

Clinify: Clinical Table Styling Tools and Utilities

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OS-21

Motivation

- Organizations have standards
 - Changing might not be an option
 - You probably have to deviate, with high amounts of nuance
- CROs may have to work with many different standards standards
- Reuse and repeatability of configurations is still critical
 - Changing those configurations needs to be easy

Some History

- Created {pharmaRTF} in 2020
 - Extended {huxtable} to make RTF tables fit for clinical reports
- {pharmaRTF} Did a Few Things Well
 - Extend, not replace
 - Build the table, then build the document
 - Keep things simple for the user
- Also lacked a lot of capabilities
 - Specific placement of column headers
 - Alternating pages
 - More extensive formatting capabilities

Introducing {clinify}

- Built on top of {flextable} and {officer}
- Chose these packages because:
 - Offers most of the functionality we already want
 - Treat docx files as a first class output
 - With {officer}, can also highly customize the document and not just the table

Design Philosophy

- {clinify} objects should inherit from an underlying {flextable} or {officer} object
- {clinify} functionality must not interfere with {flextable} or {officer} functionality, i.e. {flextable} or {officer} functions called should operate without error.

```

1 library(clinify)
2 # Create a clintable
3 ct <- clintable(mtcars)
4 ct

```

mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4
17.8	6	167.6	123	3.92	3.440	18.90	1	0	4	4
16.4	8	275.8	180	3.07	4.070	17.40	0	0	3	3
17.3	8	275.8	180	3.07	3.730	17.60	0	0	3	3
15.2	8	275.8	180	3.07	3.780	18.00	0	0	3	3
10.4	8	472.0	205	2.93	5.250	17.98	0	0	3	4



```
1 ct <- clintable(mtcars) |>
2   clin_add_titles(
3     list(
4       c("Left", "Center", "Right"),
5       c("Just the middle")
6     )
7   ) |>
8   clin_add_footnotes(
9     list(
10      c(
11        "Here's a footnote.",
12        format(Sys.time(), "%H:%M %A, %B %d, %Y")
13      )
14    )
15  )
```

```
1 ct <- clintable(mtcars) |>
2   clin_add_titles(
3     list(
4       c("Left", "Center", "Right"),
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11        "Here's a footnote.",
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13      )
14    )
15  )
```

Left

Center
Just the middle

Right

mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
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18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
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17.3	8	275.8	180	3.07	3.730	17.60	0	0	3	3
15.2	8	275.8	180	3.07	3.780	18.00	0	0	3	3
10.4	8	472.0	205	2.93	5.250	17.98	0	0	3	4

Here's a footnote.

11:30 Tuesday, March 11, 2025



Page-by, Group-by, Alternating Pages

- Page by
 - Use a data variable to force page breaks
 - Can also use maximum rows allowed on a page
- Group by
 - Pull a variable (or variables) above the column headers
 - Break between groups
- Alternating pages
 - Allow overflow of columns to multiple pages
 - Allow key variables that appear on each page

Prep Some Data...

```
1 dat <- mtcars
2 # Make a page by variable
3 dat['page'] <- c(
4   rep(1, 10),
5   rep(2, 10),
6   rep(3, 10),
7   c(4, 4)
8 )
9 # Make some group variables
10 dat2 <- rbind(dat, dat)
11 dat2['groups1'] <- c(
12   rep('a', 32),
13   rep('b', 32)
14 )
15 dat2['groups2'] <- c(
16   rep('1', 16),
17   rep('2', 16),
18   rep('1', 16),
19   rep('2', 16)
20 )
```

```
1 ct <- clintable(dat2) |>
2   clin_page_by('page') |>
3   clin_group_by(c('groups1', 'groups2')) |>
4   clin_alt_pages(
5     key_cols = c('mpg', 'cyl', 'hp'),
6     col_groups = list(
7       c('disp', 'drat', 'wt'),
8       c('qsec', 'vs', 'am'),
9       c('gear', 'carb')
10    )
11  )
12 ct
```

```
1 ct <- clintable(dat2) |>
2   clin_page_by('page') |>
3   clin_group_by(c('groups1', 'groups2')) |>
4   clin_alt_pages(
5     key_cols = c('mpg', 'cyl', 'hp'),
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7       c('disp', 'drat', 'wt'),
8       c('qsec', 'vs', 'am'),
9       c('gear', 'carb')
10    )
11  )
12 ct
```

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3   clin_group_by(c('groups1', 'groups2')) |>
4   clin_alt_pages(
5     key_cols = c('mpg', 'cyl', 'hp'),
6     col_groups = list(
7       c('disp', 'drat', 'wt'),
8       c('qsec', 'vs', 'am'),
9       c('gear', 'carb')
10    )
11  )
12 ct
```

a
1

mpg	cyl	hp	gear	carb
21.0	6	110	4	4
21.0	6	110	4	4
22.8	4	93	4	1
21.4	6	110	3	1
18.7	8	175	3	2
18.1	6	105	3	1
14.3	8	245	3	4
24.4	4	62	4	2
22.8	4	95	4	2
19.2	6	123	4	4

1

2

3

Column Widths

- Assignment based on percentage width
- Width automatically set based on assigned defaults
- Alternating pages respect key column widths
 - Proportional to respective page

