

Unlocking the Future of Tables with the {tfrmt} R Package

Becca Krouse, GSK

PHUSE US Connect 2024

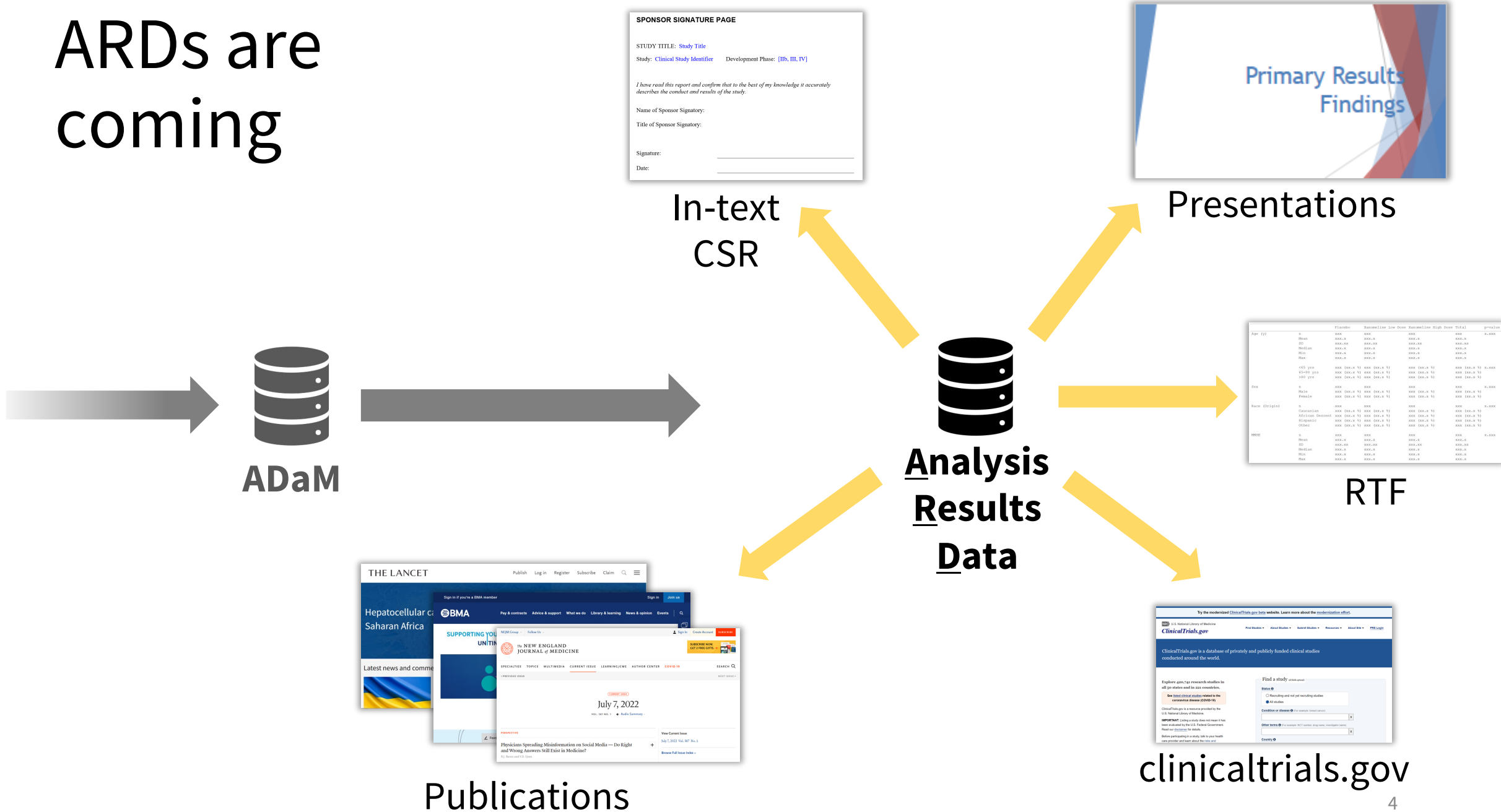


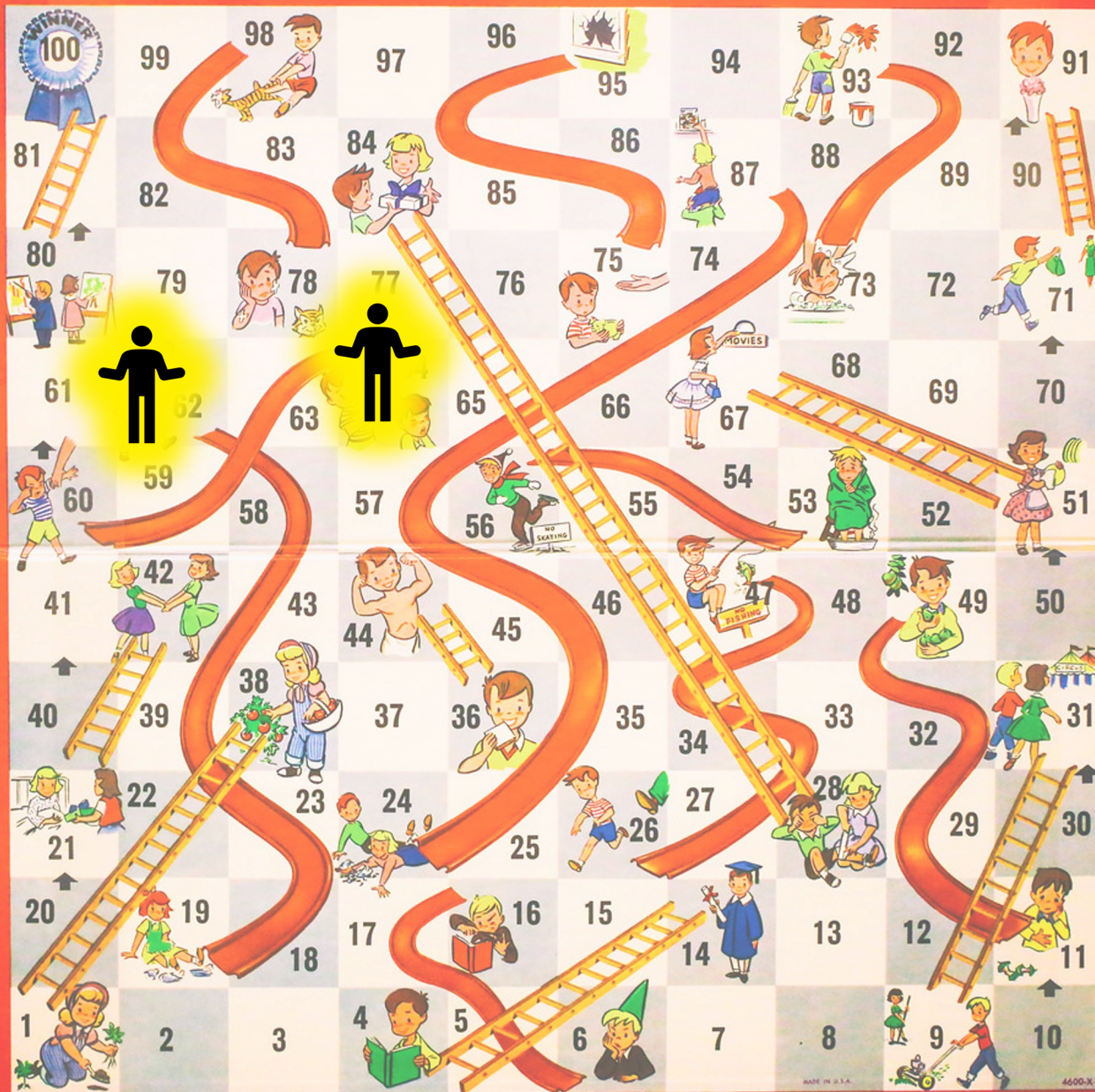
Disclaimer

This presentation is my personal opinion
and not that of my organization.

