

# Practical Tips when Using ODS and SG Procedures for Clinical Trial Graphs

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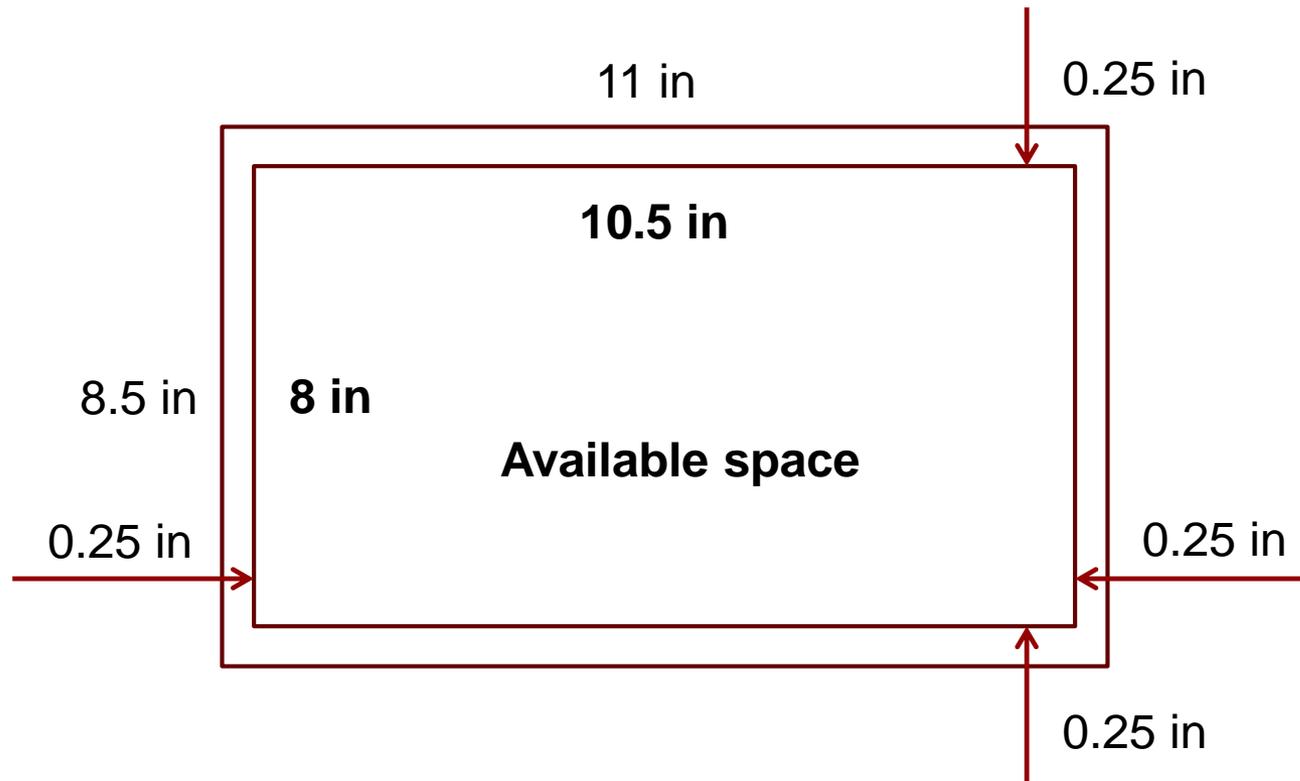


# Common Questions for SAS Graph Programming

- ❑ Why is the graph size not changed to width and height set in program
- ❑ How to maximize the graph size
- ❑ How to change graph position in the output
- ❑ How to have two different graphs in one page
- ❑ How to add space between plot area and graph edge or annotation area
- ❑ How to remove the border line of graph

# The Letter Paper Size and Space for Graph

- ❑ ODS Printer (PDF) default margin is 0.25 inch from each side
- ❑ Coming up examples 1-7 are using the default margin and landscape orientation



# Visualize Space for Graph with Color Background

- ❑ Turn on background color for available space

```
proc template;
  define style color;
    parent = styles.pearl;
    style body from body/
      backgroundcolor=light gray;
  end;
run;
```

- ❑ ODS layout with background color of layout area

Ex. 1

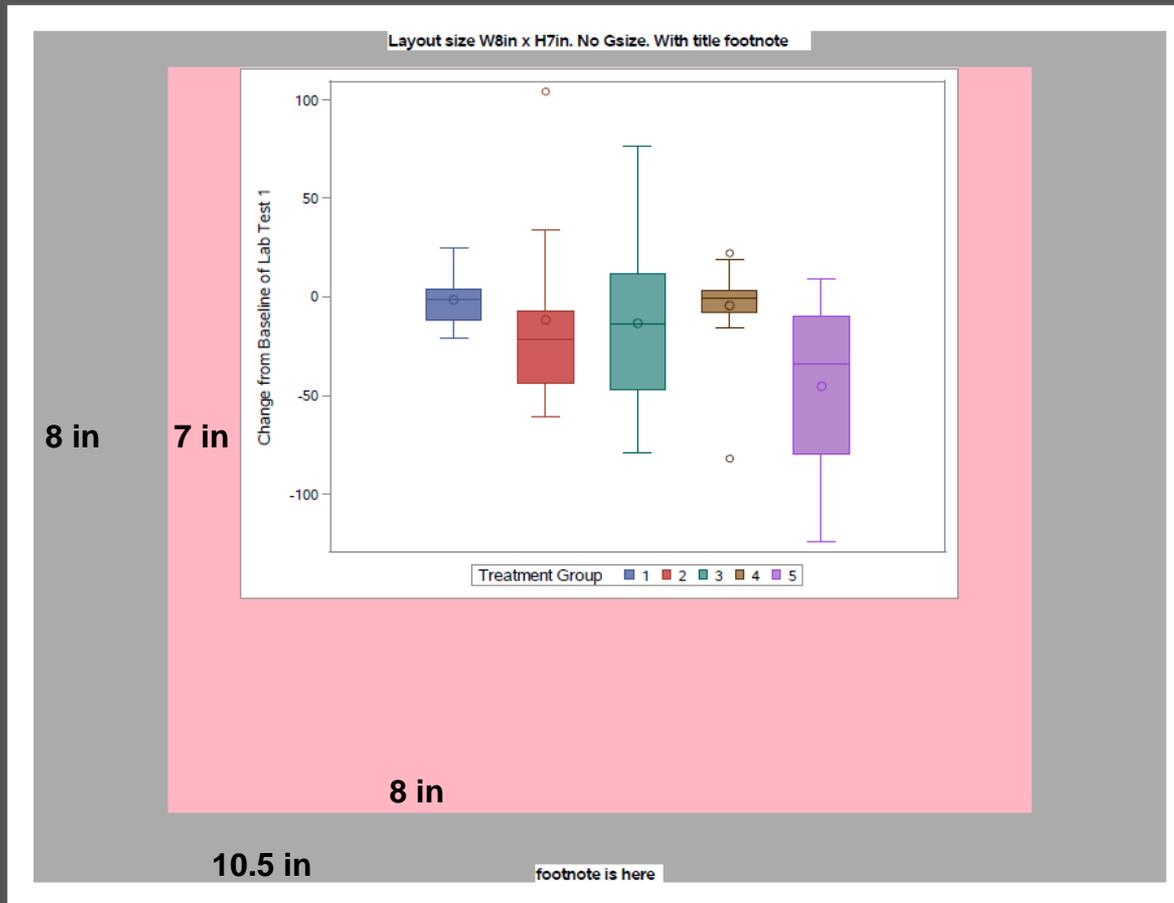
```
options nodate nonumber orientation = landscape;
title 'Layout size W8in x H7in. No Gsize. With title footnote';
footnote 'footnote is here';

ods pdf file='Ex1_layoutsizeW8H7_nogsize_with_tf.pdf' nogtitle nogfoot style=color;
ods layout start width=8in height=7in style={background=lightpink};
```

```
proc sgplot data=dummydata1;
  vbox chg / group=grp;
run;
```

```
ods layout end;
ods _all_ close;
```

