

# rtables

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baseIR Nov 27, 2017

# Why Yet Another Table R Package?

- Pharma for regulatory reporting has specific demands from tables
  - pagination, decoration (titles and footnotes)
  - cross-checking (compare `tbl1[i,j]` with `tbl2[m,n]`)
  - multiple values per cell
  - multiple output formats (txt, html, pdf, png, markdown)
  - colspans, rounding
- Some of our tables resemble more a report than a table
- Some graphs are tables with a bit of graphics
  - e.g. forest plots

# R tables landscape

[base::table](#)

[hmisc](#)

[tables](#)

[knitr::kable](#)

[htmltables](#)

[xtable](#)

[tableone](#)

[stargazer](#)

[texreg](#)

[ascii](#)

[txtplot](#)

# R tables landscape

[base::table](#)

[hmisc](#)

[tables](#)

[knitr::kable](#)

[htmltables](#)

[xtable](#)

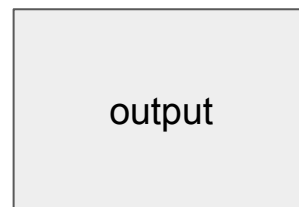
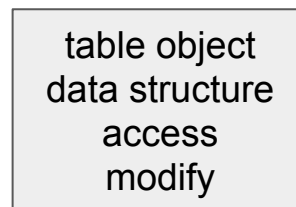
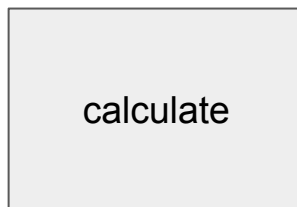
[tableone](#)

[stargazer](#)

[texreg](#)

[ascii](#)

[txtplot](#)



# rtables

<https://github.com/Roche/rtables>


	<b>Header</b>			

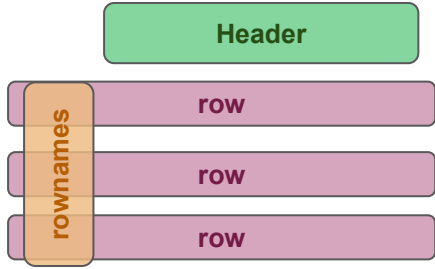
	<b>Header</b>			
<b>rownames</b>				



	Header			
rownames	row 1			

	Header			
rownames	row 1		cell 1,3	


=



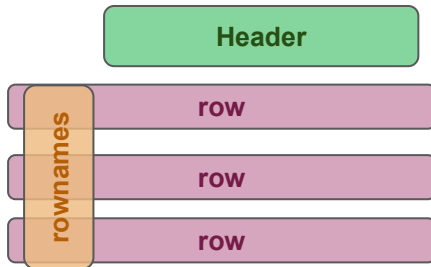
=



=

data + format + colspan


=



=



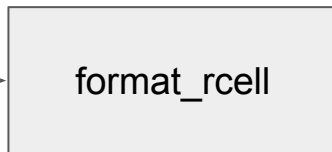
=

data + format + colspan



```
data = c(13.2243212,  
         9.232134)  
format = "(xx.xx, xx.xx)"  
colspan = 2
```

output type = "ascii"



"(13.22, 19.23)"

# Example

```
library(rtables)
```

```
tbl <- rtable(  
  col.names = c("Treatment\nN=100", "Comparison\nN=300"),  
  format = "xx (xx.xx%)",  
  rrow("A", c(104, .2), c(100, .4)),  
  rrow("B", c(23, .4), c(43, .5)),  
  rrow(),  
  rrow("this is a very long section header"),  
  rrow("estimate", rcell(55.23, "xx.xx", colspan = 2)),  
  rrow("95% CI", indent = 1, rcell(c(44.8, 67.4), format = "(xx.x, xx.x)", colspan = 2))  
)
```

```
tbl
```

# Example

```
library(rtables)
```

```
tbl <- rtable(  
  col.names = c("Treatment\nN=100", "Comparison\nN=300"),  
  format = "xx (xx.xx%)",  
  rrow("A", c(104, .2), c(100, .4)),  
  rrow("B", c(23, .4), c(43, .5)),  
  rrow(),  
  rrow("this is a very long section header"),  
  rrow("estimate", rcell(55.23, "xx.xx", colspan = 2)),  
  rrow("95% CI", indent = 1, rcell(c(44.8, 67.4), format = "(xx.x, xx.x)", colspan = 2))  
)
```

