SAS ユーザー総会 2017

帳票Mockup からのRTF用テンプレート SASプログラム自動作成ツール 「Taiho TLF Automated Tool」の紹介

○伊藤衡気[1]、栗矢芳之[2]、銭本敦[2]

（株式会社タクミインフォメーションテクノロジー[1]、大鵬薬品工業株式会社[2]）

要旨:

Excelで作成したTLF Mockupから、

RTF出力用のSASマクロプログラムを、

自動で作成するツール、

「Taiho TLF Automated Tool（TTAT）」を紹介する。

キーワード: RTF, VBA, 自動生成, TLF, 標準化, Mockup

Agenda

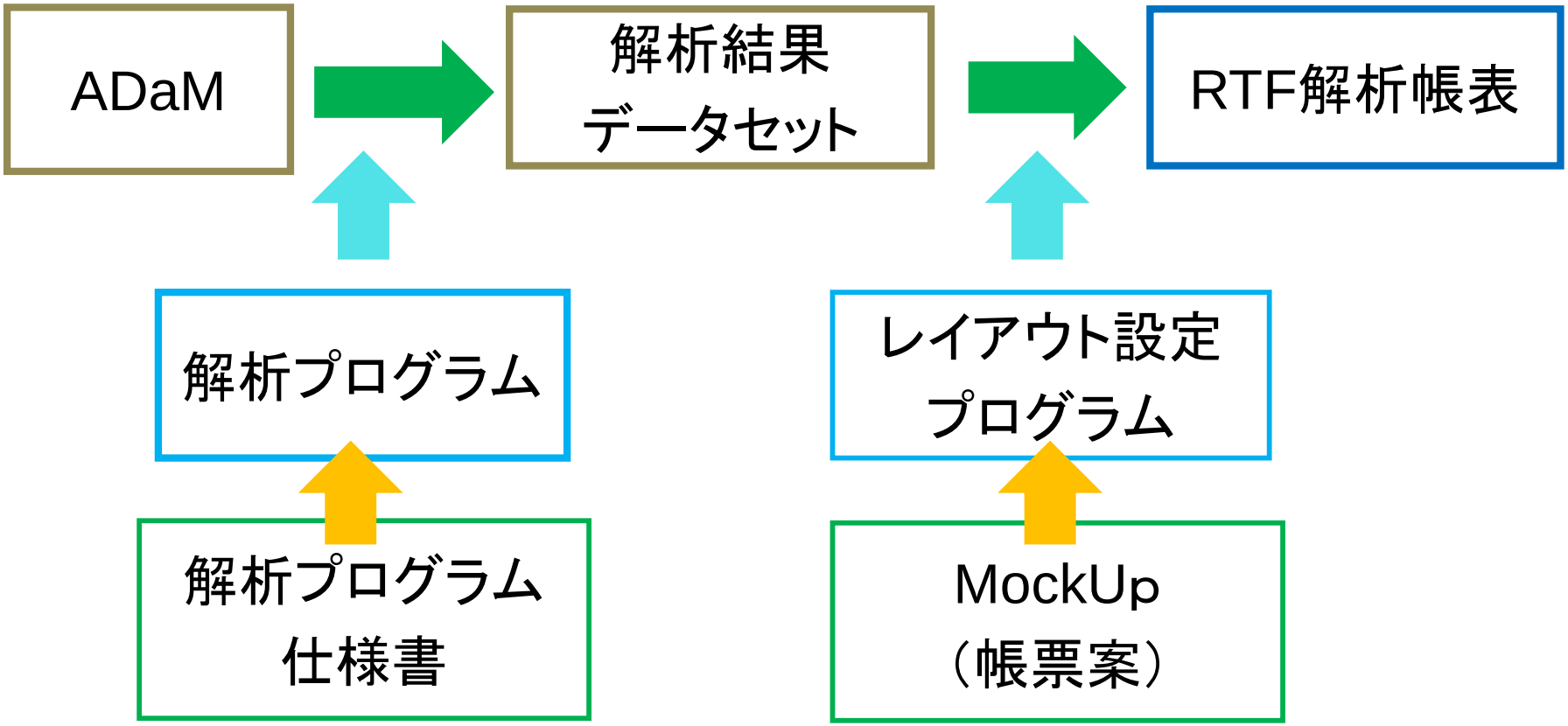
1. Prologue　　：RTF帳票作成における問題点
2. Progress　　：TTATの機能について
3. Advantage　：TTATによってもたらされるメリット
4. Presentation：DEMO

1. Prologue

臨床試験におけるTLFの主流がExcelからRTFに移行した今、解析などの本質的な部分ではなく、見た目を整えるテンプレートプログラムの作成に時間をとられるという問題が生じている。