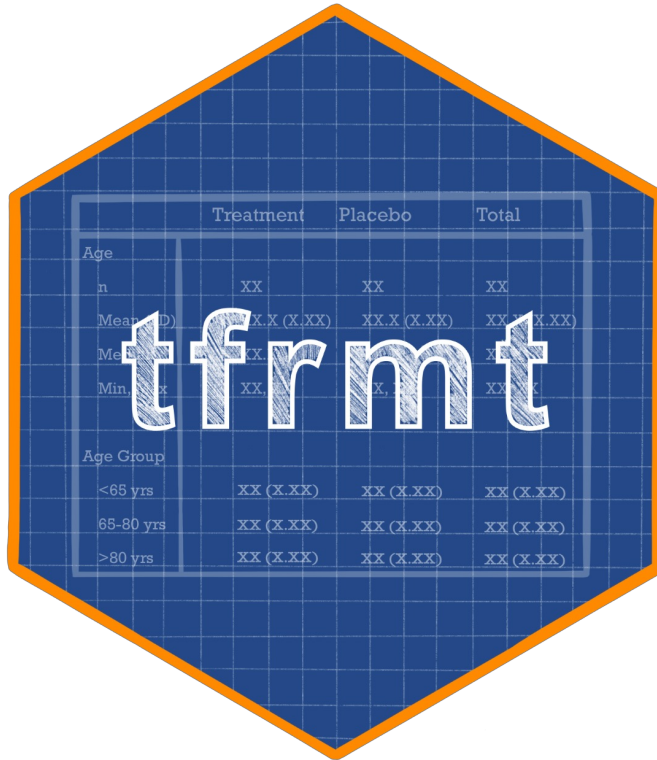


ARDs are coming



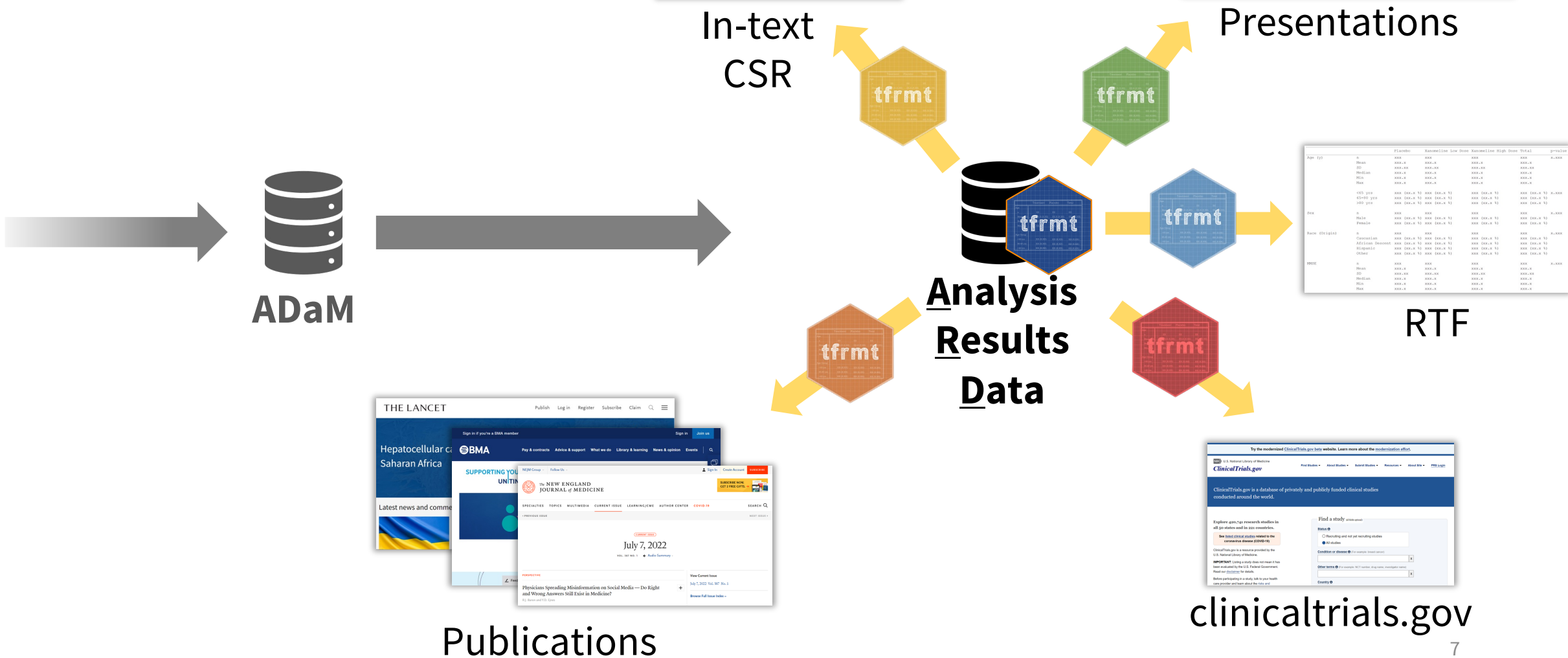


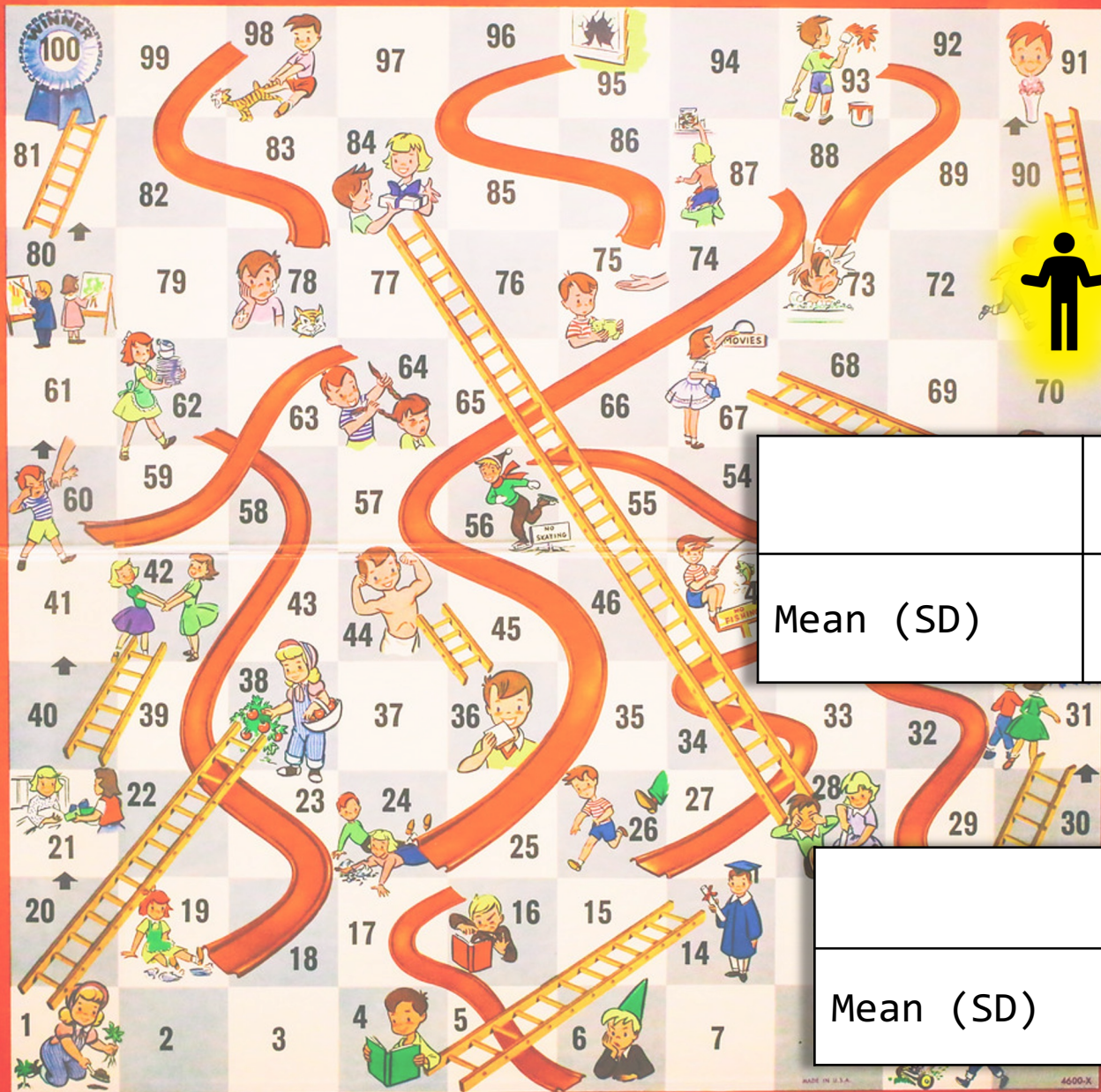
Group Label		Column	Param	Value
Age	n	Placebo	n	15.00
Age	n	Trt	n	13.00
Age	n	Total	n	28.00
Sex	n	Placebo	n	14.00
Sex	n	Trt	n	13.00
Sex	n	Total	n	27.00
Age	Mean (sd)	Placebo	mean	73.56
Age	Mean (sd)	Trt	mean	74.231
Age	Mean (sd)	Total	mean	71.84
Age	Mean (sd)	Placebo	SD	9.347
Age	Mean (sd)	Trt	SD	7.234
Age	Mean (sd)	Total	SD	8.293



The {tfrmt} package provides a language for defining display-related **metadata**, which can then be used to **automate** and easily **update** output formats.

