEBE50",
ref_value_col = "black",
ref_value_size = 1,
ref_value_linetype = "dashed",
interval_col = "blue",
interval_size = 1,
interval_fatten = 4,
bsv_col = "red",
bsv_text_id = c("BSV", "bsv", "IIV", "Bsv"),
interval_bsv_text = "",
strip_col = "#E5E5E5",
paramname_shape = FALSE,
paramname_color = FALSE,
legend_shape_reverse = FALSE,
facet_switch = c("both", "y", "x", "none"),
facet_scales = c("fixed", "free_y", "free_x", "free"),
facet_space = c("fixed", "free_x", "free_y", "free"),
facet_labeller = "label_value",
label_wrap_width = 55,
facet_labeller_multiline = FALSE,
strip_placement = c("inside", "outside"),
strip_outline = TRUE,
facet_spacing = 5.5,
major_x_ticks = NULL,
minor_x_ticks = NULL,
x_range = NULL,

```

```

logxscale = FALSE,
show_yaxis_gridlines = TRUE,
show_xaxis_gridlines = TRUE,
show_table_facet_stripe = "none",
table_facet_switch = c("both", "y", "x", "none"),
show_table_yaxis_tick_label = FALSE,
reserve_table_xaxis_label_space = TRUE,
table_panel_border = TRUE,
table_position = c("right", "below", "none"),
plot_table_ratio = 4,
vertical_dodge_height = 0.8,
legend_space_x_mult = 1,
legend_ncol_interval = 1,
legend_ncol_shape = 1,
plot_margin = c(5.5, 5.5, 5.5, 5.5),
table_margin = c(5.5, 5.5, 5.5, 5.5),
legend_margin = c(0, 0.1, -0.1, 0),
parse_xlabel = FALSE,
parse_ylabel = FALSE,
plot_title = "\n",
return_list = FALSE
)

```

### Arguments

data	Data to use.
facet_formula	Facet formula.
xlabel	X axis title.
ylabel	Y axis title.
x_facet_text_size	Facet text size X.
y_facet_text_size	Facet text size Y.
x_facet_text_angle	Facet text angle X.
y_facet_text_angle	Facet text angle Y.
x_facet_text_vjust	Facet text vertical justification.
y_facet_text_vjust	Facet text vertical justification.
x_facet_text_hjust	Facet text horizontal justification.
y_facet_text_hjust	Facet text horizontal justification.
xy_facet_text_bold	Bold Facet text. Logical TRUE FALSE.

**x\_label\_text\_size** X axis labels size.  
**y\_label\_text\_size** Y axis labels size.  
**break\_ylabel** Split Y axis labels into multiple lines. Logical FALSE TRUE.  
**y\_label\_text\_width** Number of characters to break Y axis labels.  
**table\_text\_size** Table text size.  
**base\_size** theme\_bw base\_size for the plot and table.  
**theme\_benrich** apply Benjamin Rich's theming.  
**table\_title** What text to use for table title (theme\_benrich has a default).  
**table\_title\_size** table title size.  
**ref\_legend\_text** Reference legend text.  
**area\_legend\_text** Area legend text.  
**interval\_legend\_text** Pointinterval Legend text.  
**legend\_order** Legend order. A four-element vector with the following items ordered in your desired order: "pointinterval", "ref", "area", "shape". if an item is absent the legend will be omitted.  
**combine\_area\_ref\_legend** Combine reference and area legends if they share the same text?  
**combine\_interval\_shape\_legend** Combine interval and shape legends when paramname\_color=TRUE ?  
**legend\_position** where to put the legend: "top", "bottom", "right", "none"  
**show\_ref\_area** Show reference window?  
**ref\_area** Reference area. Two-element numeric vector multiplying the ref\_value.  
**show\_ref\_value** Show reference line?  
**ref\_value** X intercept of reference line.  
**ref\_area\_col** Reference area background color.  
**ref\_value\_col** Reference line color.  
**ref\_value\_size** Reference line size.  
**ref\_value\_linetype** Reference line linetype.  
**interval\_col** Point range color. One or Multiple values.  
**interval\_size** Point range size. Default to 1  
**interval\_fatten** Point range fatten. Default to 4

bsv_col	BSV pointinterval color. One value.
