

# Formulas in R

Many of the commands in R allow us to use a syntax as follows:

```
command(formula , data=datasetName , ... otherOptions)
```

A *formula* is a special syntax in R that in general looks as one of the following:

```
~<rhs>  
<lhs>~<rhs>  
~<rhs>|<groups>  
<lhs>~<rhs>|<groups>
```

So it consists of a tilde followed by a “right-hand-side” expression, typically the name of a variable. It can optionally take a “left-hand-side” expression to the left of the tilde, and may end with a vertical line followed by a “groups” section. All sections contain the variables to be considered or expressions of such variables some times, and multiple variables can be typically separated by a plus sign.

**lhs** The variables on the left-hand-side are the target variables and we are interested in how they are influenced by the other variables. When doing a scatterplot, lhs corresponds to the y axis.

**rhs** The variables on the right-hand-side are the source variables and we are interested in themselves if there is no left-hand-side, or how they influence the variables in the left-hand-side if there are any.

**groups** The variables in the groups section are meant to be variables used to break down the results. If used in a graph situation for example, the graph would have a different panel for each value of the group variables.

## Examples

```
# Looking at general health on its own  
~genhealth  
# Compare physical health against mental health ,  
# break down by general health category  
physhealth~menthealth|genhealth  
# Look at both physical health and mental health  
~physhealth+menthealth  
  
fewStates <- counties %>% filter(state %in% c("Indiana", "Kentucky", "Alaska", "California",  
# Boxplot of foreign-born percentages per county with separate box per state.  
bwplot(state~foreign_born , data=fewStates)  
# Histogram of foreign-born percentages per county with separate panel per state.  
histogram(~foreign_born | state , data=fewStates)  
# Median of foreign-born percentages for counties computed per state  
median(~foreign_born | state , data=counties)
```