一度テンプレートプログラムを作成しても、列を追加するなど細々した修正が入ることも多々有り、手間がかかる作業となっている。

RTF作成フロー


ADaM
解析結果
データセット
RTF解析帳表
解析プログラム
レイアウト設定
プログラム
解析プログラム
仕様書
MockUp
（帳票案）

テンプレートプログラム例(一部)

```
proc template ;
  define table RT11421010TFAS2 / store = work.TEMPLATE(UPDATE) ;
  style = { rules=rows frame=hsides } ;
  cellstyle _ROW_ in(&IND_01.) and _column_=1 as Cell{leftmargin=  .5cm}
  , _ROW_ in(&IND_02.) and _column_=1 as Cell{leftmargin= 1.0cm} ;

* title and footnote;
  title1          font= 'Times New Roman' height=9pt j=l "&THPRJNO. Protocol &THPTCNO." j=r "&timehead. Page ^{thispage}";
  title2          font= 'Times New Roman' height=9pt ' ' ;
  title3          font= 'Times New Roman' height=9pt j=c 'RT1-1421-010T-FAS-2' ;
  title4          font= 'Times New Roman' height=9pt j=c 'Best Overall Response (Indepedemt Review Committie)' ;
  footnote        font= 'Times New Roman' height=9pt j=l "Program Name : &pgname." j=r "User ID : &THID." ;

* header ;
  header  Header1 Header2 Header3 Header4 Header5 Header6 Header7 Header8 ;
  define header1  ; text " "          ; just=l start=&THVAR01. ; end = &THVAR01. ; split="@"; end ;
  define header2  ; text "&TNVAR01."  ; just=c start=&THVAR02. ; end = &THVAR02. ; split="@"; end ;
  define header3  ; text "&TNVAR02."  ; just=c start=&THVAR03. ; end = &THVAR03. ; split="@"; end ;
  define header4  ; text "Test"       ; STYLE={BORDERBOTTOMWIDTH=1pt };just=c start=&THVAR04. ; end = &THVAR04. ; split="@"; end ;
  define header5  ; text " "          ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=l start=&THVAR01. ; end = &THVAR01. ; split="@"; end ;
  define header6  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVAR02. ; end = &THVAR02. ; split='@'; end ;
  define header7  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVAR03. ; end = &THVAR03. ; split='@'; end ;
  define header8  ; text "P Value *"  ; STYLE={BORDERBOTTOMWIDTH=1pt };just=c start=&THVAR04. ; end = &THVAR04. ; split="@"; end ;

 * body ;
  column &THVAR01. &THVAR02. &THVAR03. &THVAR04.  ;
  define &THVAR01.  ; print_headers=off  ; style={width=166.6pt just=l BORDERTOPCOLOR=white } ; end ;
  define &THVAR02.  ; print_headers=off  ; style={width= 99.0pt just=c BORDERTOPCOLOR=white } ; end ;
  define &THVAR03.  ; print_headers=off  ; style={width= 99.0pt just=c BORDERTOPCOLOR=white } ; end ;
  define &THVAR04.  ; print_headers=off  ; style={width= 77.5pt just=c BORDERTOPCOLOR=white } ; end ;

 * footer ;
  footer  footer1 footer2  ;
   %if &last.=1 %then %do ;
     define footer1 ; text "Analysis Set: FAS"          ; style={just=l borderbottomstyle=none  } ; split='@'; end ;
     define footer2 ; text "*:Fisher's Exact Test"      ; style={just=l borderbottomstyle=none  } ; split='@'; end ;
   %end ;
```

[必須の作業]

テンプレートプログラム作成作業 x 帳票数

[それに加え…]

