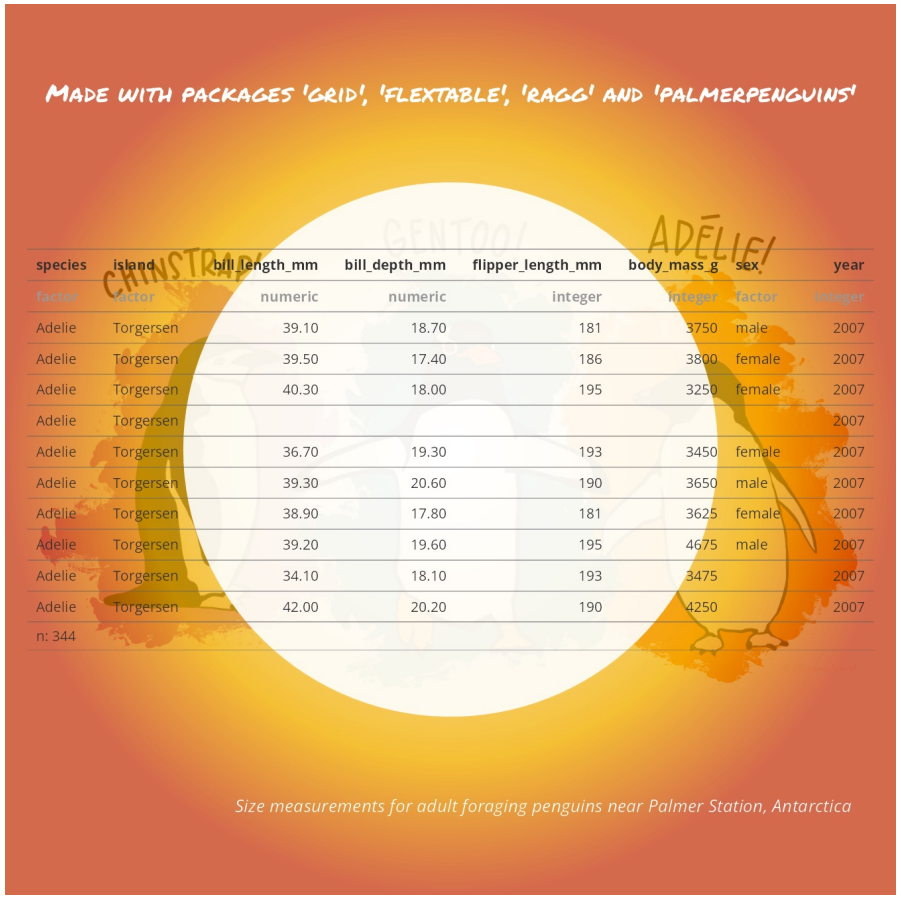
Réaliser ses tableaux avec flextable

Les avancées liées au Rconsortium

‘flextable’ (2017 - Gohel et Skintzos) fournit une grammaire pour créer et personnaliser des tableaux.

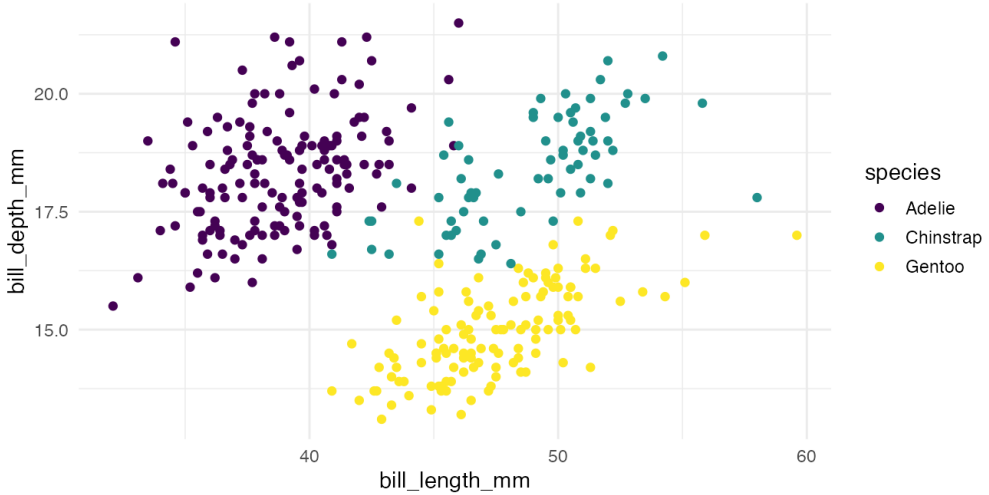
Les formats suivants sont pris en charge : 'Word' (.docx), 'PowerPoint' (.pptx), 'RTF', 'PDF', 'HTML' et R 'Grid Graphics’. La syntaxe est la même pour l'utilisateur quel que soit le type de sortie à produire.