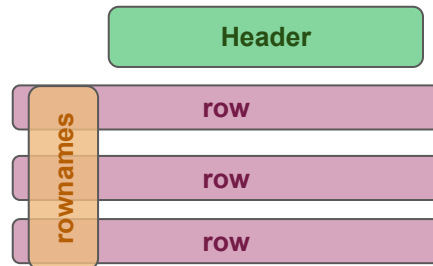
```
tbl
```

# Example

```
library(rtables)
```

```
tbl <- rtable(  
  col.names = c("Treatment\nN=100", "Comparison\nN=300"),  
  format = "xx (xx.xx%)",  
  row("A", c(104, .2), c(100, .4)),  
  row("B", c(23, .4), c(43, .5)),  
  row(),  
  row("this is a very long section header"),  
  row("estimate", rcell(55.23, "xx.xx", colspan = 2)),  
  row("95% CI", indent = 1, rcell(c(44.8, 67.4), format = "(xx.x, xx.x)", colspan = 2))  
)
```

```
tbl
```

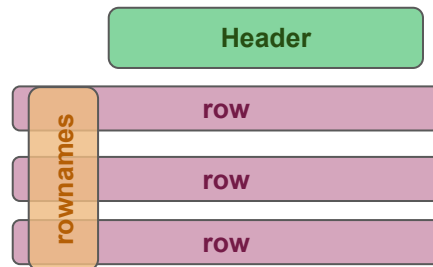


# Example

```
library(rtables)
```

```
tbl <- rtable(  
  col.names = c("Treatment\nN=100", "Comparison\nN=300"),  
  format = "xx (xx.xx%)",  
  rrow("A", c(104, .2), c(100, .4)),  
  rrow("B", c(23, .4), c(43, .5)),  
  rrow(),  
  rrow("this is a very long section header"),  
  rrow("estimate", rcell(55.23, "xx.xx", colspan = 2)),  
  rrow("95% CI", indent = 1, rcell(c(44.8, 67.4), format = "(xx.x, xx.x)", colspan = 2))  
)
```

```
tbl
```



data  
format  
colspan

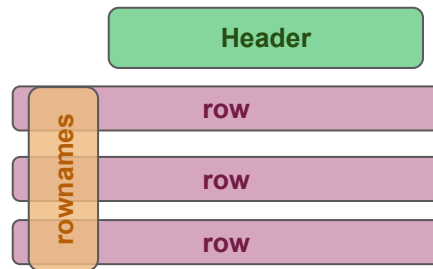


# Example

```
library(rtables)
```

```
tbl <- rtable(  
  col.names = c("Treatment\nN=100", "Comparison\nN=300"),  
  format = "xx (xx.xx%)",  
  rrow("A", c(104, .2), c(100, .4)),  
  rrow("B", c(23, .4), c(43, .5)),  
  rrow(),  
  rrow("this is a very long section header"),  
  rrow("estimate", rcell(55.23, "xx.xx", colspan = 2)),  
  rrow("95% CI", indent = 1, rcell(c(44.8, 67.4), format = "(xx.x, xx.x)", colspan = 2))  
)
```

```
tbl
```



data  
format  
colspan

```

> library(rtables)
> tbl <- rtable(
+   col.names = c("Treatment\nN=100", "Comparison\nN=300"),
+   format = "xx (xx.xx%)",
+   rrow("A", c(104, .2), c(100, .4)),
+   rrow("B", c(23, .4), c(43, .5)),
+   rrow(),
+   rrow("this is a very long section header"),
+   rrow("estimate", rcell(55.23, "xx.xx", colspan = 2)),
+   rrow("95% CI", indent = 1, rcell(c(44.8, 67.4), format = "(xx.x, xx.x)", colspan = 2))
+ )
> tbl