ARDs + {tfrmt}





	Trt	Placebo	Total
Mean (SD)	74.23 (7.23)	73.56 (9.35)	71.84 (8.29)



	Trt	Placebo	Total
Mean (SD)	74.2 (7.2)	73.6 (9.3)	71.8 (8.3)

Constructing a tfrmt object

tfrmt(

)

Constructing a tfrmt object

tfrmt(

group = "AEBODSYS",

label = "AETERM",

column = "TRT",

...

)

	TRT1 TRT2 TRT3		
	N — xx N — xx N — xx		
AEBODSYS_1			
AETERM_1	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_2	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_3	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AEBODSYS_2			
AETERM_1	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_2	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_3	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AEBODSYS_3			
AETERM_1	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_2	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_3	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)

Constructing a tfrmt object

```
tfrmt(
```

```
  group = "AEBODSYS",
  label = "AETERM",
  column = "TRT",
```

```
  ...
```

```
  body_plan = body_plan(),
```

```
  col_plan = col_plan(),
```

```
  row_grp_plan = row_grp_plan(),
```

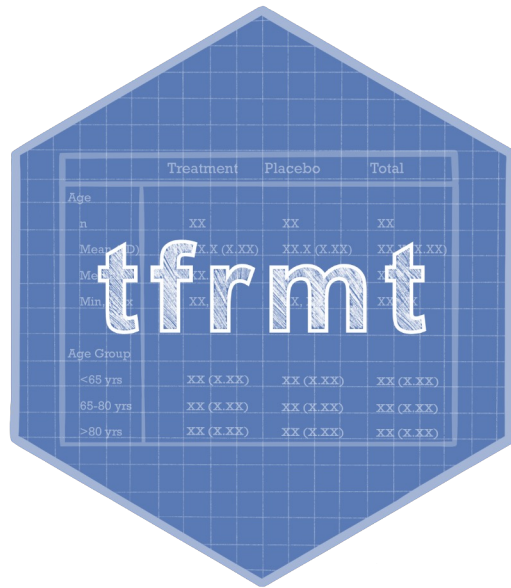
```
  col_style_plan = col_style_plan()
```

```
  ...
```

```
)
```

	TRT1	TRT2	TRT3
	N = xx	N = xx	N = xx
AEBODSYS_1			
AETERM_1	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_2	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_3	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AEBODSYS_2			
AETERM_1	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_2	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_3	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AEBODSYS_3			
AETERM_1	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_2	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
AETERM_3	XX (xx.x %)	XX (xx.x %)	XX (xx.x %)

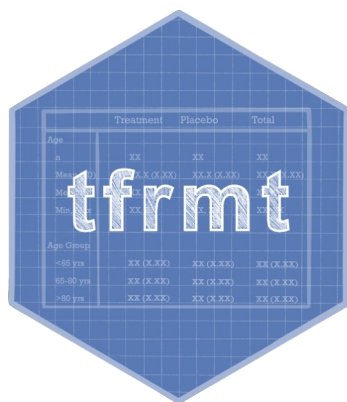
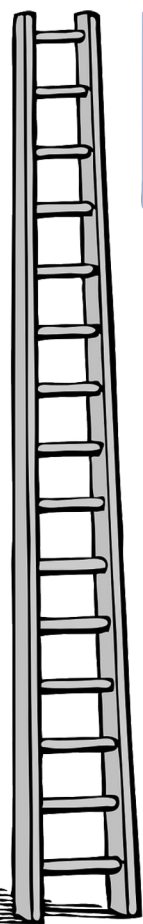
Using the tfrmt



	Treatment	Placebo	Total
Age			
n	XX	XX	XX
Mean	XX (X.XX)	XX (X.XX)	XX (X.XX)
Median	XX	XX	XX
Min	XX	XX	XX
Max	XX	XX	XX
Age Group			
<65 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)
65-80 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)
>80 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)

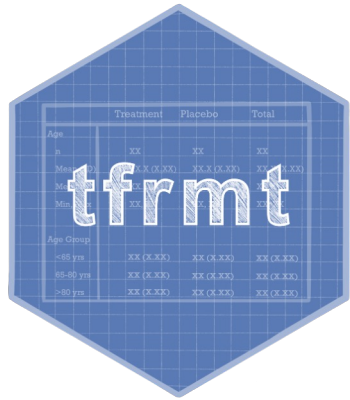
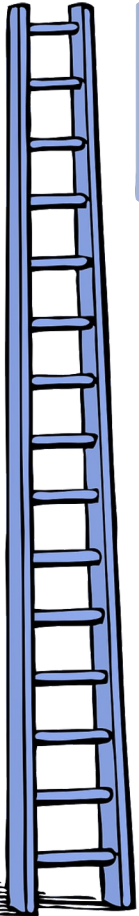
```
tfrmt_ae <- tfrmt(  
  group = "AEBODSYS",  
  label = "AETERM",  
  column = "TRT",  
  ...  
  body_plan = body_plan(...),  
  col_plan = col_plan(...),  
  ...  
)
```