Le package offre également un ensemble de fonctions de haut niveau qui permettent, par exemple, la présentation sous forme de tableaux de modèles statistiques et la création de tableaux croisés complexes.



Les dernières avancées – grid graphics

Été 2022 : sortie graphique complètement intégrée avec grid (et donc ggplot2, patchwork et cowplot)



species	island	bill_length_mm	bill_depth_mm	flipper_length_mm	body_mass_g	sex	year
factor	factor	numeric	numeric	integer	integer	factor	integer
Adelie	Torgersen	39.10	18.70	181	3750	male	2007
Adelie	Torgersen	39.50	17.40	186	3800	female	2007
Adelie	Torgersen	40.30	18.00	195	3250	female	2007
Adelie	Torgersen						2007
Adelie	Torgersen	36.70	19.30	193	3450	female	2007
Adelie	Torgersen	39.30	20.60	190	3650	male	2007
Adelie	Torgersen	38.90	17.80	181	3625	female	2007
Adelie	Torgersen	39.20	19.60	195	4675	male	2007
Adelie	Torgersen	34.10	18.10	193	3475		2007
Adelie	Torgersen	42.00	20.20	190	4250		2007
n: 344							

Les dernières avancées – RTF

flextable and RTF

Recours au 49-3

Historique des recours au 49-3 pendant la V république[1][2]

Premier ministre		Recours au 49-3[3]	Textes concernés[4]	Motions de censure[3]
Élisabeth Borne	*2022-2023 (313 jours)*	11	3	14
Jean Castex	*2020-2022 (682 jours)*			
Édouard Philippe	*2017-2020 (1145 jours)*	1	1	2
Bernard Cazeneuve	*2016-2017 (155 jours)*			
Manuel Valls	*2014-2016 (981 jours)*	6	2	3
Jean-Marc Ayrault	*2012-2014 (685 jours)*			
François Fillon	*2007-2012 (1820 jours)*			
Dominique de Villepin	*2005-2007 (712 jours)*	1	1	0
Jean-Pierre Raffarin	*2002-2005 (1121 jours)*	2	2	2
Lionel Jospin	*1997-2002 (1799 jours)*			
Alain Juppé	*1995-1997 (747 jours)*	2	2	2
Édouard Balladur	*1993-1995 (773 jours)*	1	1	1
Pierre Bérégovoy	*1992-1993 (361 jours)*	3	3	1
Edith Cresson	*1991-1992 (323 jours)*	8	4	2
Michel Rocard	*1988-1991 (1100 jours)*	28	13	5

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flextable and RTF

Historique des recours au 49-3 pendant la V république[1][2]

Premier ministre		Recours au 49-3[3]	Textes concernés[4]	Motions de censure[3]
Jacques Chirac	*1986-1988 (782 jours)*	8	7	7
Laurent Fabius	*1984-1986 (611 jours)*	4	2	1
Pierre Mauroy	*1981-1984 (1153 jours)*	7	5	6
Raymond Barre	*1976-1981 (1722 jours)*	8	5	13
Jacques Chirac	*1974-1976 (821 jours)*			
Pierre Messmer	*1972-1974 (691 jours)*			
Jacques Chaban-Delmas	*1969-1972 (1111 jours)*			
Maurice Couve de Murville	*1968-1969 (345 jours)*			
Georges Pompidou	*1962-1968 (2279 jours)*	6	2	4
Michel Debré	*1959-1962 (1192 jours)*	4	2	4

[1] source : *https://www.assemblee-nationale.fr*

[2] source : *https://www.politiquemania.com/longevite-premier-ministre.html*

[3]Fréquence [4]Nombre de cas;

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Q1 2023 : sortie RTF implémentée (pour la pharma) – proche des sorties Word et compatibilité complète (images + textes)

Les dernières avancées – refonte de proc_freq

```
set_flextable_defaults(
  font.family = "Open Sans",
  font.size = 9)
```

```
with(ggplot2::diamonds,
  table(clarity, cut)) |>
  as_flextable()
```