```

	Treatment N=100	Comparison N=300
A	104 (20%)	100 (40%)
B	23 (40%)	43 (50%)

this is a very long section header

estimate

55.23

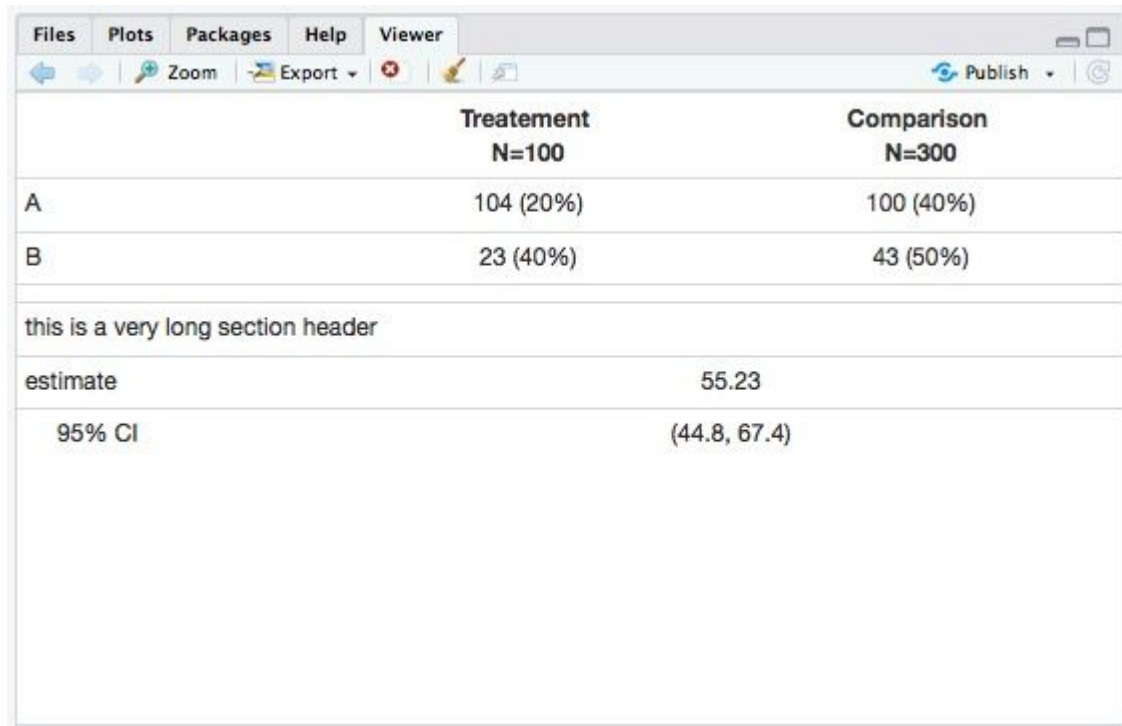
95% CI

(44.8, 67.4)

>

```
> Viewer(tbl)
```

```
>
```



	Treatment N=100	Comparison N=300
A	104 (20%)	100 (40%)
B	23 (40%)	43 (50%)
this is a very long section header		
estimate		55.23
95% CI		(44.8, 67.4)

Use [Bootstrap 3](#) for formatting

# Current & Planned Output Formats

## Current

- `as_html`
- `toString`

## Planned

- `as_gridGrob`
- `as_markdown`
- `as_latex`
- `as_xml`

# Access non-rounded raw data in cell

	Treatment N=100	Comparison N=300
A	104 (20%)	100 (40%)
B	23 (40%)	43 (50%)
this is a very long section header		
estimate	55.23	
95% CI	(44.8, 67.4)	

```
> tbl[2,1][2]
[1] 0.4
> |
```

# Access non-rounded raw data in cell

	Treatment N=100	Comparison N=300
A	104 (20%)	100 (40%)
B	23 (40%)	43 (50%)
this is a very long section header		
estimate		55.23
95% CI		(44.8, 67.4)

```
> tbl[2,1][2]
[1] 0.4
> |
```

```
> tbl[5,1]
[1] 55.23
attr(,"format")
[1] "xx.xx"
attr(,"colspan")
[1] 2
attr(,"class")
[1] "rcell"
> tbl[5,2]
[1] 55.23
attr(,"format")
[1] "xx.xx"
attr(,"colspan")
[1] 2
attr(,"class")
[1] "rcell"
>
```