Using the tfrmt



	TRT1		TRT2		TRT3	
	N = xx		N = xx		N = xx	
AEBODSYS_1						
AETERM_1	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AETERM_2	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AETERM_3	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AEBODSYS_2						
AETERM_1	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AETERM_2	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AETERM_3	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AEBODSYS_3						
AETERM_1	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AETERM_2	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)
AETERM_3	XX	(xx.x %)	XX	(xx.x %)	XX	(xx.x %)

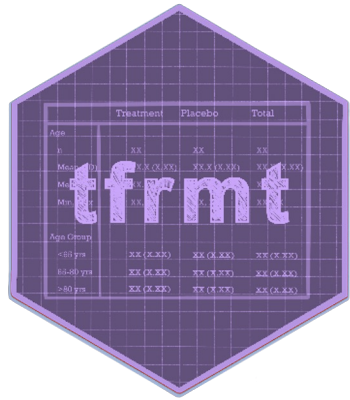
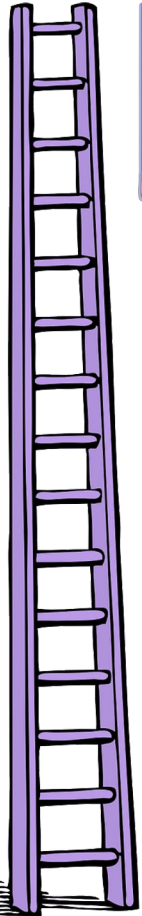
Using the tfrmt...again



+ ARD

	Placebo N = 86	Xanomeline Low Dose N = 84	Xanomeline High Dose N = 84
ANY BODY SYSTEM	65 (75.6 %)	77 (91.7 %)	76 (90.5 %)
CARDIAC DISORDERS	12 (14.0 %)	13 (15.5 %)	15 (17.9 %)
GASTROINTESTINAL DISORDERS	17 (19.8 %)	14 (16.7 %)	20 (23.8 %)
GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS	21 (24.4 %)	47 (56.0 %)	40 (47.6 %)
APPLICATION SITE PRURITUS	6 (7.0 %)	22 (26.2 %)	22 (26.2 %)
APPLICATION SITE ERYTHEMA	3 (3.5 %)	12 (14.3 %)	15 (17.9 %)
APPLICATION SITE IRRITATION	3 (3.5 %)	9 (10.7 %)	9 (10.7 %)
INFECTIONS AND INFESTATIONS	16 (18.6 %)	9 (10.7 %)	13 (15.5 %)
NERVOUS SYSTEM DISORDERS	8 (9.3 %)	20 (23.8 %)	25 (29.8 %)
DIZZINESS	2 (2.3 %)	8 (9.5 %)	11 (13.1 %)
RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS	8 (9.3 %)	9 (10.7 %)	10 (11.9 %)
SKIN AND SUBCUTANEOUS TISSUE DISORDERS	20 (23.3 %)	39 (46.4 %)	40 (47.6 %)
PRURITUS	8 (9.3 %)	21 (25.0 %)	26 (31.0 %)
ERYTHEMA	8 (9.3 %)	14 (16.7 %)	14 (16.7 %)
RASH	5 (5.8 %)	13 (15.5 %)	9 (10.7 %)

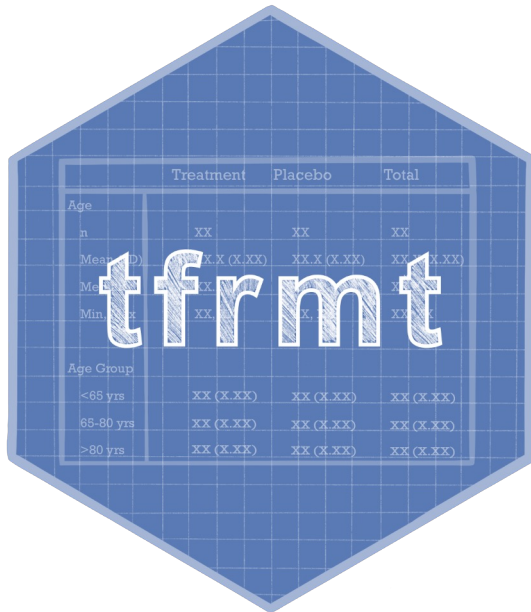
Customizing the tfrmt



+ ARD

	Placebo N = 86	Xanomeline Low Dose N = 84	Xanomeline High Dose N = 84	Placebo N = 86
ANY BODY SYSTEM	65 (75.6 %)	77 (91.7 %)	76 (90.5 %)	86
CARDIAC DISORDERS	12 (14.0 %)	13 (15.5 %)	15 (17.9 %)	5 %
GASTROINTESTINAL DISORDERS	17 (19.8 %)	14 (16.7 %)	20 (23.8 %)	0 %
GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS	21 (24.4 %)	47 (56.0 %)	40 (47.6 %)	3 %
APPLICATION SITE PRURITUS	6 (7.0 %)	22 (26.2 %)	22 (26.2 %)	0 %
APPLICATION SITE ERYTHEMA	3 (3.5 %)	12 (14.3 %)	15 (17.9 %)	5 %
APPLICATION SITE IRRITATION	3 (3.5 %)	9 (10.7 %)	9 (10.7 %)	5 %
INFECTIONS AND INFESTATIONS	16 (18.6 %)	9 (10.7 %)	13 (15.5 %)	5 %
NERVOUS SYSTEM DISORDERS	8 (9.3 %)	20 (23.8 %)	25 (29.8 %)	3 %
DIZZINESS	2 (2.3 %)	8 (9.5 %)	11 (13.1 %)	3 %
RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS	8 (9.3 %)	9 (10.7 %)	10 (11.9 %)	3 %
SKIN AND SUBCUTANEOUS TISSUE DISORDERS	20 (23.3 %)	39 (46.4 %)	40 (47.6 %)	3 %
PRURITUS	8 (9.3 %)	21 (25.0 %)	26 (31.0 %)	3 %
ERYTHEMA	8 (9.3 %)	14 (16.7 %)	14 (16.7 %)	3 %
RASH	5 (5.8 %)	13 (15.5 %)	9 (10.7 %)	h group.