OU

```
proc_freq(
  x = ggplot2::diamonds,
  row = "clarity",
  col = "cut")
```

		Var2					
Var1		Fair	Good	Very Good	Premium	Ideal	Total
I1	Count	210 (0.4%)	96 (0.2%)	84 (0.2%)	205 (0.4%)	146 (0.3%)	741 (1.4%)
	Mar. pct [(1)]	13.0% ; 28.3%	2.0% ; 13.0%	0.7% ; 11.3%	1.5% ; 27.7%	0.7% ; 19.7%	
SI2	Count	466 (0.9%)	1,081 (2.0%)	2,100 (3.9%)	2,949 (5.5%)	2,598 (4.8%)	9,194 (17.0%)
	Mar. pct	28.9% ; 5.1%	22.0% ; 11.8%	17.4% ; 22.8%	21.4% ; 32.1%	12.1% ; 28.3%	
SI1	Count	408 (0.8%)	1,560 (2.9%)	3,240 (6.0%)	3,575 (6.6%)	4,282 (7.9%)	13,065 (24.2%)
	Mar. pct	25.3% ; 3.1%	31.8% ; 11.9%	26.8% ; 24.8%	25.9% ; 27.4%	19.9% ; 32.8%	
VS2	Count	261 (0.5%)	978 (1.8%)	2,591 (4.8%)	3,357 (6.2%)	5,071 (9.4%)	12,258 (22.7%)
	Mar. pct	16.2% ; 2.1%	19.9% ; 8.0%	21.4% ; 21.1%	24.3% ; 27.4%	23.5% ; 41.4%	
VS1	Count	170 (0.3%)	648 (1.2%)	1,775 (3.3%)	1,989 (3.7%)	3,589 (6.7%)	8,171 (15.1%)
	Mar. pct	10.6% ; 2.1%	13.2% ; 7.9%	14.7% ; 21.7%	14.4% ; 24.3%	16.7% ; 43.9%	
VVS2	Count	69 (0.1%)	286 (0.5%)	1,235 (2.3%)	870 (1.6%)	2,606 (4.8%)	5,066 (9.4%)
	Mar. pct	4.3% ; 1.4%	5.8% ; 5.6%	10.2% ; 24.4%	6.3% ; 17.2%	12.1% ; 51.4%	
VVS1	Count	17 (0.0%)	186 (0.3%)	789 (1.5%)	616 (1.1%)	2,047 (3.8%)	3,655 (6.8%)
	Mar. pct	1.1% ; 0.5%	3.8% ; 5.1%	6.5% ; 21.6%	4.5% ; 16.9%	9.5% ; 56.0%	
IF	Count	9 (0.0%)	71 (0.1%)	268 (0.5%)	230 (0.4%)	1,212 (2.2%)	1,790 (3.3%)
	Mar. pct	0.6% ; 0.5%	1.4% ; 4.0%	2.2% ; 15.0%	1.7% ; 12.8%	5.6% ; 67.7%	
Total	Count	1,610 (3.0%)	4,906 (9.1%)	12,082 (22.4%)	13,791 (25.6%)	21,551 (40.0%)	53,940 (100.0%)

[(1)] Columns and rows percentages

Avancées 2023 et « R Tables for Regulatory Submissions Working Group »

The goal of the working group is to create standards for creating tables that meet the requirements of FDA submission documents, and hence enhance the suitability of R for FDA submissions. It is part of a larger R Consortium effort to facilitate the certification and validation of R packages and tools for FDA submissions thereby allowing drug developers to submit documentation for regulatory approval using the R programming environment in conjunction with open-source packages without the need for closed and often expensive proprietary tools.