# Ex. 1: Layout W 8in x H 7 in. No Graph Size Set

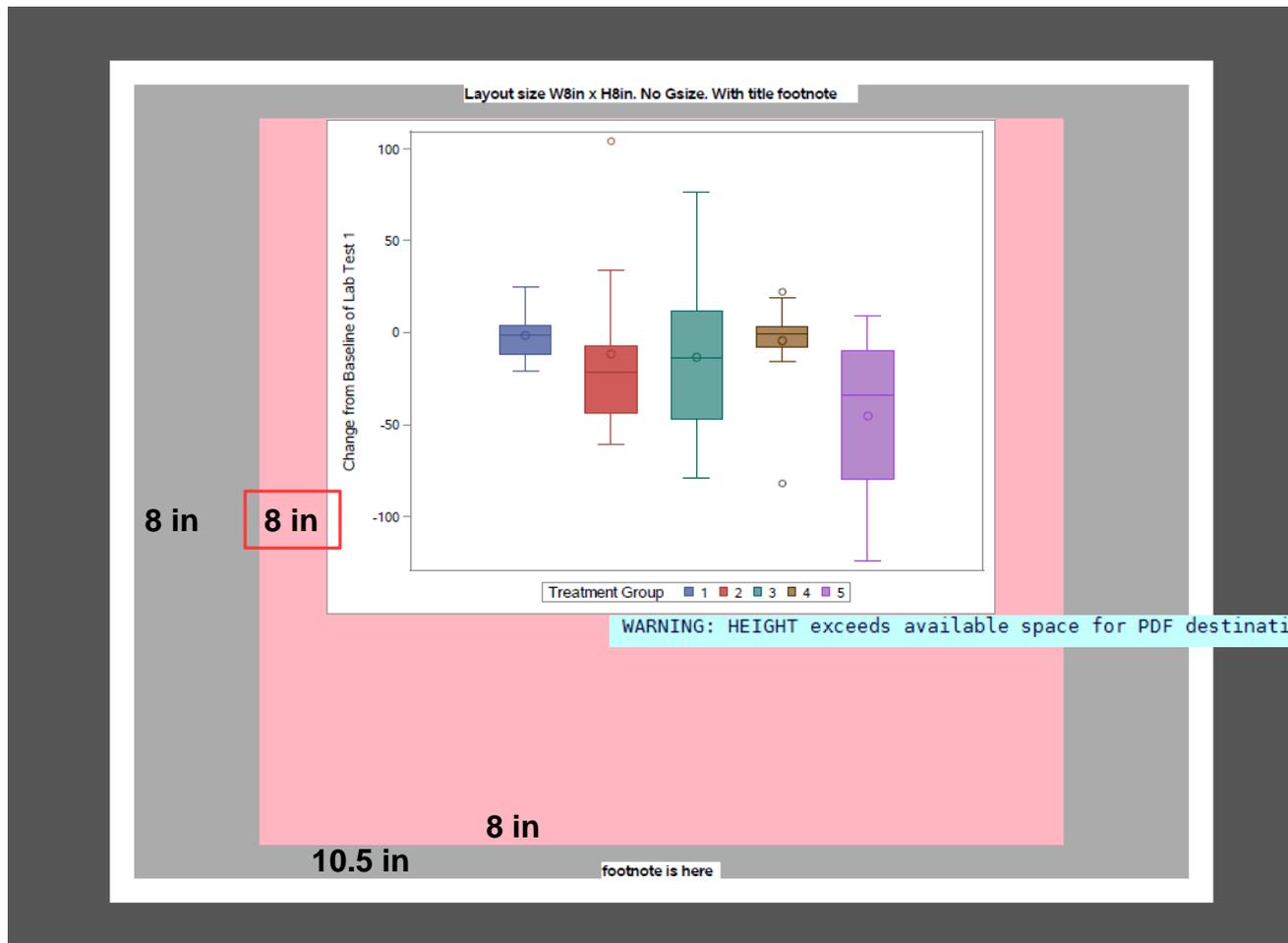


- Available space:  
W 10.5 in x H 8 in
- Layout area:  
W 8 in x H 7 in
- Graph size is determined by SAS default as  
aspect ratio:  
 $H = 0.75 \times W$

## Ex. 2: Layout W 8in x H 8 in. No Graph Size Set

- Will graph height increase if layout height is increased to 8in?

```
ods pdf file='Ex2_layoutsizeW8H8_nogsize_with_tf.pdf' nogtitle nogfoot style=color;  
ods layout start width=8in height=8in style={background=lightpink};
```