```
1 ct <- clintable(dat2) |>
2   clin_page_by('page') |>
3   clin_group_by(c('groups1', 'groups2')) |>
4   clin_alt_pages(
5     key_cols = c('mpg', 'cyl', 'hp'),
6     col_groups = list(
7       c('disp', 'drat', 'wt'),
8       c('qsec', 'vs', 'am'),
9       c('gear', 'carb')
10    )
11  ) |>
12  clin_col_widths(mpg = .2, cyl=.2, disp=.15, vs=.15)
13 ct
```

a

1

mpg

cyl

hp

gear

carb

21.0

6

110

4

4

21.0

6

110

4

4

22.8

4

93

4

1

21.4

6

110

3

1

18.7

8

175

3

2

18.1

6

105

3

1

14.3

8

245

3

4

24.4

4

62

4

2

22.8

4

95

4

2

19.2

6

123

4

4

1

2

3

Column Headers

- Simplify ability to assign custom column headers
- Allow for spanning headers
 - Allow levels of nesting
- Take header from labels if available

```
1 library(flextable)
2 ct <- clintable(iris) |>
3   clin_column_headers(
4     Sepal.Length = c("Flowers", "Sepal", "Length"),
5     Sepal.Width = c("Flowers", "Sepal", "Width"),
6     Petal.Length = c("Petal", "Length"),
7     Petal.Width = c("Petal", "Width")
8   ) |>
9   align(align='center', part='header') |>
10  align(align='center', part='body')
11 ct
```

```
1 library(flextable)
2 ct <- clintable(iris) |>
3   clin_column_headers(
4     Sepal.Length = c("Flowers", "Sepal", "Length"),
5     Sepal.Width = c("Flowers", "Sepal", "Width"),
6     Petal.Length = c("Petal", "Length"),
7     Petal.Width = c("Petal", "Width")
8   ) |>
9   align(align='center', part='header') |>
10  align(align='center', part='body')
11 ct
```



Flowers				
Sepal		Petal		
Length	Width	Length	Width	
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa
4.8	3.0	1.4	0.1	setosa
4.3	3.0	1.1	0.1	setosa
5.8	4.0	1.2	0.2	setosa

```
1 dat <- iris
2 attr(refdat$Sepal.Length, 'label') <- "Flower||Sepal||Length"
3 attr(refdat$Sepal.Width, 'label') <- "Flower||Sepal||Width"
4 attr(refdat$Petal.Length, 'label') <- "Flower||Petal||Length"
5 attr(refdat$Petal.Width, 'label') <- "Flower||Petal||Width"
6
7 ct <- clintable(dat)|>
8   align(align='center', part='header') |>
9   align(align='center', part='body')
10 ct
```

Flowers				
Sepal		Petal		
Length	Width	Length	Width	
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa
4.8	3.0	1.4	0.1	setosa
4.3	3.0	1.1	0.1	setosa
5.8	4.0	1.2	0.2	setosa

Understanding Defaults

- Default styles are applied to `clintable()` objects automatically when printing
- Stored in options, and customizable:
 - `clinify_docx_default`: Default docx properties assigned to output document
 - Also controls page width based on margins
 - `clinify_titles_default`: Default title styles (within document header)
 - `clinify_footnotes_default`: Default footnote styles (within document footer)
 - `clinify_table_default`: Default table body styles

Tying it All Together

```
1 # Create a basic table
2 ct <- clintable(dat2) |>
3   clin_page_by('page') |>
4   clin_group_by(c('groups1', 'groups2')) |>
5   clin_alt_pages(
6     key_cols = c('mpg', 'cyl', 'hp'),
7     col_groups = list(
8       c('disp', 'drat', 'wt'),
9       c('qsec', 'vs', 'am'),
10      c('gear', 'carb')
11    )
12  ) |>
13  clin_col_widths(mpg = .2, cyl=.2, disp=.15, vs=.15) |>
14  clin_add_titles(
15    list(
16      c("Left", "Center", "Right"),
17      c("Just the middle")
18    )
19  ) |>
```



Left

Center
Just the middle

Right

a
1

mpg

cyl

hp

gear

carb

21.0

6

110

4

4

21.0

6

110

4

4

22.8

4

93

4

1

21.4

6

110

3

1

18.7

8

175

3

2

18.1

6

105

3

1

14.3

8

245

3

4

24.4

4

62

4

2

22.8

4

95

4

2

19.2

6

123

4

4

Here's a footnote.

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1

2

3

Here's a footnote.

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Left

Center
Just the middle

Right

a
1

mpg	<u>cyl</u>	hp	<u>disp</u>	drat	<u>wt</u>
17.8	6	I 123	167.6	3.92	3.440
16.4	8	180	275.8	3.07	4.070
17.3	8	180	275.8	3.07	3.730
15.2	8	180	275.8	3.07	3.780
10.4	8	205	472.0	2.93	5.250
10.4	8	215	460.0	3.00	5.424

Key Ideas

- `{clinify}` works as an extension of the `{flextable}` and `{officer}` packages to help with clinical reporting
- It focuses on additional required features and streamlines less straightforward pieces
- Intent is not to be redundant with other packages in the pharmaverse
 - Packages like `{rtables}` or `{gtsummary}` can already output to `{flextable}` objects