bsv_text_id	Text string(s) to identify BSV. Default to c("BSV", "bsv", "IIV", "Bsv")
interval_bsv_text	BSV legend text.
strip_col	Strip background color.
paramname_shape	Map symbol to parameter(s)?
paramname_color	Map symbol to parameter(s)?
legend_shape_reverse	TRUE or FALSE.
facet_switch	Facet switch to near axis. Possible values: "both", "y", "x", "none".
facet_scales	Facet scales. Possible values: "free_y", "fixed", "free_x", "free".
facet_space	Facet spaces. Possible values: "fixed", "free_x", "free_y", "free".
facet_labeller	Facet Labeller. Default "label_value" any other valid 'facet_grid' labeller can be specified.
label_wrap_width	How many characters before breaking the line. Numeric value. any other valid 'facet_grid' labeller can be specified.
facet_labeller_multiline	break facet strips into multiple lines. Logical TRUE FALSE.
strip_placement	Strip placement. Possible values: "inside", "outside".
strip_outline	Draw rectangle around the Strip. Logical TRUE FALSE.
facet_spacing	Control the space between facets in points.
major_x_ticks	X axis major ticks. Numeric vector.
minor_x_ticks	X axis minor ticks. Numeric vector.
x_range	Range of X values. Two-element numeric vector.
logxscale	X axis log scale. Logical TRUE FALSE.
show_yaxis_gridlines	Draw the y axis gridlines. Logical TRUE FALSE.
show_xaxis_gridlines	Draw the x axis gridlines. Logical TRUE FALSE.
show_table_facet_strip	Possible values: "none", "both", "y", "x".
table_facet_switch	Table facet switch to near axis. Possible values: "both", "y", "x", "none".
show_table_yaxis_tick_label	Show table y axis ticks and labels?
reserve_table_xaxis_label_space	keep space for the x axis label to keep alignment.

`table_panel_border` Draw the panel border for the table. Logical TRUE FALSE.

`table_position` Table position. Possible values: "right", "below", "none".

`plot_table_ratio` Plot-to-table ratio. Suggested value between 1-5.

`vertical_dodge_height` Amount of vertical dodging to apply on segments and table text.

`legend_space_x_mult` Multiplier to adjust the spacing between legend items.

`legend_ncol_interval` Control the number of columns for the pointinterval legend.

`legend_ncol_shape` Control the number of columns for the shape legend.

`plot_margin` Control the white space around the main plot. Vector of four numeric values for the top, right, bottom and left sides.

`table_margin` Control the white space around the table. Vector of four numeric values for the top, right, bottom and left sides.

`legend_margin` Control the white space around the plot legend. Vector of four numeric values for the top, right, bottom and left sides.

`parse_xlabel` treat xlabel as an expression. Logical FALSE TRUE.

`parse_ylabel` treat ylabel as an expression. Logical FALSE TRUE.

`plot_title` main plot title default to a line break.

`return_list` What to return if True a list of the main and table plots is returned instead of the gtable/plot.

## Examples

```
library(dplyr)
library(ggplot2)

# Example 1

plotdata <- get_sample_data("forest-plot-table.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
         lowerlabel = format(round(lower,2), nsmall = 2),
         upperlabel = format(round(upper,2), nsmall = 2),
         LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))
param <- "BZD AUC"
plotdata <- filter(plotdata,paramname==param)
plotdata$covname <- reorder(plotdata$covname,plotdata$upper,FUN =max)
plotdata$label <- reorder(plotdata$label,plotdata$scen)
covs <- c("WEIGHT","AGE")
plotdata <- filter(plotdata,covname%in%covs)
forest_plot(plotdata,
            ref_legend_text = "Reference (vertical line)",
            area_legend_text = "Reference (vertical line)",
```