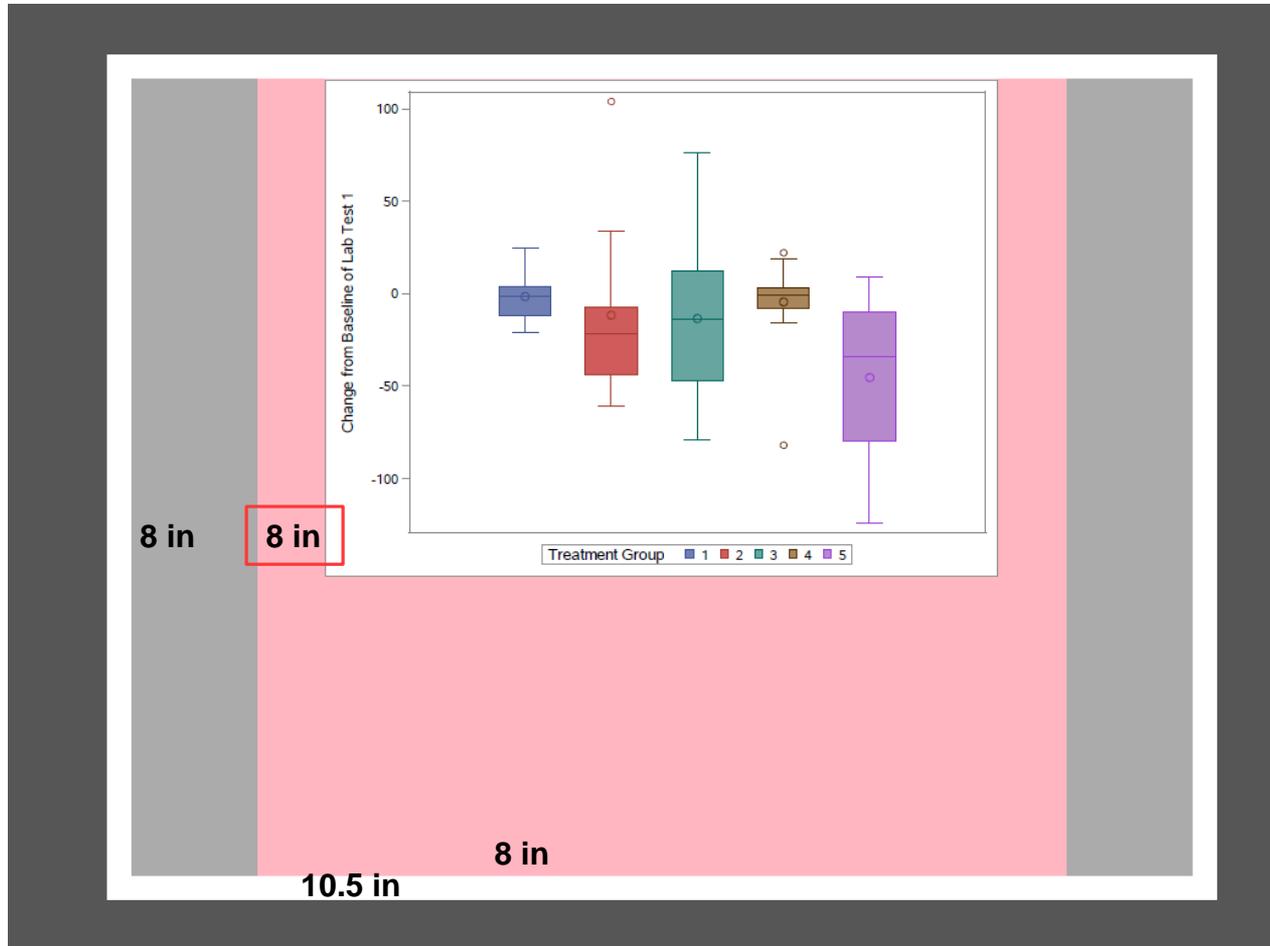


- Answer is no
- Graph size is still determined by SAS default as  
aspect ratio:  
 $H = 0.75 \times W$
- There is warning message:
- Don't forget title and footnote take space too

## Ex. 3: Same as Ex. 2 but Remove Title Footnote

- Will graph height increase if title footnotes are removed?

```
ods pdf file='Ex2_layoutsizeW8H8_nogsize_with_tf.pdf' nogtitle nogfoot style=color;  
ods layout start width=8in height=8in style={background=lightpink};
```



- Answer is no
- But warning message is gone and layout is correct W 8 x H 8
- Graph size is still determined by SAS default as  
aspect ratio:  
 $H = 0.75 \times W$

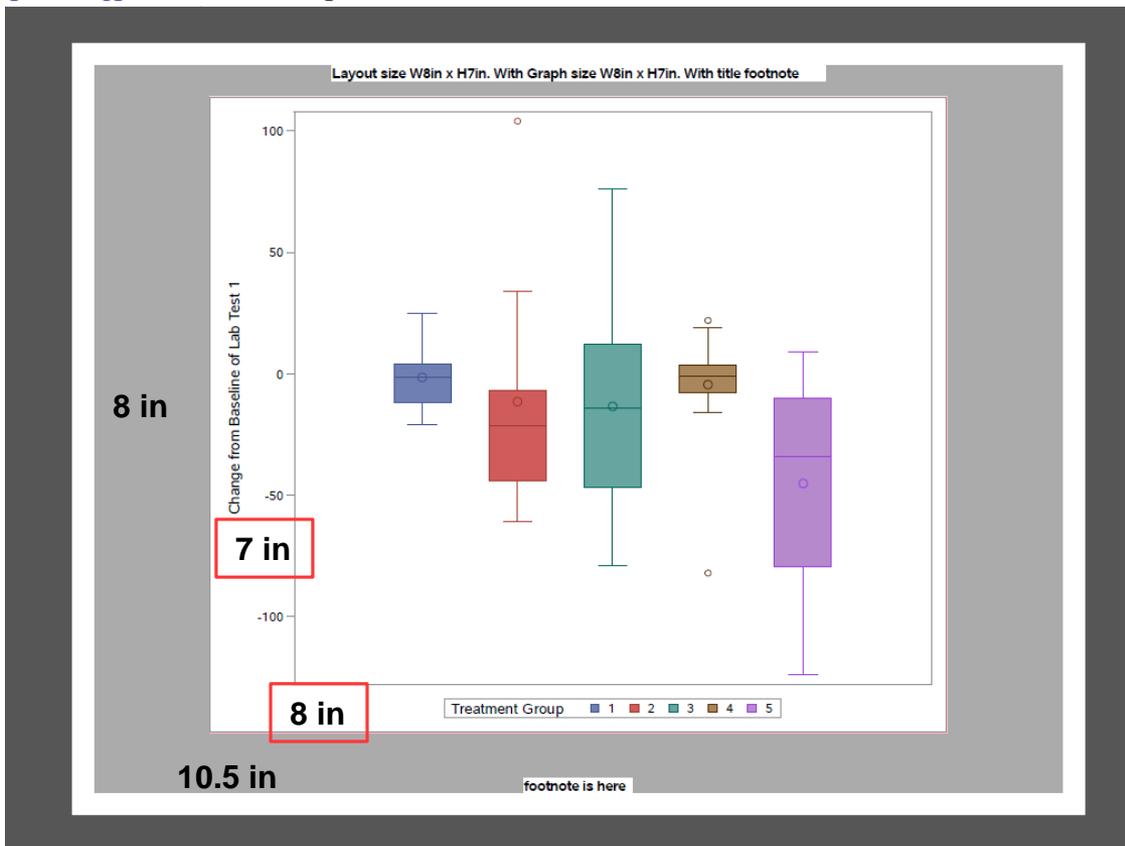
# Ex. 4: Maximize Graph Size with Title Footnote