# Cell Formats Strings

```
> get_rcell_formats()
```

```
$`1d`
```

```
[1] "xx"      "xx."     "xx.x"    "xx.xx"   "xx.xxx"  "xx.xxxx" "xx%"     "xx.x%"   "xx.xx%"  "xx.xxx%"
```

```
$`2d`
```

```
[1] "xx / xx"      "xx. / xx."     "xx.x / xx.x"   "xx.xx / xx.xx" "xx (xx%)"      "xx (xx.%)"     "xx (xx.x%)"
```

```
[8] "xx (xx.xx%)"  "xx. (xx.%)"    "xx.x (xx.x%)"  "xx.xx (xx.xx%)" "(xx, xx)"      "(xx., xx.)"    "(xx.x, xx.x)"
```

```
[15] "(xx.xx, xx.xx)" "xx - xx"       "xx.x - xx.x"   "xx.xx - xx.xx" "xx.x (xx.x)"   "xx.xx (xx.xx)" "xx.x, xx.x"
```

```
[22] "xx.x to xx.x"
```

```
attr("info")
```

```
[1] "xx does not modify the element, and xx. rounds a number to 0 digits"
```

```
>
```

# Comparing two rtables

```
expected <- rtable(  
  col.names = c("ARM A\nN=100", "ARM B\nN=200"),  
  format = "xx",  
  rrow("row 1", 10, 15),  
  rrow(),  
  rrow("section title"),  
  rrow("row colspan", rcell(c(.345543, .4432423), colspan = 2, format = "(xx.xx, xx.xx)"))  
)
```

```
object <- rtable(  
  col.names = c("ARM A\nN=100", "ARM B\nN=200"),  
  format = "xx",  
  rrow("row 1", 14, 15.03),  
  rrow(),  
  rrow("section title")  
)
```



# Comparing two rtables

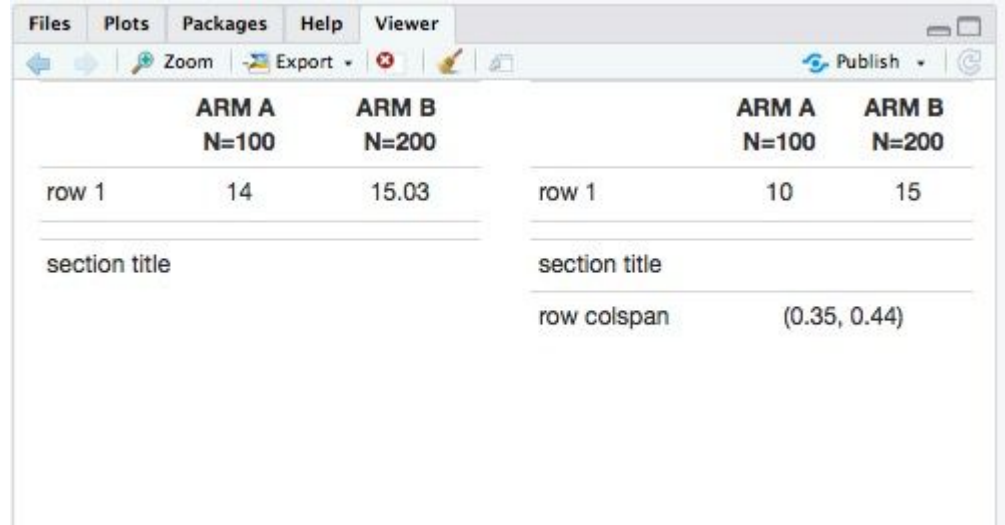
```
expected <- rtable(  
  col.names = c("ARM A\nN=100", "ARM B\nN=200"),  
  format = "xx",  
  rrow("row 1", 10, 15),  
  rrow(),  
  rrow("section title"),  
  rrow("row colspan", rcell(c(.34554
```

```
)  
  
object <- rtable(  
  col.names = c("ARM A\nN=100", "ARM B\nN=200"),  
  format = "xx",  
  rrow("row 1", 14, 15.03),  
  rrow(),  
  rrow("section title")  
)
```

```
> compare_rtables(object, expected, tol = .1, comp.attr = TRUE)  
  1 2  
1 X .  
2 . .  
3 . .  
4 + +  
> |
```

# Visually Comparing to rtable objects

```
> Viewer(object, expected)
> |
```

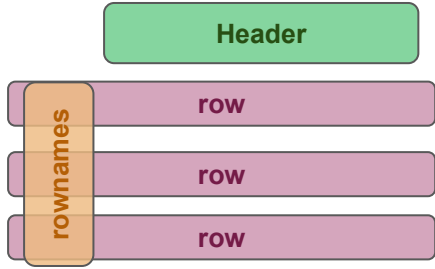


The screenshot shows the Viewer application window with two tables side-by-side. The left table has columns for ARM A (N=100) and ARM B (N=200). The right table has columns for ARM A (N=100) and ARM B (N=200). The tables are visually compared, showing differences in data values and layout.