Saving the tfrmt



The graphic shows a table with the following structure:

	Treatment	Placebo	Total
Age			
n	XX	XX	XX
Mean (SD)	XX.X (X.XX)	XX.X (X.XX)	XX.X (X.XX)
Median	XX	XX	XX
Min	XX	XX	XX
Max	XX	XX	XX
Age Group			
<65 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)
65-80 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)
>80 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)

The text "tfrmt" is written in a large, white, stylized font across the middle of the table.

`tf$formattable()`

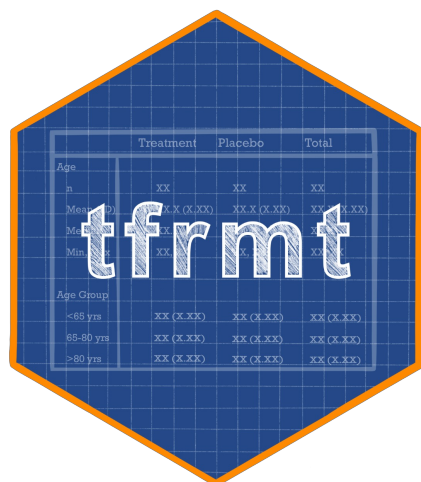


tfrmt_ae.json

```
{
  "group": ["AEBODSYS"],
  "label": ["AETERM"],
  "param": ["param"],
  "value": ["value"],
  "column": ["TRT"],
  "row_grp_plan": {
    "struct_list": [],
    "label_loc": {
      "location": ["indented"],
      "indent": ["  "]
    }
  },
  "body_plan": [
    {
      "group_val": [".default"],
      "label_val": [".default"],
      "param_val": ["n", "pct"],
      "frmt_combine": {
        "expression": ["{n} {pct}"],
        "frmt_ls": {
          "n": {
            "frmt": {
```



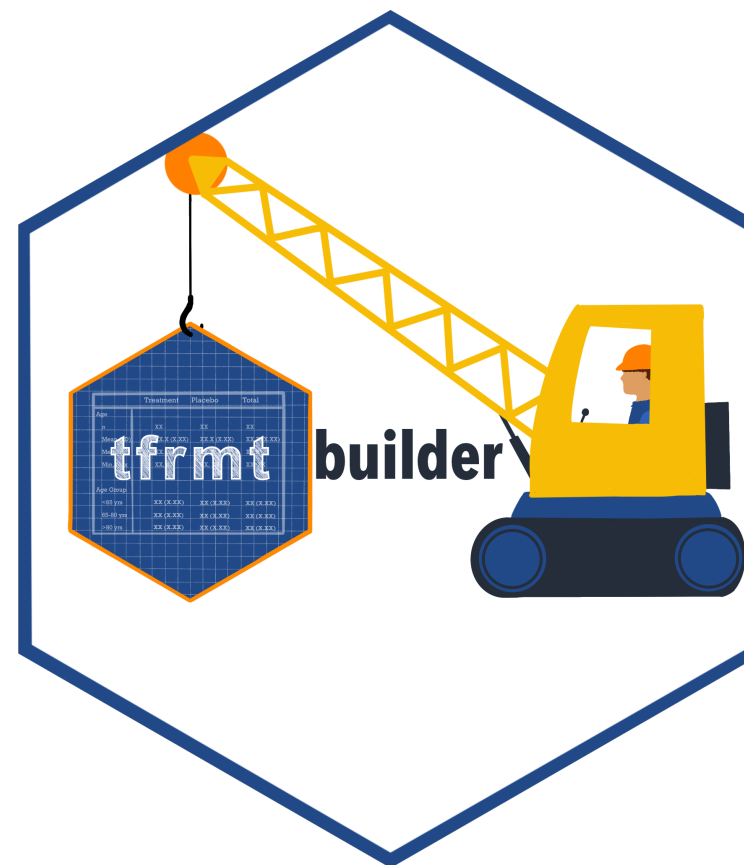
Building more paths to success



+



=





Mock Mode

N = xx

N = xx

N = xx

XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
XX (xx.x %)	XX (xx.x %)	XX (xx.x %)
XX (xx.x %)	XX (xx.x %)	XX (xx.x %)



Mock Mode

N = 86

N = 84

N = 84

65 (75.6 %)	77 (91.7 %)	76 (90.5 %)
12 (14.0 %)	13 (15.5 %)	15 (17.9 %)
17 (19.8 %)	14 (16.7 %)	20 (23.8 %)
21 (24.4 %)	47 (56.0 %)	40 (47.6 %)
6 (7.0 %)	22 (26.2 %)	22 (26.2 %)
3 (3.5 %)	12 (14.3 %)	15 (17.9 %)
3 (3.5 %)	9 (10.7 %)	9 (10.7 %)

Table Metadata

None

Upload

Load JSON

No file selected

tfrmt_ae.json

```
{
  "group": ["AEBODSYS"],
  "label": ["AETERM"],
  "param": ["param"],
  "value": ["value"],
  "column": ["TRT"],
  "row_grp_plan": {
    "struct_list": [],
    "label_loc": {
      "location": ["indented"],
      "indent": [" "]
    }
  },
  "body_plan": [
    {
      "group_val": [".default"],
      "label_val": [".default"],
      "param_val": ["n", "pct"],
      "frmt_combine": {
        "expression": ["{n}
{pct}"],
      "frmt_ls": {
        "n": {
          "frmt": {
```