- ❑ Add ODS Graphics / width= height= options to be the same size as layout area

```
title 'Layout size W8in x H7in. With Graph size W8in x H7in. With title footnote';  
footnote 'footnote is here';
```

```
ods pdf file='Ex4_layoutsizeW8H7_withgsizeW8H7_with_tf.pdf' nogtitle nogfoot style=color;  
ods layout start width=8in height=7in style={background=lightpink};
```

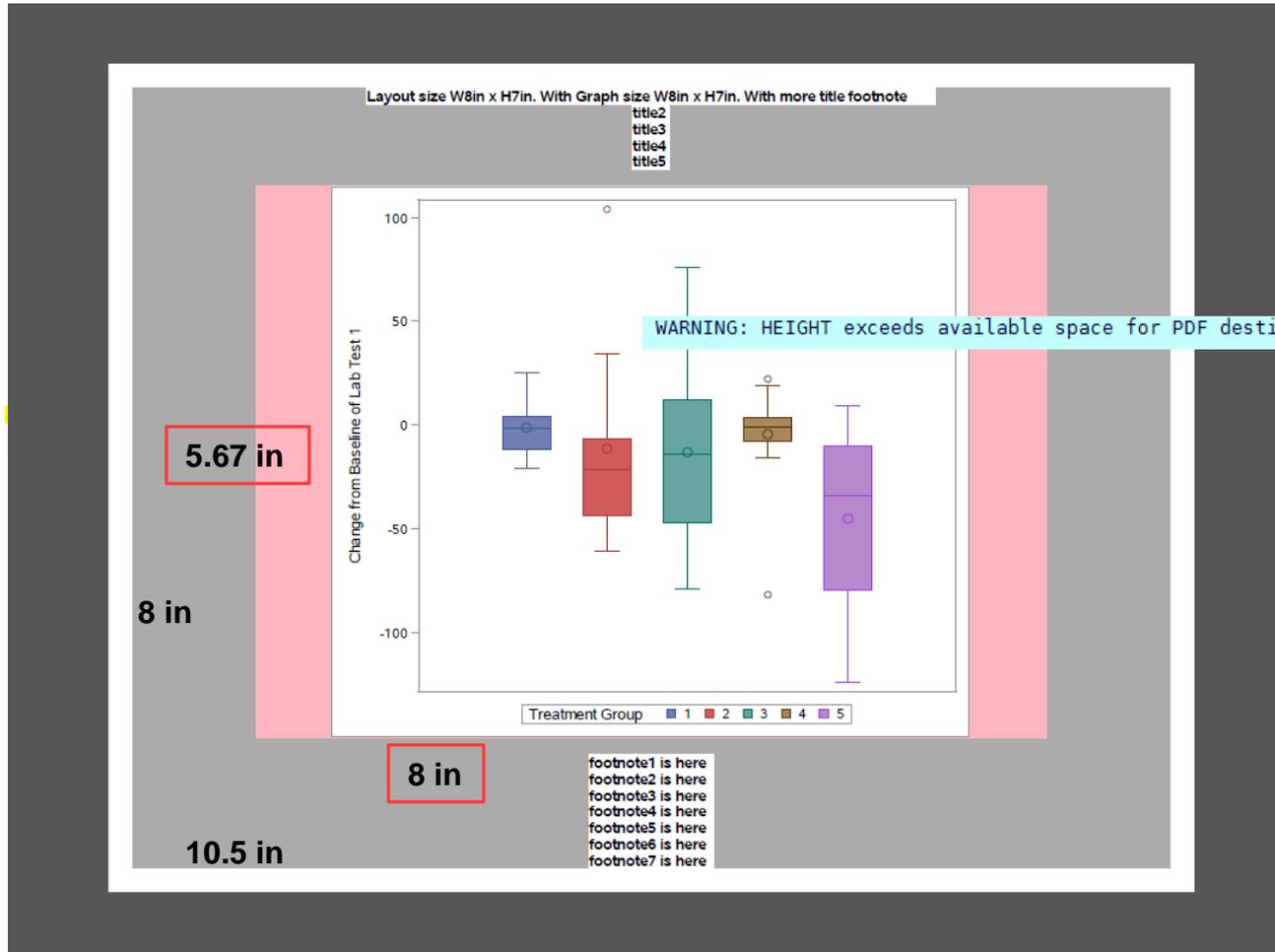
```
ods graphics/reset=all width=8in height=7in;  
proc sgplot data=dummydata1;
```



- ❑ You don't see the pink anymore
- ❑ Graph size is correct W 8 x H 7
- ❑ Maximize the graph size in layout area