随時(主に終盤で)入る細々した修正

→ プログラムの修正、Mockupの修正

この作業量を減らすことができれば

より早く、質の高い結果を出せるのではないだろうか

2. Progress

Excelで作成されたMockup(帳票レイアウト)から、

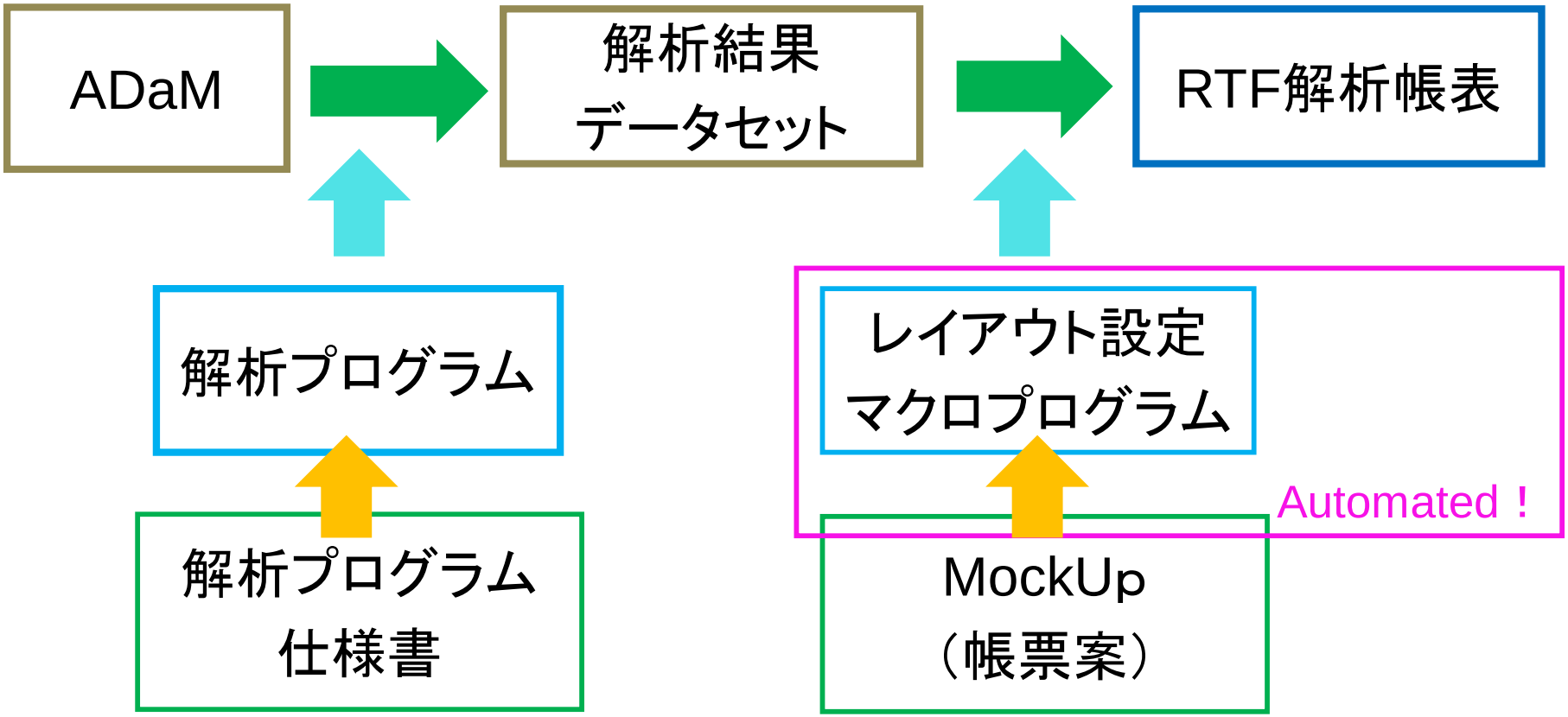
VBAでレイアウト情報を読み取り、

RTF用テンプレートSASプログラムを

自動で作成するツール

「Taiho TLF Automated Tool (TTAT)」を開発した。

RTF作成フロー


ADaM
解析結果
データセット
RTF解析帳表
解析プログラム
解析プログラム
仕様書
レイアウト設定
マクロプログラム
MockUp
（帳票案）
Automated！

Mockupから自動で SASテンプレートマクロプログラムを作成

	A	B	C	D	E
1	TAIHO-01 Protocol 100xxxxx			hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x	xx.x	
11		Range [Min , Max]	[xx , xx]	[xx , xx]	
12		Height (cm)			
13		N	xx	xx	
14		Mean (S.D.)	xxx.xx (xxx.xx)	xxx.xx (xxx.xx)	
15		Median	xxx.xx	xxx.xx	
16		Range [Min , Max]	[xxx.x , xxx.x]	[xxx.x , xxx.x]	
17		Weight (kg)			
18		N	xx	xx	
19		Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)	
20		Median	xx.xx	xx.xx	
21		Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]	
22		Analysis Set: All Treated Patients			
23					
24					
25					
26					
27					
28	Program Name : BG1-1412-010T-ATP-2			User ID : Xxxxxxx	

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```
%MACRO BG11412010TATP2(THDATA=, THPAGE= ,TNVARO1=,TNVARO2=,THVARO1=,THVARO2=,THVARO3=,THIND=) ;

%rtf_template_&THLANG.(orientation=portrait) ;
%timehead;
title ;
footnote ;
ods escapechar = '^' ;

* define output file;
ods rtf file = "&THDIR_OUT.¥BG1-1412-010T-ATP-2.rtf" style=Taiho_RTF;

%MACRO THCAT_TEMP(THPAGE_tmp,TNVARO1,TNVARO2,LAST,IND_01,IND_02) ;
proc template ;
  define table BG11412010TATP2 / store = work.TEMPLATE(UPDATE) ;
  style = { rules=rows frame=hsides } ;

  cellstyle _ROW_ in(&IND_01.) and _column_=1 as Cell{leftmargin=  .5cm}
          , _ROW_ in(&IND_02.) and _column_=1 as Cell{leftmargin= 1.0cm} ;

* title and footnote;
  title1       font= 'Times New Roman' height=9pt j=l "&THPRJNO. Protocol &THPTCNO." j=r "&timehead. Page ^{thispage}";
  title2       font= 'Times New Roman' height=9pt " " ;
  title3       font= 'Times New Roman' height=9pt j=c 'BG1-1412-010T-ATP-2' ;
  title4       font= 'Times New Roman' height=9pt j=c 'Summary of Demographics and Other Baseline Characteristics (All Treated Patients)' ;
  footnote     font= 'Times New Roman' height=9pt j=l "Program Name : &pgname." j=r "User ID : &THID." ;

* header ;
  header  Header1 Header2 Header3 Header4 Header5 Header6 ;
  define header1  ; text " "          ; just=l start=&THVARO1. ; end = &THVARO1. ; split="@"; end ;
  define header2  ; text "&TNVARO1." ; just=c start=&THVARO2. ; end = &THVARO2. ; split="@"; end ;
  define header3  ; text "&TNVARO2." ; just=c start=&THVARO3. ; end = &THVARO3. ; split="@"; end ;
  define header4  ; text " "          ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=l start=&THVARO1. ; end = &THVARO1. ; split="@"; end ;
  define header5  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVARO2. ; end = &THVARO2. ; split='@'; end ;
  define header6  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVARO3. ; end = &THVARO3. ; split='@'; end ;

* body ;
  column &THVARO1. &THVARO2. &THVARO3. ;
  define &THVARO1.  ; print_headers=off  ; style={width=209.4pt just=l BORDERTOPCOLOR=white } ; end ;
  define &THVARO2.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;
  define &THVARO3.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;

 * footer ;
  footer  footer1  ;
   %if &last.=1 %then %do ;
     define footer1 ; text "Analysis Set: All Treated Patients"; style={just=l borderbottomstyle=none  } ; split='@'; end ;
   %end ;
end ;
run ;