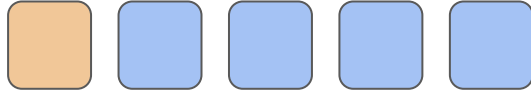
	ARM A N=100	ARM B N=200		ARM A N=100	ARM B N=200
row 1	14	15.03	row 1	10	15
section title			section title		
			row colspan	(0.35, 0.44)	

planned features for rtables


=



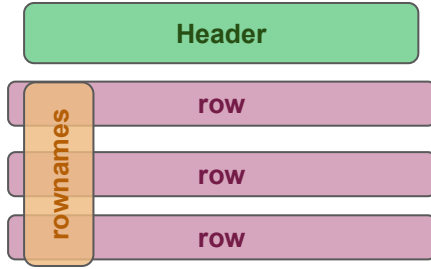
=



=

data + format + colspan


=



=

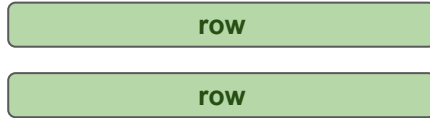


=

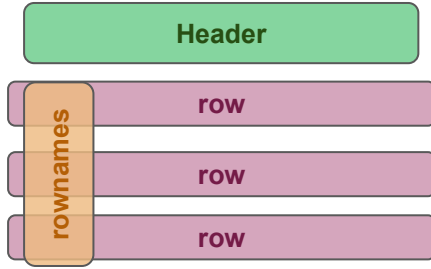
data + format + colspan



=




=



=



=

data + format + colspan

or

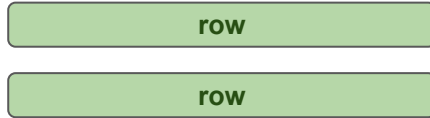


=

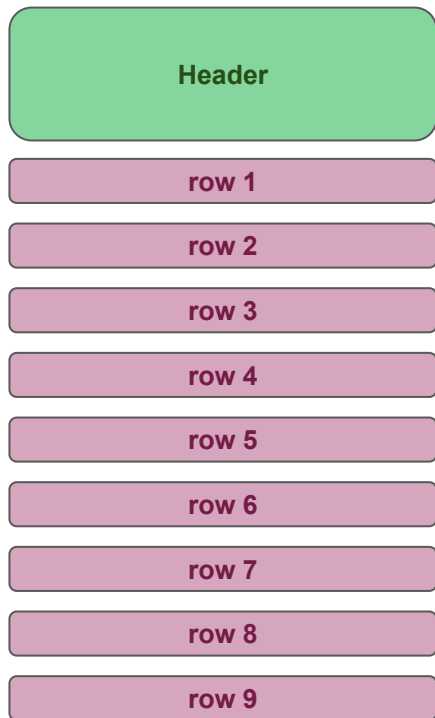

another rtable object



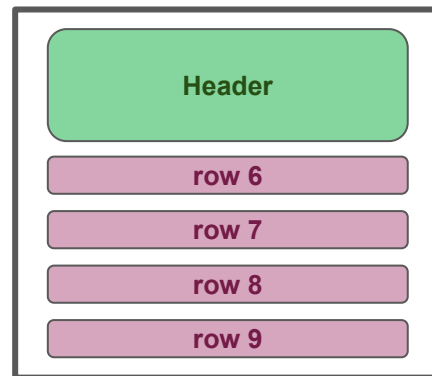
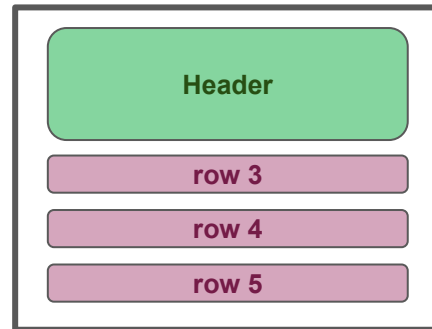
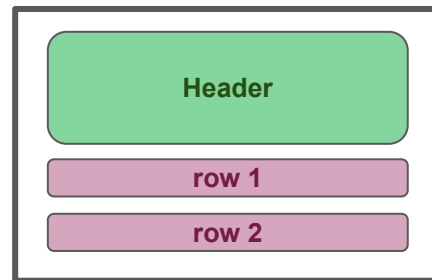
=