# Ex. 5: Same as Ex. 4 but More Title Footnotes

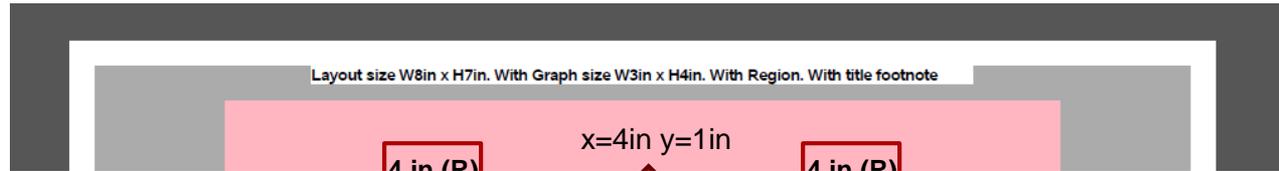
- What will happen to layout and graph area



- Layout is forced to be smaller
- There is warning message:
- Graph size is determined by SAS default as  
aspect ratio:  
 $H = 0.75 \times W$

# Ex. 6: Control Graph Position or Add Graph

- Add ODS Region `x= y= width= height=` with `ODS Graphics / width= height=` options

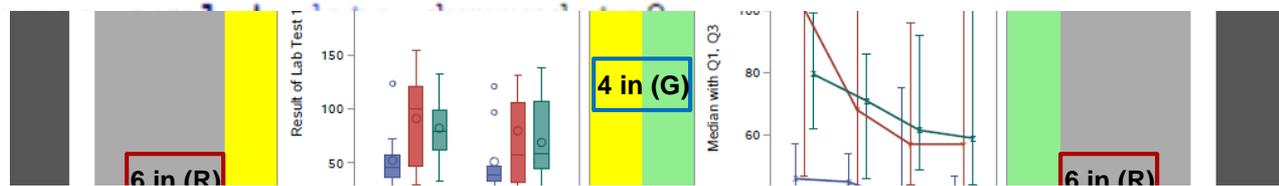


```
ods graphics/reset=all width=3in height=4in;
```

```
ods region x=0in y=1in width=4in height=6in style={background=yellow};
```

with title footnote';  
 □ Region x, y is the top-left corner of layout container  
 style=color;  
 top-left

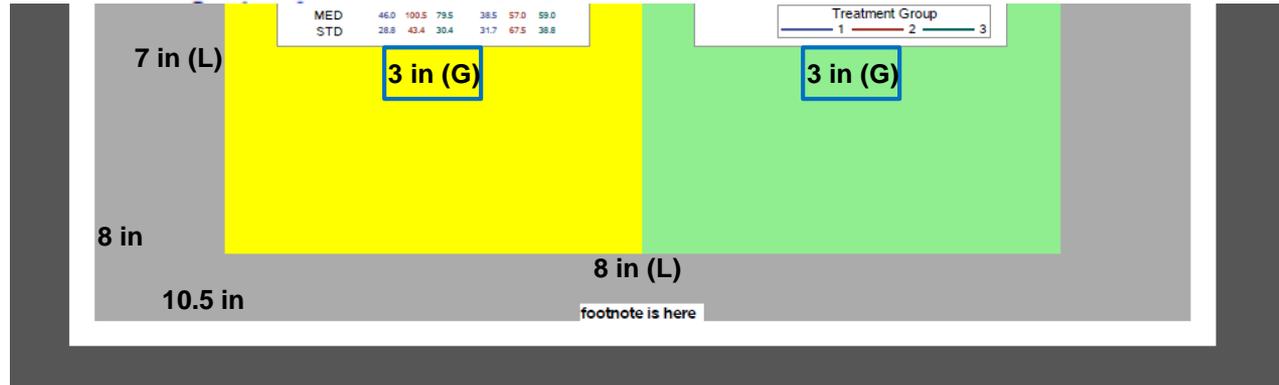
- Two Region size are W4 x H6  
`style={size=6}`



```
ods graphics/reset=all width=3in height=4in;
```

```
ods region x=4in y=1in width=4in height=6in style={background=lightgreen};
```

- Two graph size are correct W 3 x H 4

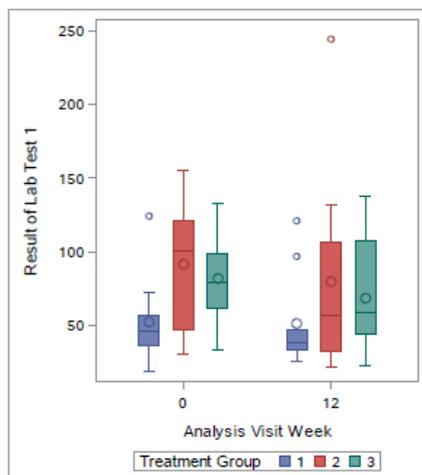


- Two different graphs in one page!  
`group=on;`  
`markercharacter =`  
`name='s';`

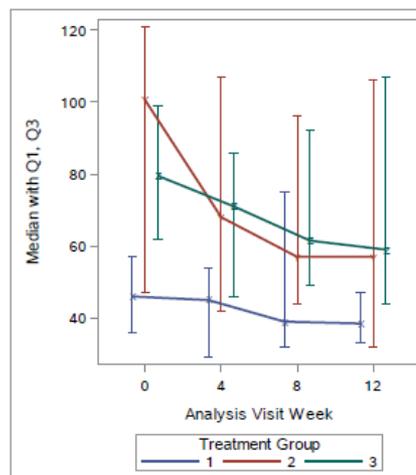
```
ods layout end;  
ods graphics off;  
ods _all_ close;
```

# Ex. 7: Add Reporting and Remove Color to Finish

Layout size W8in x H7in. With Graph size W3in x H4in. With Region. With reports



		WK 0	WK 4	WK 8	WK 12
Group 1	Median	46.0	45.0	39.0	38.5
	Std	28.8	27.0	21.2	31.7
Group 2	Median	100.5	68.0	57.0	57.0
	Std	43.4	43.2	47.1	67.5
Group 3	Median	79.5	71.0	61.5	59.0
	Std	30.4	36.8	52.7	38.8