* output ;
data _NULL_ ;
  set &THDATA. ;
  where &thpage. =&THPAGE_tmp. ;
  file print ods = (template='BG11412010TATP2') ;
  put _ods_ ;
run ;

%MEND THCAT_TEMP ;
%indent ;
data _NULL_ ;
 set TH_ST ;
 call execute('%THCAT_TEMP('||strip(THPAGE_tmp) ||',%BQUOTE('|| strip(&TNVARO1. )||').%BQUOTE('|| strip(&TNVARO2. )||'),'
                            ||strip(last)||',''||'%BQUOTE('||strip(TMPIND1)||') ,%BQUOTE('||strip(TMPIND2)||')'||')');
run;

ods rtf close ;
ods listing;

%_Mod_RTF(%BQUOTE(BG1-1412-010T-ATP-2)) ;
```

マクロパラメータ生成例

BG1-1412-010T-ATP-2 Summary of Demographics and Other Baseline Characteristics (All Treated Patients)		
	TAIHO-01 (N=xxx) N (%)	Placebo (N=xxx) N (%)
Age (years)		
N	xx	xx
Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)
Median	xx.x	xx.x
Range [Min , Max]	[xx , xx]	[xx , xx]
Height (cm)		
N	xx	xx
Mean (S.D.)	xxx.xx (xxx.xx)	xxx.xx (xxx.xx)
Median	xxx.xx	xxx.xx
Range [Min , Max]	[xxx.x , xxx.x]	[xxx.x , xxx.x]
Weight (kg)		
N	xx	xx
Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)
Median	xx.xx	xx.xx
Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]
Analysis Set: All Treated Patients		


```
%MACRO BG11412010TATP2(THDATA=, THPAGE=, TNVAR01=, TNVAR02=
                      , THVAR01=, THVAR02=, THVAR03=, THIND=) ;
```

マクロパラメータ

- THDATA　：入力データセット
- THPAGE　：改ページ制御
- TNVARXX：Headerに示す文字列（N=xxなど）
  セルごとに作成
- THVARXX：Body各列に示す文字列
  列ごとに作成
- THIND　　：インデント制御

※ XXは 01 , 02 といった通し番号

マクロパラメータに入力データセット名、変数名を設定

VIEWTABLE: Dummy.Bg1_1412_010t_atp_2

	col0	pop1	pop2	col1	col2	col3	flg
1	1	TAIHO-01 (N=51)	Placebo (N=49)	Age (years)			0
2	1	TAIHO-01 (N=51)	Placebo (N=49)	N	xx	xx	1
3	1	TAIHO-01 (N=51)	Placebo (N=49)	Mean (S.D.)	xxx (xxx)	xxx (xxx)	1
4	1	TAIHO-01 (N=51)	Placebo (N=49)	Median	xxx	xxx	1
5	1	TAIHO-01 (N=51)	Placebo (N=49)	Range [Min , Max]	[xx , xx]	[xx , xx]	1
6	1	TAIHO-01 (N=51)	Placebo (N=49)	Height (cm)			0
7	1	TAIHO-01 (N=51)	Placebo (N=49)	N	xx	xx	1
8	1	TAIHO-01 (N=51)	Placebo (N=49)	Mean (S.D.)	xxxx (xxxx)	xxxx (xxxx)	1
9	1	TAIHO-01 (N=51)	Placebo (N=49)	Median	xxxx	xxxx	1
10	1	TAIHO-01 (N=51)	Placebo (N=49)	Range [Min , Max]	[xxx , xxx]	[xxx , xxx]	1
11	1	TAIHO-01 (N=51)	Placebo (N=49)	Weight (kg)			0
12	1	TAIHO-01 (N=51)	Placebo (N=49)	N	xx	xx	1
13	1	TAIHO-01 (N=51)	Placebo (N=49)	Mean (S.D.)	xxx (xxx)	xxx (xxx)	1
14	1	TAIHO-01 (N=51)	Placebo (N=49)	Median	xxx		1
15	1	TAIHO-01 (N=51)	Placebo (N=49)	Range [Min , Max]	[xxx , x		1

```
%BG11412010TATP2(
 THDATA=dummy.BG11412010TATP2
,THPAGE =col0
,TNVAR01=pop1
,TNVAR02=pop2
,THVAR01=col1
,THVAR02=col2
,THVAR03=col3
,THIND  =flg
);
```

RTF生成イメージ

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BG1-1412-010T-ATP-2

Summary of Demographics and Other Baseline Characteristics (All Treated Patients)

	TAIHO-01 (N=51) N (%)	Placebo (N=49) N (%)
Age (years)		
N	xx	xx
Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)
Median	xx.x	xx.x
Range [Min , Max]	[xx , xx]	[xx , xx]
Height (cm)		
N	xx	xx
Mean (S.D.)	xxx.xx (xxx.xx)	xxx.xx (xxx.xx)
Median	xxx.xx	xxx.xx
Range [Min , Max]	[xxx.x , xxx.x]	[xxx.x , xxx.x]
Weight (kg)		
N	xx	xx
Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)
Median	xx.xx	xx.xx
Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]
Analysis Set: All Treated Patients		

Mockupから自動で SASテンプレートマクロプログラムを作成

	A	B	C	D	E
1	TAIHO-01 Protocol 100xxxxx			hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x	xx.x	
11		Range [Min , Max]	[xx , xx]	[xx , xx]	
12		Height (cm)			
13		N	xx	xx	
14		Mean (S.D.)	xxx.xx (xxx.xx)	xxx.xx (xxx.xx)	
15		Median	xxx.xx	xxx.xx	
16		Range [Min , Max]	[xxx.x , xxx.x]	[xxx.x , xxx.x]	
17		Weight (kg)			
18		N	xx	xx	
19		Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)	
20		Median	xx.xx	xx.xx	
21		Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]	
22		Analysis Set: All Treated Patients			
23					
24					
25					
26					
27					
28	Program Name : BG1-1412-010T-ATP-2			User ID : Xxxxxxx	

1 ページ