Deux types de packages :

1. Ceux qui sont centrés sur l'expression fonctionnel, la définition du contenu mais peu de capacité de formatage (tables, rtables, tfrmt, tidytlg)
2. Ceux qui sont centrés sur le formatage, la définition du contenu est centrée sur la mise en forme d'un data.frame (flextable, gt)

	Drug X (N=134)	Placebo (N=134)	Combination (N=132)
Subjects with serious adverse events	89 (66.42%)	123 (91.79%)	88 (66.67%)
Number of censored subjects			
Clinical Cut Off	10 (7.46%)	4 (2.99%)	14 (10.61%)
Completion or Discontinuation	13 (9.70%)	3 (2.24%)	16 (12.12%)
End of AE Reporting Period	22 (16.42%)	4 (2.99%)	14 (10.61%)
Hazard ratio		1.5	1.1
95% confidence interval		(1.1, 1.9)	(0.8, 1.5)
p-value (one-sided stratified log rank)		0.0208	0.4619
Time to first serious adverse event			
Median (years)	0.39	0.37	0.26
95% confidence interval	[0.23, 0.60]	[0.25, 0.46]	[0.18, 0.34]
Min, Max	0.00, 3.00	0.00, 3.00	0.00, 3.00

	A: Drug X (N=134)	B: Placebo (N=134)	C: Combination (N=132)
Patients with at least one event	122 (91.04%)	123 (91.79%)	120 (90.91%)
Total number of events	609	622	703
cl A.1			
Patients with at least one event	78 (58.21%)	75 (55.97%)	89 (67.42%)
Total number of events	132	130	160
dcd A.1.1.1.1	50 (37.31%)	45 (33.58%)	63 (47.73%)
dcd A.1.1.1.2	48 (35.82%)	48 (35.82%)	50 (37.88%)
cl B.1			
Patients with at least one event	47 (35.07%)	49 (36.57%)	43 (32.58%)
Total number of events	56	60	62
dcd B.1.1.1.1	47 (35.07%)	49 (36.57%)	43 (32.58%)
cl B.2			
Patients with at least one event	79 (58.96%)	74 (55.22%)	85 (64.39%)
Total number of events	129	138	143
dcd B.2.1.2.1	49 (36.57%)	44 (32.84%)	52 (39.39%)
dcd B.2.2.3.1	48 (35.82%)	54 (40.30%)	51 (38.64%)
…..			

Vient d'un autre tableau

Métrique A

Métrique B

Métrique C

Métrique D

Métrique E

6 agrégations différentes à empiler dans un tableau unique et réparties sur 3 groupes

as_flextable()

Le package ‘tables’ n’est pas très loin de la ‘PROC TABULATE’ de SAS et répond à beaucoup de besoins. Le package ‘rtables’ est dédié au reporting clinique et aussi très élégant pour produire des tableaux.

```
> tab <- tabular(
   (cut + 1) ~ Format(digits=3) *
     (price + depth) * (mean + sd),
   data = ggplot2::diamonds )
> tab
```

```
           price                depth
cut        mean      sd         mean      sd
Fair       4358.758  3560.387     64.042     3.643
Good       3928.864  3681.590     62.366     2.169
Very Good  3981.760  3935.862     61.818     1.379
Premium    4584.258  4349.205     61.265     1.159
Ideal      3457.542  3808.401     61.709     0.719
All        3932.800  3989.440     61.749     1.433
```

Les codes ‘flextable’ ou ‘gt’ pour produire certains tableaux sont **longs car il faut préparer le data.frame**.

Mais l’utilisation de la fonction as_flextable() permet de s’affranchir de cette inconvénient et offre à ‘tables’ et ‘rtables’ les formats RTF, Word, PowerPoint, HTML, grid graphics, PDF (plus tard Excel)

	price		depth	
cut	mean	sd	mean	sd
Fair	4358.758	3560.387	64.042	3.643
Good	3928.864	3681.590	62.366	2.169
Very Good	3981.760	3935.862	61.818	1.379
Premium	4584.258	4349.205	61.265	1.159
Ideal	3457.542	3808.401	61.709	0.719
All	3932.800	3989.440	61.749	1.433

Adverse Event Table

https://rconsortium.github.io/rtrs-wg/commontables.html#tables-5

```
body <- tabular( Heading("Patients with at least one event")*1*
                  Heading("")*countpercentid*Arguments(ARM = ARM)*
                  Heading()*USUBJID +
                Heading("Total number of events")*1*Heading("")*1 +
                Heading()*AEBODSYS*
                 (Heading("Patients with at least one event")*
                    Percent(denom = ARM, fn = countpercentid)*
                    Heading()*USUBJID +
                   Heading("Total number of events")*1 +
                   Heading()*AEDECOD*DropEmpty(which = "row")*
                    Heading()*Percent(denom = ARM, fn = countpercentid)*
                    Heading()*USUBJID) ~
                Heading()*ARM,  data = ex_adae )
as_flextable(body, ...)
```