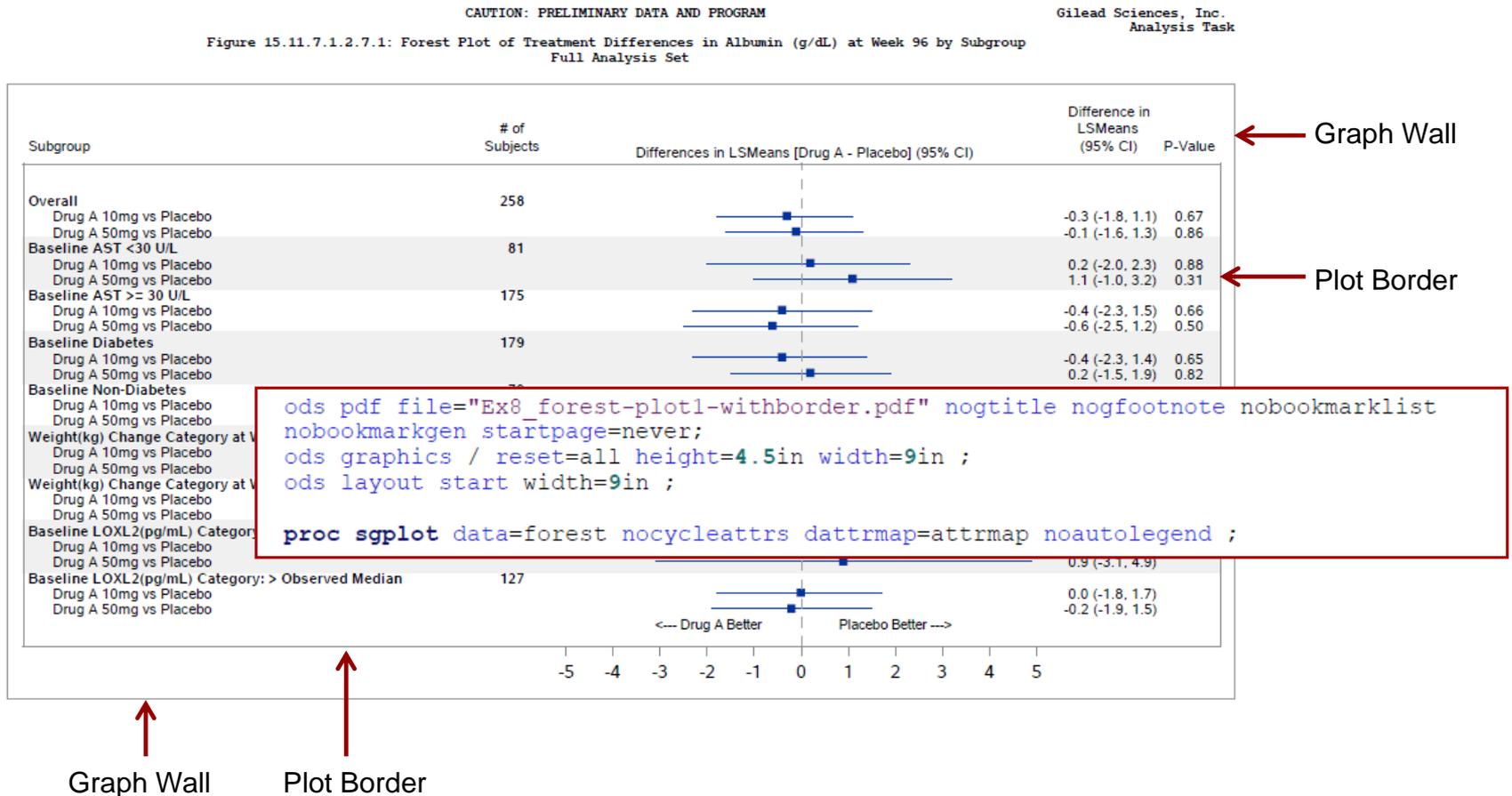


	WK 0	WK 4	WK 8	WK 12
Group 1 (n=)	10	10	10	10
Group 2 (n=)	10	10	10	10
Group 3 (n=)	10	10	10	10

footnote is here

# Ex. 8: With Graph Wall and Plot Border

- By default, graph border and plot border will show in output



Treatment difference is estimated based on a mixed-effect model for repeated measures[ except for =ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.

Data Extracted: xxxx

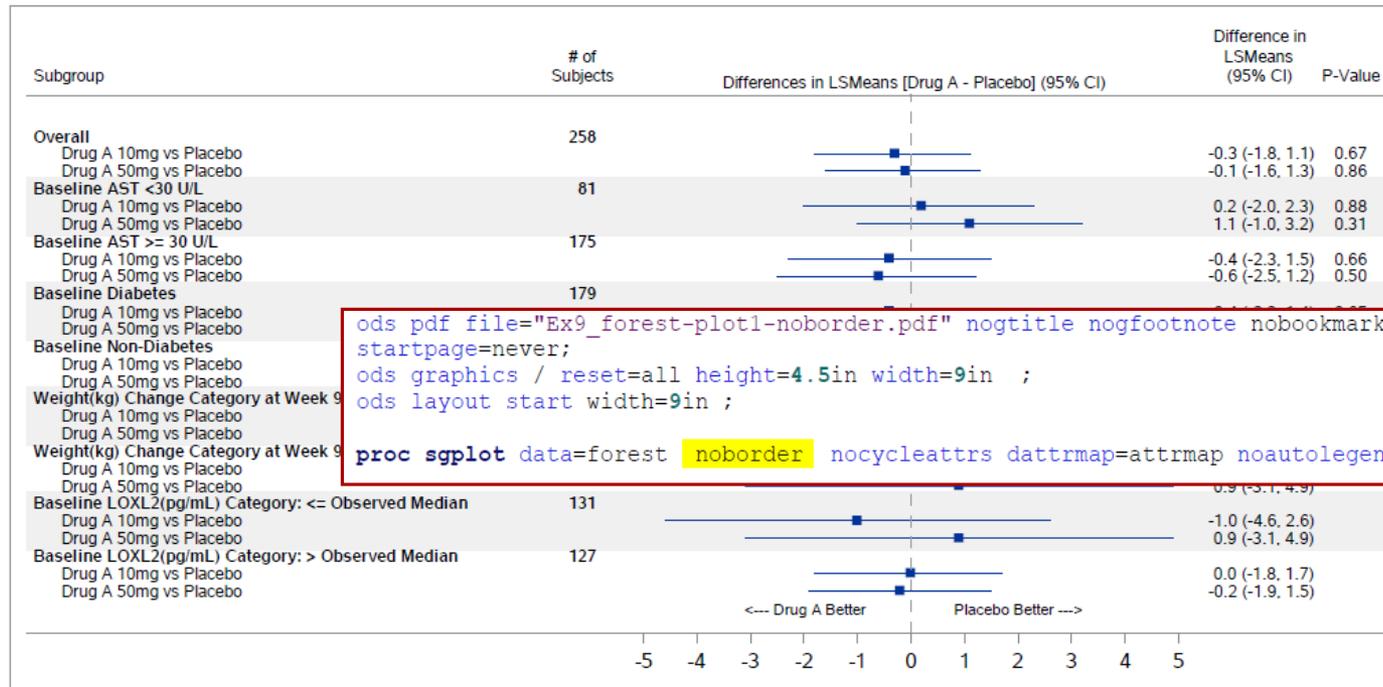
# Ex. 9: With Graph Wall but No Plot Border