```
%MACRO BG11412010TATP2(THDATA=, THPAGE= ,TNVARO1=,TNVARO2=,THVARO1=,THVARO2=,THVARO3=,THIND=) ;

%rtf_template_&THLANG.(orientation=portrait) ;
%timehead;
title ;
footnote ;
ods escapechar = '^' ;

* define output file;
ods rtf file = "&THDIR_OUT.¥BG1-1412-010T-ATP-2.rtf" style=Taiho_RTF;

%MACRO THCAT_TEMP(THPAGE_tmp,TNVARO1,TNVARO2,LAST,IND_01,IND_02) ;
proc template ;
  define table BG11412010TATP2 / store = work.TEMPLATE(UPDATE) ;
  style = { rules=rows frame=hsides } ;

  cellstyle _ROW_ in(&IND_01.) and _column_=1 as Cell{leftmargin=  .5cm}
          , _ROW_ in(&IND_02.) and _column_=1 as Cell{leftmargin= 1.0cm} ;

* title and footnote;
  title1       font= 'Times New Roman' height=9pt j=l "&THPRJNO. Protocol &THPTCNO." j=r "&timehead. Page ^{thispage}";
  title2       font= 'Times New Roman' height=9pt " " ;
  title3       font= 'Times New Roman' height=9pt j=c 'BG1-1412-010T-ATP-2' ;
  title4       font= 'Times New Roman' height=9pt j=c 'Summary of Demographics and Other Baseline Characteristics (All Treated Patients)' ;
  footnote     font= 'Times New Roman' height=9pt j=l "Program Name : &pgname." j=r "User ID : &THID." ;

* header ;
  header  Header1 Header2 Header3 Header4 Header5 Header6 ;
  define header1  ; text " "          ; just=l start=&THVARO1. ; end = &THVARO1. ; split="@"; end ;
  define header2  ; text "&TNVARO1." ; just=c start=&THVARO2. ; end = &THVARO2. ; split="@"; end ;
  define header3  ; text "&TNVARO2." ; just=c start=&THVARO3. ; end = &THVARO3. ; split="@"; end ;
  define header4  ; text " "          ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=l start=&THVARO1. ; end = &THVARO1. ; split="@"; end ;
  define header5  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVARO2. ; end = &THVARO2. ; split='@'; end ;
  define header6  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVARO3. ; end = &THVARO3. ; split='@'; end ;

* body ;
  column &THVARO1. &THVARO2. &THVARO3.  ;
  define &THVARO1.  ; print_headers=off  ; style={width=209.4pt just=l BORDERTOPCOLOR=white } ; end ;
  define &THVARO2.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;
  define &THVARO3.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;

 * footer ;
  footer  footer1  ;
   %if &last.=1 %then %do ;
     define footer1 ; text "Analysis Set: All Treated Patients"; style={just=l borderbottomstyle=none  } ; split='@'; end ;
   %end ;
end ;
run ;

* output ;
data _NULL_ ;
  set &THDATA. ;
  where &thpage. =&THPAGE_tmp. ;
  file print ods = (template='BG11412010TATP2') ;
  put _ods_ ;
run ;

%MEND THCAT_TEMP ;
%indent ;
data _NULL_ ;
 set TH_ST ;
 call execute('%THCAT_TEMP('||strip(THPAGE_tmp) ||',%BQUOTE('|| strip(&TNVARO1. )||').%BQUOTE('|| strip(&TNVARO2. )||'),'
                            ||strip(last)||',''||'%BQUOTE('||strip(TMPIND1)||') ,%BQUOTE('||strip(TMPIND2)||')'||')');
run;

ods rtf close ;
ods listing;

%_Mod_RTF(%BQUOTE(BG1-1412-010T-ATP-2)) ;
```

VBAの一部

```
sas.addline "proc template ;"
sas.addline "  define table " & TLF_pgmName() & " ;"
sas.addline "  style = { rules=rows frame=hsides } ;"
sas.addline " "
sas.addline "  cellstyle _ROW_ in(&IND_01.) and _column_=" & getIndentColumn() & " as Cell{leftmargin=  .5cm}"
sas.addline "          , _ROW_ in(&IND_02.) and _column_=" & getIndentColumn() & " as Cell{leftmargin= 1.0cm} ;"
 sas.addline " "
sas.addline "* title and footnote;"
sas.addline "  title1       font= 'Times New Roman' height=9pt j=l ""&THPRJNO. Protocol &THPTCNO."""" _
                                                                    & " j=r ""&timehead. Page ^{thispage}"";"
sas.addline "  title2       font= 'Times New Roman' height=9pt ' ' ;"
sas.addline "  title3       font= 'Times New Roman' height=9pt j=c "" & getTLF_No() & "" ;“
sas.addline "  title4       font= 'Times New Roman' height=9pt j=c "" & getTLF_Title() & "" ;"
sas.addline "  footnote      font= 'Times New Roman' height=9pt j=l ""Program Name : &pgname."""" & " j=r ""User ID : &THID."" ;"
sas.addline " "