```

xlabel = paste("Fold Change in", param, "Relative to Reference"),
logxscale = TRUE, major_x_ticks =c(0.1,1,1.5),
show_ref_area = FALSE,
paramname_color =TRUE,
interval_col =c("steelblue", "red", "steelblue", "red"),
facet_formula = "covname~.",
facet_scales = "free_y",
facet_space = "free_y",
show_table_facet_strip = "none",
table_position = "right",
plot_table_ratio = 4)

# Example 2

plotdata <- get_sample_data("forest-plot-table.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
         lowerlabel = format(round(lower,2), nsmall = 2),
         upperlabel = format(round(upper,2), nsmall = 2),
         LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))
param <- c("BZD AUC", "BZD Cmax")
plotdata <- filter(plotdata,paramname%in%param)
plotdata <- filter(plotdata,covname%in%"WEIGHT")
plotdata$covname <- reorder(plotdata$covname,plotdata$upper,FUN =max)
plotdata$label <- reorder(plotdata$label,plotdata$scen)
forest_plot(plotdata,
  ref_legend_text = "Reference (vertical line)",
  area_legend_text = "Reference (vertical line)",
  xlabel = paste("Fold Change of Parameter", "Relative to Reference"),
  show_ref_area = FALSE,
  facet_formula = "covname~paramname",
  facet_scales = "free_y",
  facet_space = "free_y",
  x_facet_text_size = 10,
  y_facet_text_size = 10,
  y_label_text_size = 10,
  y_label_text_width = 15,
  x_label_text_size = 10,
  facet_switch = "both",
  show_table_facet_strip = "both",
  show_table_yaxis_tick_label = TRUE,
  table_position = "below",
  plot_table_ratio = 1)

## Not run:

# Example 3a

plotdata <- get_sample_data("forest-plot-table.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
         lowerlabel = format(round(lower,2), nsmall = 2),
         upperlabel = format(round(upper,2), nsmall = 2),
         LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))

```

```

plotdata$covname <- reorder(plotdata$covname,plotdata$upper,FUN =max)
plotdata$label <- reorder(plotdata$label,plotdata$scen)

plotdata$compound <- c(rep("1-OH",18),rep("BZD",18))
plotdata$paramname <- c(rep("AUC",9),rep("CMAX",9),rep("AUC",9),rep("CMAX",9))

forest_plot(plotdata,
  ref_area = c(0.8, 1.2),
  x_facet_text_size = 13,
  y_facet_text_size = 13,
  ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
  area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
  xlabel = "Fold Change Relative to Parameter",
  facet_formula = covname~compound,
  facet_switch = "both",
  facet_scales = "free",
  facet_space = "fixed",
  paramname_shape = TRUE,          paramname_color = FALSE,
  combine_interval_shape_legend = FALSE,
  table_position = "right", plot_title = "",
  ref_area_col = rgb( col2rgb("gray50")[1], col2rgb("gray50")[2],col2rgb("gray50")[3],
    max = 255, alpha = 0.1*255 ) ,
  interval_col = c("steelblue"),
  strip_col = "lightblue",
  plot_table_ratio = 1)

# Example 3

plotdata <- get_sample_data("forestplotdatacpidata.csv")
forest_plot(plotdata,
  ref_area = c(0.8, 1.2),
  x_facet_text_size = 12,
  y_facet_text_size = 12,
  y_label_text_size = 10,
  x_label_text_size = 10,
  table_text_size = 6,
  plot_table_ratio = 1.5,
  ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
  area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
  xlabel = "Fold Change Relative to RHZE",
  facet_formula = "covname~paramname",
  table_position = "below",
  show_table_facet_strip = "both",
  show_table_yaxis_tick_label = TRUE)

# Example 4
plotdata <- get_sample_data("dataforest.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
    lowerlabel = format(round(lower,2), nsmall = 2),
    upperlabel = format(round(upper,2), nsmall = 2),
    LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))
plotdata <- plotdata %>%

```