- Add `noborder` in Proc Sgplot statement to turn off plot border

CAUTION: PRELIMINARY DATA AND PROGRAM

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Figure 15.11.7.1.2.7.1: Forest Plot of Treatment Differences in Albumin (g/dL) at Week 96 by Subgroup  
Full Analysis Set



← Graph Wall

```
ods pdf file="Ex9_forest-plot1-noborder.pdf" nogtitle nogfootnote nobookmarklist nobookmarkgen
startpage=never;
ods graphics / reset=all height=4.5in width=9in ;
ods layout start width=9in ;
proc sgplot data=forest noborder nocycleattrs dattmap=attrmap noautolegend ;
```

↑  
Graph Wall

Treatment difference is estimated based on a mixed-effect model for repeated measures[ except for =ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.

Data Extracted: xxx

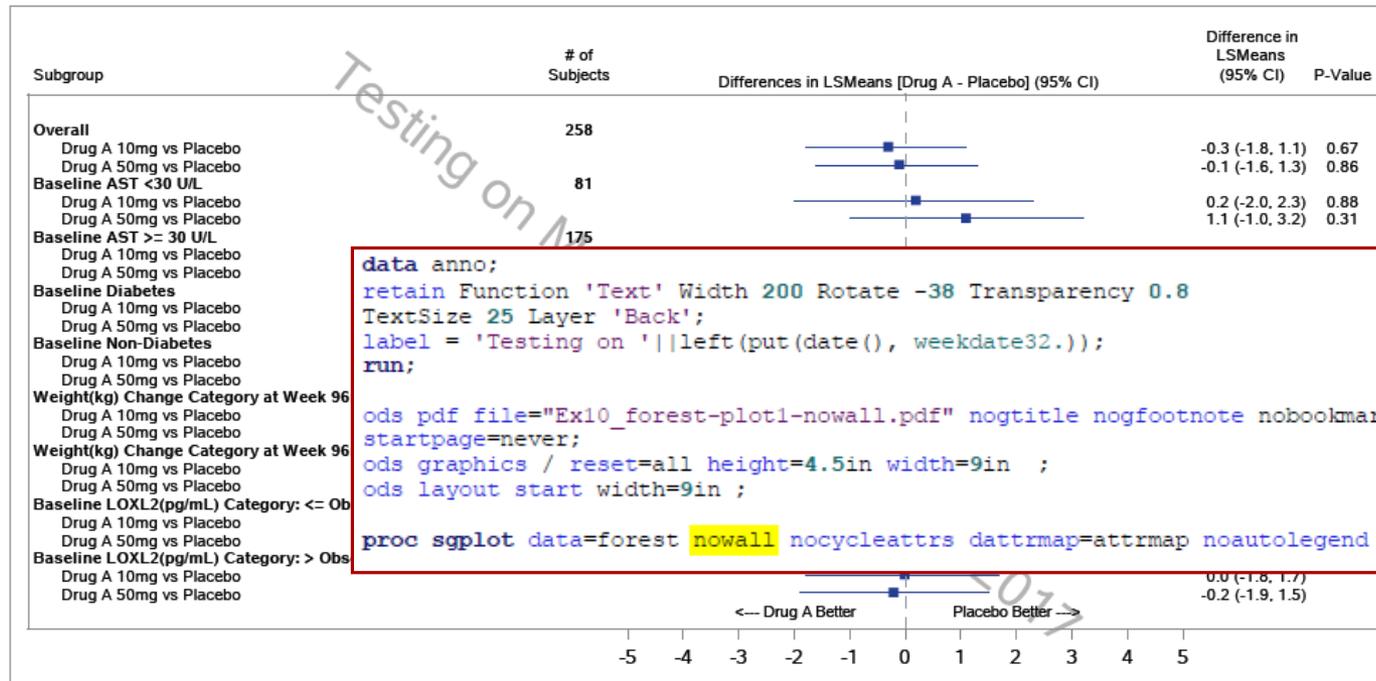
# Ex. 10: Turn Off Graph Wall's Fill for Annotation

- Add `nowall` in Proc Sgplot statement to turn off graph wall's fill

CAUTION: PRELIMINARY DATA AND PROGRAM

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Analysis Task

Figure 15.11.7.1.2.7.1: Forest Plot of Treatment Differences in Albumin (g/dL) at Week 96 by Subgroup  
Full Analysis Set