sas.addlines HeaderDefinition() ' Header定義
sas.addlines BodyDefinition()   ' Body定義
sas.addlines FooterDefinition() ' Footer定義

sas.addline "end ;"
sas.addline “run ; “
```

帳票レイアウトから取得する情報

	A	B	C	D	E
1	TAIHO-01 Protocol 100xxxxx			hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x	xx.x	
11		Range [Min , Max]	[xx , xx]	[xx , xx]	
12		Height (cm)			
13		N	xx	xx	
14		Mean (S.D.)	xxx.xx (xxx.xx)	xxx.xx (xxx.xx)	
15		Median	xxx.xx	xxx.xx	
16		Range [Min , Max]	[xxx.x , xxx.x]	[xxx.x , xxx.x]	
17		Weight (kg)			
18		N	xx	xx	
19		Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)	
20		Median	xx.xx	xx.xx	
21		Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]	
22		Analysis Set: All Treated Patients			

1 ページ

Title

	A	B	C	D	E
1	TAIHO-01 Protocol 100xxxxx			hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x		
11		Range [Min , Max]	[xx , xx]		
12		Height (cm)			
13		N	xx		
14		Mean (S.D.)	xxx.xx (xxx.xx)		
15		Median	xxx.xx		
16		Range [Min , Max]	[xxx.x , xxx.x]		
17		Weight (kg)			
18		N	xx	xx	
19		Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)	
20		Median	xx.xx	xx.xx	
21		Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]	
22		Analysis Set: All Treated Patients			

1 ページ

- 帳票番号
- 帳票タイトル

文字列を取得しtitle定義文を生成

	A	B	C	D	E
1		TAIHO-01 Protocol 100xxxxx		hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			

```
* title and footnote;
  title1       font= 'Times New Roman' height=9pt j=l "&THPRJNO. Protocol &THPTCNO." j=r "&timehead. Page ^{thispage}";
  title2       font= 'Times New Roman' height=9pt    ;
  title3       font= 'Times New Roman' height=9pt j=c 'BG1-1412-010T-ATP-2' ;
  title4       font= 'Times New Roman' height=9pt j=c 'Summary of Demographics and Other Baseline Characteristics (All Treated Patients)' ;
  footnote     font= 'Times New Roman' height=9pt j=l 'Program Name : &pgname.' j=r 'User ID : &THID.' ;
```

Header

	A	B	C	D	E
1		TAIHO-01 Protocol 100xxxxx		hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
21		Range [Min , Max]	[xx.x , xx.x]	[xx.x , xx.x]	
22		Analysis Set: All Treated Patients			

- 範囲 (列数、行数)
- 文字列
- セルの結合：[セルを結合して中央揃え]、[選択範囲で中央]
- 罫線
- 文字配置：左寄せ、中央寄せ、右寄せ
- インデント段数

Headerを左から右にセルの情報を取得し定義文を作成
最終列に到達したら次の行の左端から続行

	A	B	C	D	E
1		TAIHO-01 Protocol 100xxxxx		hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5		①	② TAIHO-01 (N=xxx)	③ Placebo (N=xxx)	
6		④	⑤ N (%)	⑥ N (%)	

```
* header ;
  header  Header1 Header2 Header3 Header4 Header5 Header6 ;
① define header1  ; text " "          ; just=l start=&THVAR01. ; end = &THVAR01. ; split="@"; end ;
② define header2  ; text "&TNVAR01." ; just=c start=&THVAR02. ; end = &THVAR02. ; split="@"; end ;
③ define header3  ; text "&TNVAR02." ; just=c start=&THVAR03. ; end = &THVAR03. ; split="@"; end ;
                                    ⋮
```

Body

	A	B	C	D	E
1	TAIHO-01 Protocol 100xxxxx			hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x	xx.x	
11		Range [Min , Max]	[xx , xx]	[xx , xx]	
12		Height (cm)			
13		N	xx	xx	
14		Mean (S.D.)	xxx		
15		Median			
16		Range [Min , Max]	[xx		
17		Weight (kg)			
18		N			
19		Mean (S.D.)	xx		
20		Median			
21		Range [Min , Max]	[x		
22		Analysis Set: All Treated Patients			

1 ページ

- 列数
- 各列の幅
- 各列の文字配置
- インデントの有無

各列ごとに定義文を作成
1行目から幅の割合と文字配置情報を取得

	A	B	C	D	E
1		TAIHO-01 Protocol 100xxxxx		hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years) ①	②	③	
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x	xx.x	
11		Range [Min , Max]	[xx , xx]	[xx , xx]	
12		Height (cm)			
13		N	xx	xx	
14		Mean (S.D.)	xxx.xx (xxx.xx)	xxx.xx (xxx.xx)	
15		Median	xxx.xx	xxx.xx	
16		Range [Min , Max]	[xxx.x , xxx.x]	[xxx.x , xxx.x]	
17		Weight (kg)			
18		N	xx	xx	

1 ページ