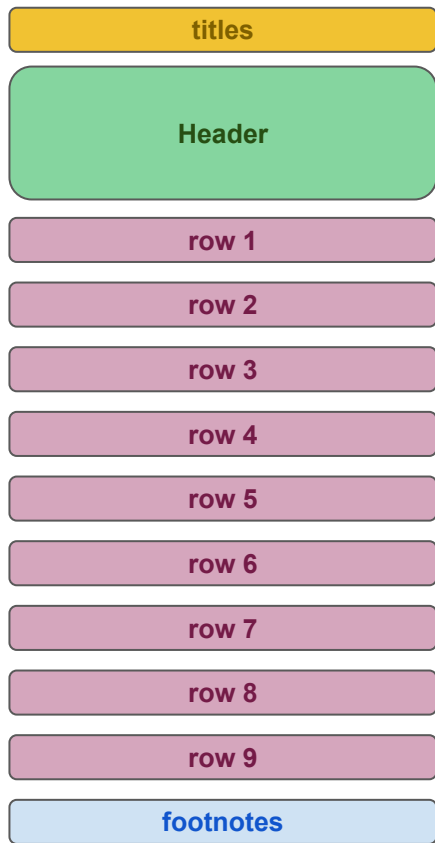
# Pagination



split so that tables  
fit on letter or a4 pages



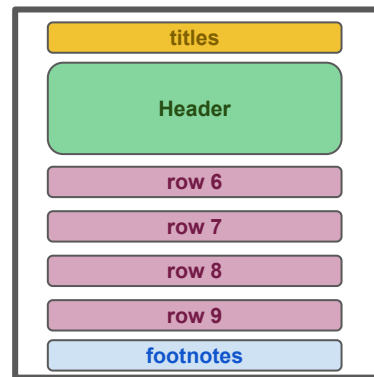
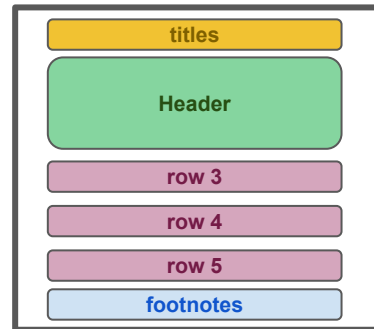
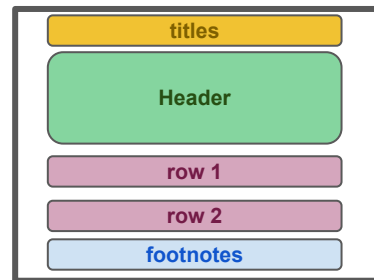
# Pagination, Titles, Footnotes



split so that tables  
fit on letter or a4 pages



also with titles and footnotes





# Query, Access, Modify, Compose

## Currently implemented

- `dim`, `ncol`, `nrow`
- `row.names`
- `names`
- ``[`(i,j)`
- `as.rtable`

## Planned

- `t()`
- ``[`(i,)`, ``[`(,j)`
- ``[<-``
- `cbind`, `rbind`
- `as.rtable` (more coercions)
- ...

# Cell Formats

- `sprintf` format strings compatibility (thanks to Doug Kelkhoff)
- left, right, dot alignments
- markup cells (for html)
- reference value in data object (non-sequential rendering of data)

# Output Formats

## Current

- `as_html`
- `toString`

## Planned

- `as_gridGrob`
- `as_markdown`
- `as_latex`
- `as_xml`

# New ways to calculate rtables

**calculate**

table object  
data structure  
access  
modify

output

we are looking for collaborators

thank you!

questions?

<https://github.com/Roche/rtables>