	A: Drug X (N=134)	B: Placebo (N=134)	C: Combination (N=132)
Patients with at least one event	122 (91.04%)	123 (91.79%)	120 (90.91%)
Total number of events	609	622	703
cl A.1			
Patients with at least one event	78 (58.21%)	75 (55.97%)	89 (66.42%)
Total number of events	132	130	160
dcd A.1.1.1.1	50 (37.31%)	45 (33.58%)	63 (47.01%)
dcd A.1.1.1.2	48 (35.82%)	48 (35.82%)	50 (37.31%)
cl B.1			
Patients with at least one event	47 (35.07%)	49 (36.57%)	43 (32.09%)
Total number of events	56	60	62
dcd B.1.1.1.1	47 (35.07%)	49 (36.57%)	43 (32.09%)
cl B.2			
Patients with at least one event	79 (58.96%)	74 (55.22%)	85 (63.43%)
Total number of events	129	138	143
dcd B.2.1.2.1	49 (36.57%)	44 (32.84%)	52 (38.81%)
dcd B.2.2.3.1	48 (35.82%)	54 (40.30%)	51 (38.06%)
cl C.1			
Patients with at least one event	43 (32.09%)	46 (34.33%)	43 (32.09%)
Total number of events	55	63	64
dcd C.1.1.1.3	43 (32.09%)	46 (34.33%)	43 (32.09%)

Time to Event Analysis Table

https://rconsortium.github.io/rtrs-wg/commontables.html#flextable-6

	A: Drug X (N=134)	B: Placebo (N=134)	C: Combination (N=132)
Subjects with serious adverse events	89 (66.42%)	123 (91.79%)	88 (66.67%)
Number of censored subjects			
Clinical Cut Off	10 (7.46%)	4 (2.99%)	14 (10.61%)
Completion or Discontinuation	13 (9.70%)	3 (2.24%)	16 (12.12%)
End of AE Reporting Period	22 (16.42%)	4 (2.99%)	14 (10.61%)
Hazard ratio		1.5	1.1
95% confidence interval		(1.1, 1.9)	(0.8, 1.5)
p-value (one-sided stratified log rank)		0.0208	0.4619
Time to first serious adverse event			
Median (years)	0.39	0.37	0.26
95% confidence interval	[0.23, 0.60]	[0.25, 0.46]	[0.18, 0.34]
Min, Max	0.00, 3.00	0.00, 3.00	0.00, 3.00

Concomitant Medications

https://rconsortium.github.io/rtrs-wg/commontables.html#flextable-7

Conmed Example

Uses the adcm dataset from **random.cdisc.data**

	A: Drug X (N=134)	B: Placebo (N=134)	C: Combination (N=132)
At Least One Concomittant Med	122 (91.0%)	123 (91.8%)	120 (90.9%)
medcl A			
A_1/3	54 (40.3%)	49 (36.6%)	69 (52.3%)
A_2/3	53 (39.6%)	50 (37.3%)	56 (42.4%)
A_3/3	45 (33.6%)	54 (40.3%)	48 (36.4%)
medcl B			
B_1/4	52 (38.8%)	57 (42.5%)	59 (44.7%)
B_2/4	52 (38.8%)	55 (41.0%)	56 (42.4%)
B_3/4	47 (35.1%)	47 (35.1%)	52 (39.4%)
B_4/4	50 (37.3%)	45 (33.6%)	55 (41.7%)
medcl C			
C_1/2	51 (38.1%)	50 (37.3%)	56 (42.4%)
C_2/2	52 (38.8%)	58 (43.3%)	60 (45.5%)

Créé avec un objet de rtables cette fois-ci:

```
tt_to_flextable(build_table(lyt, cadcm, alt_counts_df = cadsl)) |>
  theme_booktabs() |>
  font(fontname = "Open Sans") |>
  bold(i = ~ V2 %in% "", j = 1, bold = TRUE) |>
  bold(i = 1, j = 1, bold = TRUE) |>
  align(j = 2:4, align = "center", part = "all") |>
  set_table_properties(layout = "fixed") |>
  autofit() |>
  mk_par(i = 1, j = 1, part = "header",
       as_paragraph(as_chunk("Conmed Example",
         props = fp_text_default(font.size = 14)))) |>
  mk_par(i = 2, j = 1, part = "header",
       as_paragraph("Uses the adcm dataset from ",
         as_b("random.cdisc.data")))
```