```
  * body ;
    column &THVAR01. &THVAR02. &THVAR03.  ;
① define &THVAR01.  ; print_headers=off  ; style={width=209.4pt just=l BORDERTOPCOLOR=white } ; end ;
② define &THVAR02.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;
③ define &THVAR03.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;
```

Footer

	A	B	C	D	E
1	TAIHO-01 Protocol 100xxxxx			hh:mm xxxxx, xxxxx dd, yyyy page p	
2					
3		BG1-1412-010T-ATP-2			
4		Summary of Demographics and Other Baseline Characteristics (All Treated Patients)			
5			TAIHO-01 (N=xxx)	Placebo (N=xxx)	
6			N (%)	N (%)	
7		Age (years)			
8		N	xx	xx	
9		Mean (S.D.)	xx.x (xx.x)	xx.x (xx.x)	
10		Median	xx.x	xx.x	
11		Range [Min , Max]			
12		Height (cm)			
13		N			
14		Mean (S.D.)	xx		
15		Median			
16		Range [Min , Max]	[		
17		Weight (kg)			
18		N			
19		Mean (S.D.)	x		
20		Median			
21		[illegible]	[xx.x , xx.x]	[xx.x , xx.x]	
22		Analysis Set: All Treated Patients			

1 ページ

- 開始行
- 最終行
- 文字列
- インデント段数

文字列を取得しtitle定義文を生成

17	Weight (kg)		
18	N	xx	xx
19	Mean (S.D.)	xx.xx (xx.xx)	xx.xx (xx.xx)
20	Median	xx.xx	xx.xx
21	[illegible]	[xx.x , xx.x]	[xx.x , xx.x]
22	Analysis Set: All Treated Patients		

```
* footer ;
 footer  footer1  ;
  %if &last.=1 %then %do ;
    define footer1 ; text "Analysis Set: All Treated Patients"; style={just=l borderbottomstyle=none  } ; split='@'; end ;
  %end ;
```

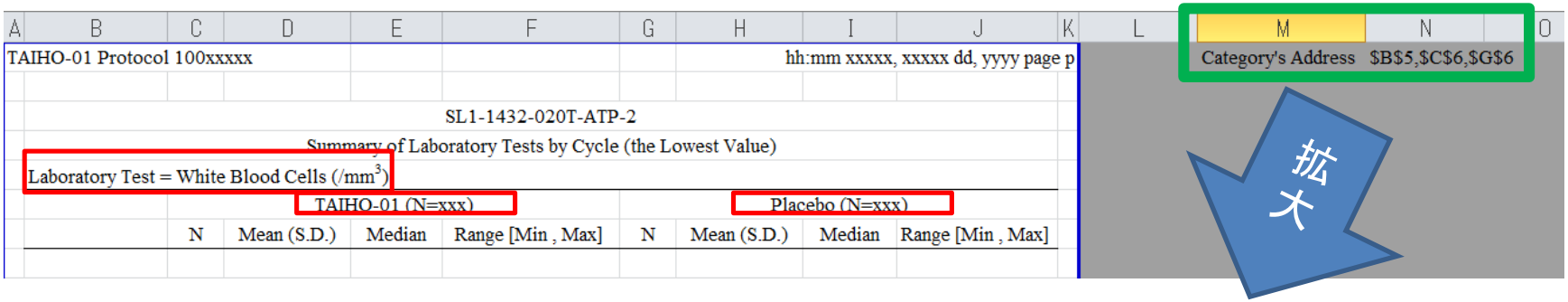
生成されたテンプレートプログラムの一部

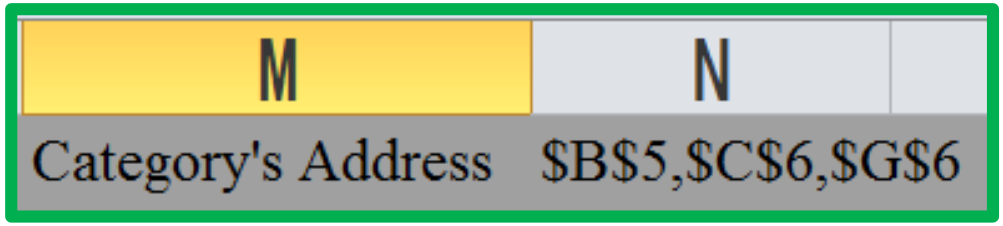
```
proc template ;
  define table BG11412010TATP2 / store = work.TEMPLATE(UPDATE) ;
  style = { rules=rows frame=hsides } ;

  cellstyle _ROW_ in(&IND_01.) and _column_=1 as Cell{leftmargin=  .5cm}
          , _ROW_ in(&IND_02.) and _column_=1 as Cell{leftmargin= 1.0cm} ;

* title and footnote;
  title1        font= 'Times New Roman' height=9pt j=l "&THPRJNO. Protocol &THPTCNO." j=r "&timehead. Page ^{thispage}";
  title2        font= 'Times New Roman' height=9pt   ;
  title3        font= 'Times New Roman' height=9pt j=c 'BG1-1412-010T-ATP-2' ;
  title4        font= 'Times New Roman' height=9pt j=c 'Summary of Demographics and Other Baseline Characteristics (All Treated Patients)' ;
  footnote      font= 'Times New Roman' height=9pt j=l "Program Name : &pgname." j=r "User ID : &THID." ;