```

    filter(covname%in%c("Weight"))
plotdata$label <- as.factor(as.character(plotdata$label))
plotdata$label <- factor(plotdata$label, c("36.2 kg", "66 kg", "110 kg"))
forest_plot(plotdata,
             ref_area = c(0.8, 1.2),
             x_facet_text_size = 13,
             y_facet_text_size = 13,
             ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
             area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
             xlabel = "Fold Change Relative to Parameter",
             facet_formula = "covname~paramname",
             facet_switch = "both",
             facet_scales = "free",
             facet_space = "fixed",
             table_position = "below",
             plot_table_ratio = 1,
             show_table_facet_strip = "both",
             show_table_yaxis_tick_label = TRUE)

# Example 5

forest_plot(plotdata,
             ref_area = c(0.8, 1.2),
             x_facet_text_size = 13,
             y_facet_text_size = 13,
             ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
             area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
             xlabel = "Fold Change Relative to Parameter",
             facet_formula = "covname~.",
             facet_switch = "both",
             facet_scales = "free",
             facet_space = "fixed",
             paramname_shape = TRUE,
             table_position = "none",
             ref_area_col = rgb( col2rgb("gray50")[1], col2rgb("gray50")[2], col2rgb("gray50")[3],
                                max = 255, alpha = 0.1*255 ) ,
             interval_col = "steelblue",
             strip_col = "lightblue",
             plot_table_ratio = 1)

## End(Not run)

```

---

get\_sample\_data

*Get sample dataset*


---

## Description

Get a sample dataset that is included with the package to plot a forest plot.

**Usage**

```
get_sample_data(dataset = "dfall.csv")
```

**Arguments**

dataset            A sample dataset file.

---

prezista

*Prezista Drug Label Data*

---

**Description**

A dataset containing an excerpt from the official Prezista FDA Drug Label to help in the app exploration.

**Usage**

```
prezista
```

**Format**

A dataset with 33 rows and 6 variables

**covname** Covariate Name, a character variable with two values Protease Inhibitors and Other Antiretrovirals

**label** Covariate value label, a character variable with several possible values

**paramname** Parameter on which the effects are shown, a character variable with three possible values Cmax, AUC and Cmin

**mid** Middle value for the effects, the median from the uncertainty distribution

**lower** Lower value for the effects usually the 5% from the uncertainty distribution

**upper** Upper value for the effects usually the 95% from the uncertainty distribution

**Source**

Table 16 from [https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2017/021976s045\\_202895s0201b1.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/021976s045_202895s0201b1.pdf)

---

```
run_interactiveforestplot
```

*Run the interactiveforestplot application*

---

### Description

Run the interactiveforestplot application.

### Usage

```
run_interactiveforestplot(data = NULL)
```

### Arguments

`data` optional data to load when the app is launched

### Examples

```
if (interactive()) {  
  run_interactiveforestplot()  
}
```

---

```
wtage
```

*Weight Age CDC growth charts data*

---

### Description

Weight-for-age, 2 to 20 years, LMS parameters and selected smoothed weight percentiles in kilograms, by sex and age.

### Usage

```
wtage
```

### Format

A dataset with 436 rows and 14 variables

**Sex** 1=male; 2=female

**Agemos** Age in months

**L** skewness distribution parameter

**M** location distribution parameter

**S** scale distribution parameter

**P3** Smoothed third percentile

- P5** Smoothed fifth percentile
- P10** Smoothed tenth percentile
- P25** Smoothed twenty fifth percentile
- P50** Smoothed fiftieth percentile
- P75** Smoothed seventy fifth percentile
- P90** Smoothed ninetieth percentile
- P95** Smoothed ninety fifth percentile
- P97** Smoothed ninety seventh percentile

**Source**

CDC website <https://www.cdc.gov/growthcharts/data/zscore/wtage.csv>

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