Data

Auto

Upload

Example

Load Data

No file selected

ard_ae.csv

AEBODSYS	AETERM	TRT	param	value	ord1	ord2
ANY BODY SYSTEM	ANY BODY SYSTEM	Placebo	n	65.000000	0	0
ANY BODY SYSTEM	ANY BODY SYSTEM	Placebo	pct	75.581395	0	0
ANY BODY SYSTEM	ANY BODY SYSTEM	Xanomeline Low Dose	n	77.000000	0	0
ANY BODY SYSTEM	ANY BODY SYSTEM	Xanomeline Low Dose	pct	91.666667	0	0
ANY BODY SYSTEM	ANY BODY SYSTEM	Xanomeline High Dose	n	76.000000	0	0
ANY BODY SYSTEM	ANY BODY SYSTEM	Xanomeline High Dose	pct	90.476190	0	0
CARDIAC DISORDERS	CARDIAC DISORDERS	Placebo	n	12.000000	1	0
CARDIAC DISORDERS	CARDIAC DISORDERS	Placebo	pct	13.953488	1	0

Data Mapping
(Required)Body Plan
(Required)Row Group Plan
(Optional)Column Plan
(Optional)Column Style Plan
(Optional)Footnote Plan
(Optional)Big Ns
(Optional)Titles
(Optional)

Data Mapping

Reset

Groups



Select variable

Label

Select variable

Param

param

Value

value

Columns



Select variable

Sorting Columns



Save

Table

Data

Refresh

Incomplete settings configuration

Data Mapping
(Required)Body Plan
(Required)Row Group Plan
(Optional)Column Plan
(Optional)Column Style Plan
(Optional)Footnote Plan
(Optional)Big Ns
(Optional)Titles
(Optional)

Data Mapping

Reset

Groups



AEBODSYS

Label

AETERM

Param

param

Value

value

Columns



TRT

Sorting Columns



ord1

ord2

Save

Table

Data

Refresh

	Placebo N = 86	Xanomeline Low Dose N = 84	Xanomeline High Dose N = 84
ANY BODY SYSTEM	65 (76%)	77 (92%)	76 (90%)
CARDIAC DISORDERS	12 (14%)	13 (15%)	15 (18%)
GASTROINTESTINAL DISORDERS	17 (20%)	14 (17%)	20 (24%)
GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS	21 (24%)	47 (56%)	40 (48%)
APPLICATION SITE PRURITUS	6 (7%)	22 (26%)	22 (26%)
APPLICATION SITE ERYTHEMA	3 (3%)	12 (14%)	15 (18%)
APPLICATION SITE IRRITATION	3 (3%)	9 (11%)	9 (11%)
INFECTIONS AND INFESTATIONS	16 (19%)	9 (11%)	13 (15%)
NERVOUS SYSTEM DISORDERS	8 (9%)	20 (24%)	25 (30%)
DIZZINESS	2 (2%)	8 (10%)	11 (13%)
RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS	8 (9%)	9 (11%)	10 (12%)
SKIN AND SUBCUTANEOUS TISSUE DISORDERS	20 (23%)	39 (46%)	40 (48%)
PRURITUS	8 (9%)	21 (25%)	26 (31%)
ERYTHEMA	8 (9%)	14 (17%)	14 (17%)
RASH	5 (6%)	13 (15%)	9 (11%)

Modify

View

Data Mapping
(Required)

Body Plan
(Required)

Row Group Plan
(Optional)

Column Plan
(Optional)

Column Style Plan
(Optional)

Footnote Plan
(Optional)

Big Ns
(Optional)

Titles
(Optional)

Column Plan ↺ Reset

Click column name to edit. Note: Group/label columns have a black border and cannot be moved. Only groups may be dropped.

Order Columns

AEBODSYS
AETERM
Xanomeline High Dose
Xanomeline Low Dose
Placebo

Edit AEBODSYS

System Organ Class

💾 Save

Drop Columns

ord1
ord2

Table Metadata

[JSON](#)

```
{
  "group": ["AEBODSYS"],
  "label": ["AETERM"],
  "param": ["param"],
  "value": ["value"],
  "column": ["TRT"],
  "row_grp_plan": {
    "struct_list": [],
    "label_loc": {
      "location": ["indented"],
      "indent": [" "]
    }
  },
  "body_plan": [
    {
      "group_val": [".default"],
      "label_val": [".default"],
      "param_val": ["n", "pct"],
      "frmt_combine": {
        "expression": ["{n} {pct}"],
        "frmt_ls": {
          "n": {
            "frmt": {
              "expression": ["xxx"],
              "missing": {},
              "scientific": {},
```

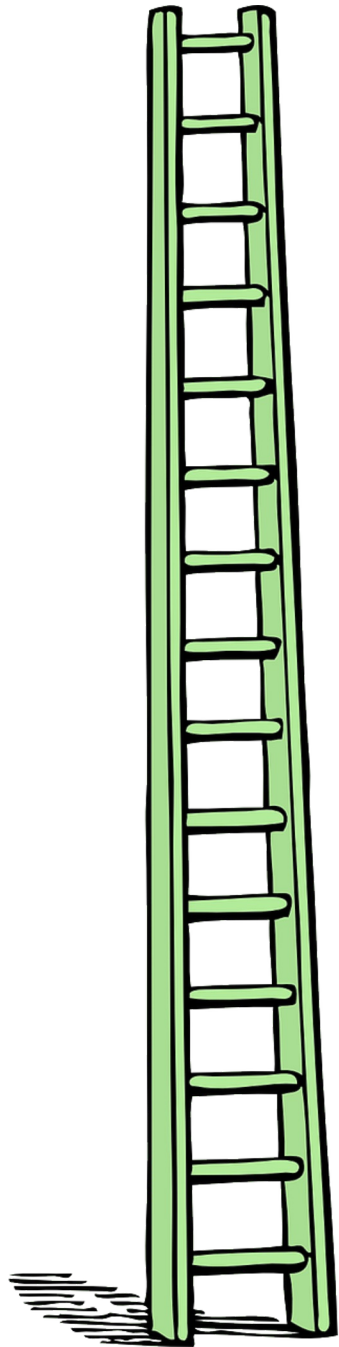
Table

[HTML](#)[PNG](#)