* header ;
  header  Header1 Header2 Header3 Header4 Header5 Header6 ;
  define header1  ; text " "          ; just=l start=&THVAR01. ; end = &THVAR01. ; split="@"; end ;
  define header2  ; text "&TNVAR01." ; just=c start=&THVAR02. ; end = &THVAR02. ; split="@"; end ;
  define header3  ; text "&TNVAR02." ; just=c start=&THVAR03. ; end = &THVAR03. ; split="@"; end ;
  define header4  ; text " "          ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=l start=&THVAR01. ; end = &THVAR01. ; split="@"; end ;
  define header5  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVAR02. ; end = &THVAR02. ; split='@'; end ;
  define header6  ; text 'N (%)'      ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOLOR=white};just=c start=&THVAR03. ; end = &THVAR03. ; split='@'; end ;

 * body ;
  column &THVAR01. &THVAR02. &THVAR03.  ;
  define &THVAR01.  ; print_headers=off  ; style={width=209.4pt just=l BORDERTOPCOLOR=white } ; end ;
  define &THVAR02.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;
  define &THVAR03.  ; print_headers=off  ; style={width=116.3pt just=c BORDERTOPCOLOR=white } ; end ;

 * footer ;
  footer  footer1  ;
   %if &last.=1 %then %do ;
     define footer1 ; text "Analysis Set: All Treated Patients"; style={just=l borderbottomstyle=none  } ; split='@'; end ;
   %end ;
end ;
run ;
```

ページごとにHeaderの文字列が変化する帳票

	A	B	C	D	E	F	G	H	I	J	K
1	TAIHO-01 Protocol 100xxxxx								hh:mm xxxxx, xxxxx dd, yyyy page p		
2											
3		SL1-1432-020T-ATP-2									
4		Summary of Laboratory Tests by Cycle (the Lowest Value)									
5		Laboratory Test = White Blood Cells (/mm^3)									
6				TAIHO-01 (N=xxx)				Placebo (N=xxx)			
7			N	Mean (S.D.)	Median	Range [Min , Max]	N	Mean (S.D.)	Median	Range [Min , Max]	
8											
9		Value of Nadir*									
10		Baseline	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	
11		Cycle 1	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	
12		Cycle 2	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	
13		Cycle 3	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	

該当セルのアドレスを示すことで、定義文にマクロ変数が入力される






```
define header1  ; text "&TNVAR01."  ; STYLE={BORDERBOTTOMWIDTH=1pt BORDERTOPCOL
define header2  ; text " "          ; just=l start=&THVAR01. ; end = &THVAR01.
define header3  ; text "&TNVAR02."  ; just=c start=&THVAR02. ; end = &THVAR05.
define header4  ; text "&TNVAR03."  ; just=c start=&THVAR06. ; end = &THVAR09.
```

Headerに表示したい文字列を格納した変数を作成

1ページ目のHeaderに表示される文字列

	col0	pop0	pop1	pop2	
1	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	
2	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	Value of N
3	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	Baseline
4	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	Cycle 1
5	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	Cycle 2
6	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	Cycle 3
7	1	Laboratory Test = White Blood Cells (/mm^{super 3})	TAIHO-01 (N=51)	Placebo (N=49)	All Cycle
8	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	
9	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	Value of N
10	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	Baseline
11	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	Cycle 1
12	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	Cycle 2
13	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	Cycle 3
14	2	Laboratory Test = Hemoglobin (g/dL)	TAIHO-01 (N=49)	Placebo (N=48)	All Cycle

2ページ目のHeaderに表示される文字列

出力結果1ページ目

TAIHO-01 Protocol 1081675 17:30 Thursday, July 27, 2017 Page 1

SL1-1432-020T-ATP-2

Summary of Laboratory Tests by Cycle (the Lowest Value)

Laboratory Test = White Blood Cells (/mm^3)

	TAIHO-01 (N=51)				Placebo (N=49)			
	N	Mean (S.D.)	Median	Range [Min , Max]	N	Mean (S.D.)	Median	Range [Min , Max]
Value of Nadir*								
Baseline	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
Cycle 1	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
Cycle 2	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
Cycle 3	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
All Cycle	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]

出力結果2ページ目

TAIHO-01 Protocol 1081675 17:30 Thursday, July 27, 2017 Page 2

SL1-1432-020T-ATP-2

Summary of Laboratory Tests by Cycle (the Lowest Value)

Laboratory Test = Hemoglobin (g/dL)

	TAIHO-01 (N=49)				Placebo (N=48)			
	N	Mean (S.D.)	Median	Range [Min , Max]	N	Mean (S.D.)	Median	Range [Min , Max]
Value of Nadir*								
Baseline	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
Cycle 1	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
Cycle 2	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
Cycle 3	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]
All Cycle	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]	xxx	xx.xx (xx.xx)	xx.xx	[xx.x , xx.x]

Analysis Set: All Treated Patients

*: The Worst Value in each Cycle

† : Days reflect cycle days (from start of cycle indicated)

Mockup作成時の主な制約

- タイトルの位置は固定
- 縦線、斜線は対応していない
- Body内の罫線は対応していない
- Bodyのインデントは1列のみ対応
- 列は30列まで

3. Advantage

- テンプレートプログラム作成の手間自体が大幅に減少
- 細々とした変更にも簡単に対応可能
- Mockupの編集がSASプログラムに反映されるため MockupとRTFテンプレートの差異の予防にも
- 大鵬薬品工業の全テーブル、リストに対応

4. Presentation

DEMO

最後に

SASの可能性は

新しい技術の分野は言うまでも無く

TTATで用いたVBAなど

よく知られた既存の技術の中にも

まだまだ広がっています

本プレゼンテーションがその一例となれれば幸いです