Adverse Events by Treatment Group

	Xanomeline High Dose N = 84	Xanomeline Low Dose N = 84	Placebo N = 86
ANY BODY SYSTEM	76 (90%)	77 (92%)	65 (76%)
CARDIAC DISORDERS	15 (18%)	13 (15%)	12 (14%)
GASTROINTESTINAL DISORDERS	20 (24%)	14 (17%)	17 (20%)
GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS	40 (48%)	47 (56%)	21 (24%)
APPLICATION SITE PRURITUS	22 (26%)	22 (26%)	6 (7%)
APPLICATION SITE ERYTHEMA	15 (18%)	12 (14%)	3 (3%)
APPLICATION SITE IRRITATION	9 (11%)	9 (11%)	3 (3%)
INFECTIONS AND INFESTATIONS	13 (15%)	9 (11%)	16 (19%)
NERVOUS SYSTEM DISORDERS	25 (30%)	20 (24%)	8 (9%)
DIZZINESS	11 (13%)	8 (10%)	2 (2%)
RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS	10 (12%)	9 (11%)	8 (9%)
SKIN AND SUBCUTANEOUS TISSUE DISORDERS	40 (48%)	39 (46%)	20 (23%)
PRURITUS	26 (31%)	21 (25%)	8 (9%)
ERYTHEMA	14 (17%)	14 (17%)	8 (9%)
RASH	9 (11%)	13 (15%)	5 (6%)

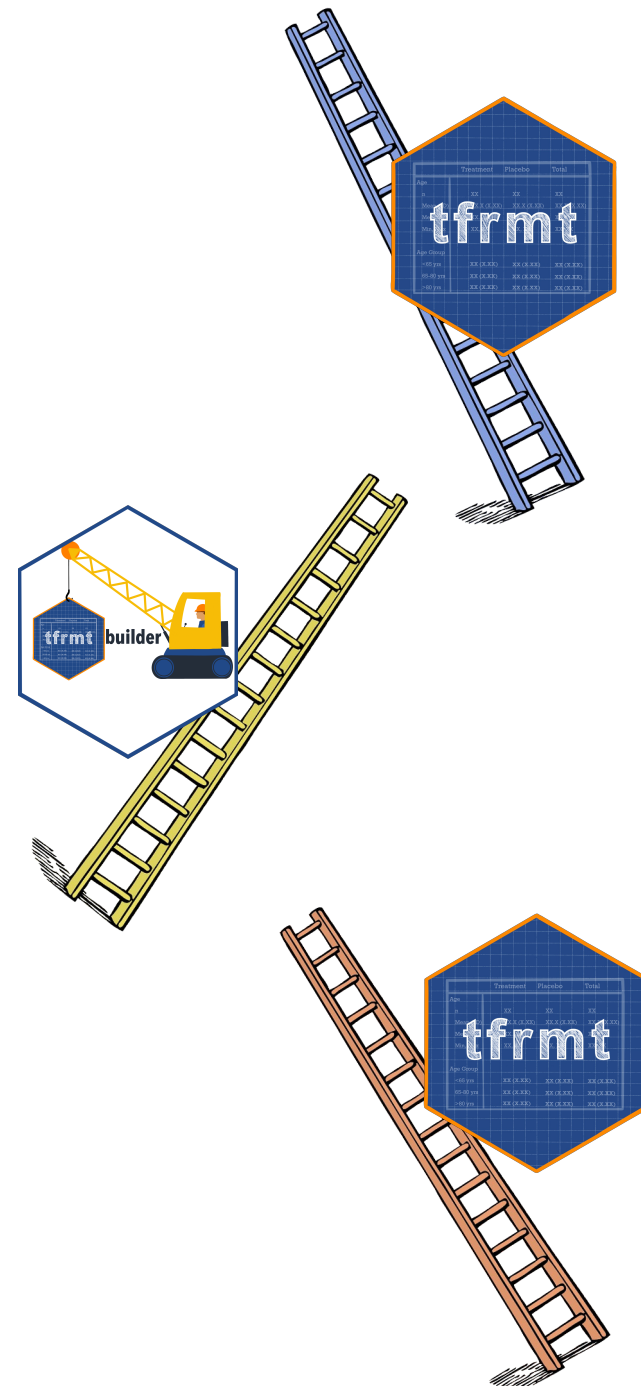
Note: Percentages are based on the number of subjects in the safety population within each group



Export
JSON

Build or
modify table

Define
starting point





Thank you!



The logo for tfrmt, featuring the text 'tfrmt' in a white, stylized font with a blue outline, set against a blue background with a white grid pattern. The logo is enclosed in a blue hexagon with an orange border.

	Treatment	Placebo	Total
Age			
n	XX	XX	XX
Mean (SD)	XX.X (X.XX)	XX.X (X.XX)	XX.X (X.XX)
Median (IQR)	XX (X.XX)	XX (X.XX)	XX (X.XX)
Min-Max	XX (X.XX)	XX (X.XX)	XX (X.XX)
Age Group			
<65 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)
65-80 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)
>80 yrs	XX (X.XX)	XX (X.XX)	XX (X.XX)

gsk-biostatistics.github.io/tfrmt



gsk-biostatistics.github.io/tfrmtbuilder