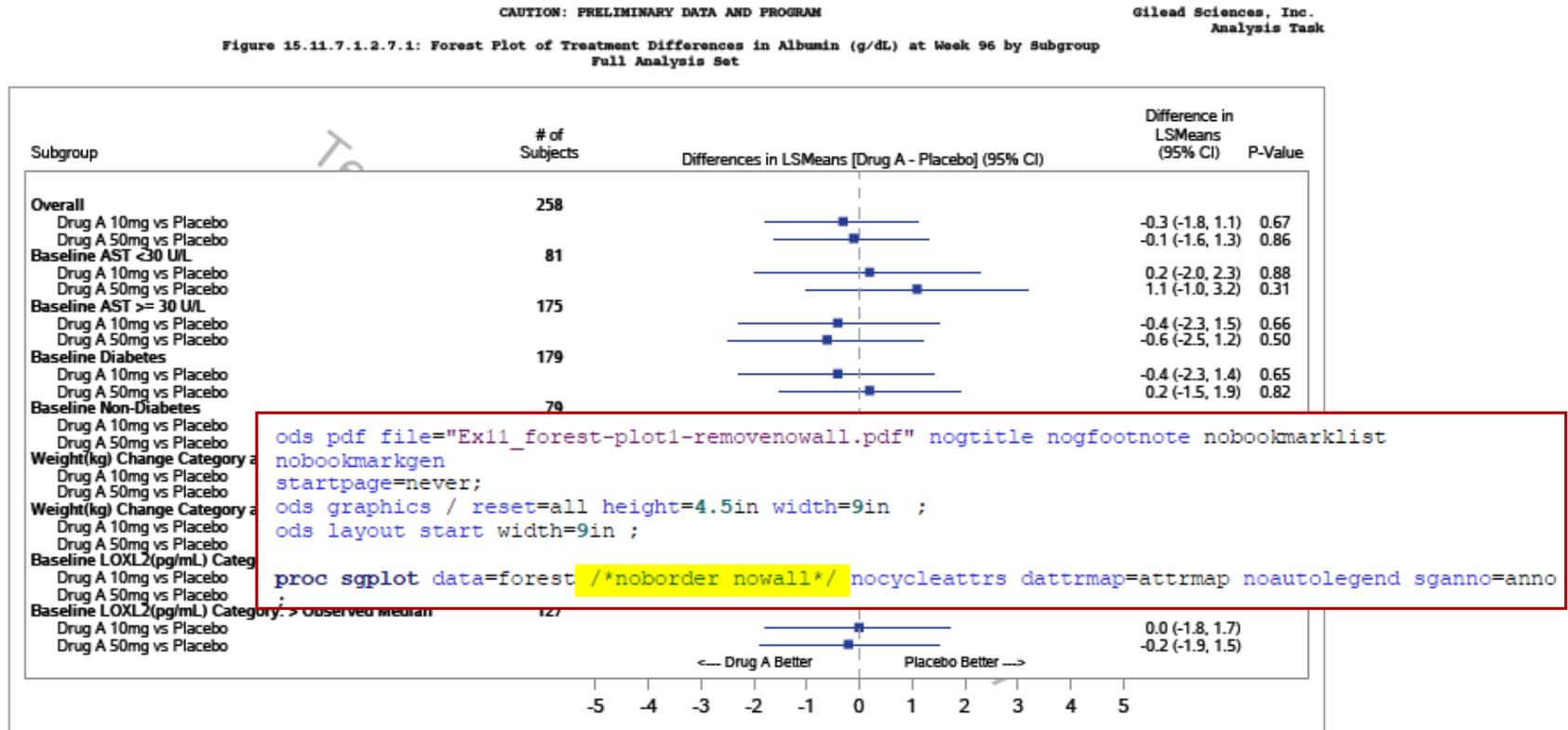


Treatment difference is estimated based on a mixed-effect model for repeated measures[, except for =ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.

Data Extracted: xxx

# Ex. 11: Same as Ex. 10 but Remove nowall Option

- Remove `nowall` in Proc Sgplot statement will block annotation that locates in plot area

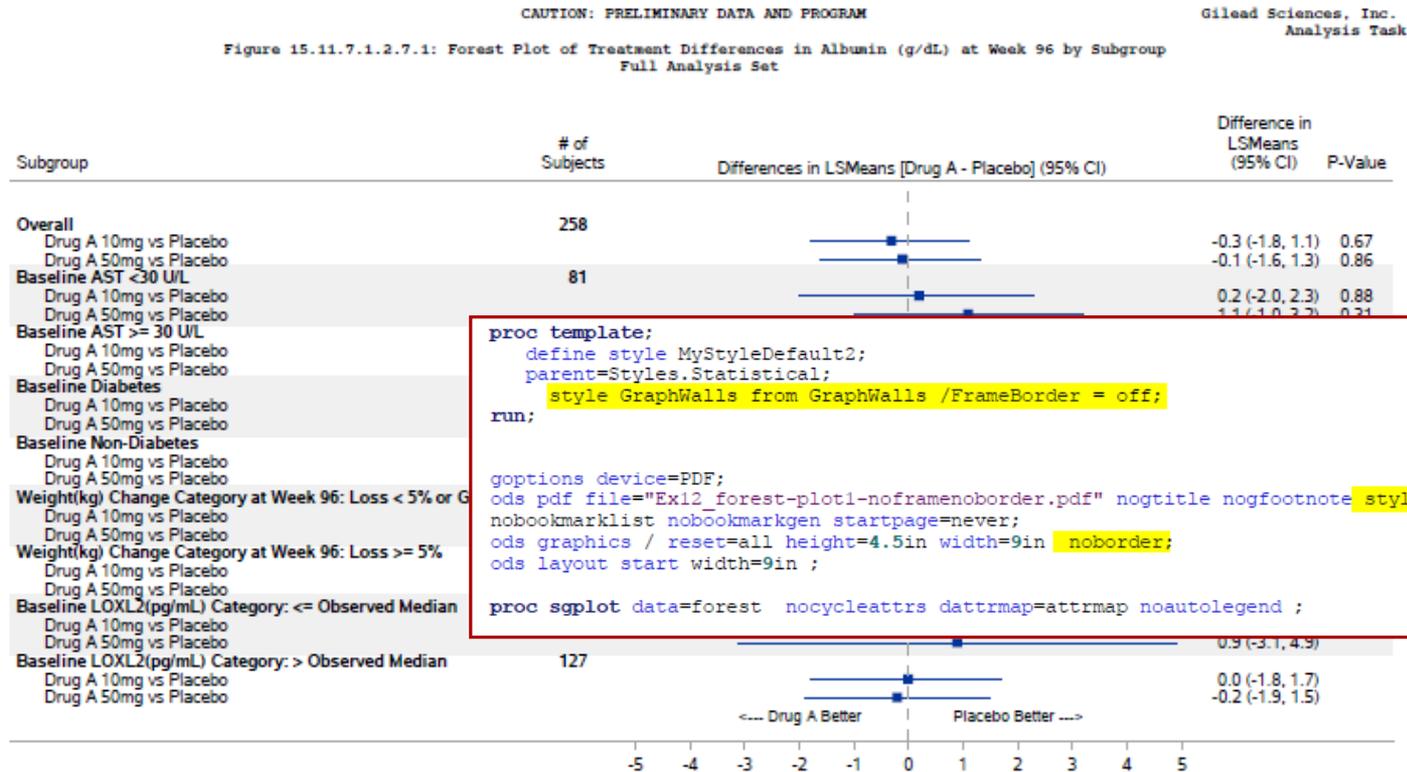


Treatment difference is estimated based on a mixed-effect model for repeated measures[ except for =ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.

Data Extracted: xxx

# Ex. 12: No Graph Wall and No Plot Border

- Apply template style with `style GraphWalls from GraphWalls /FrameBorder = off`
- Add `ODS Graphics / noborder` option

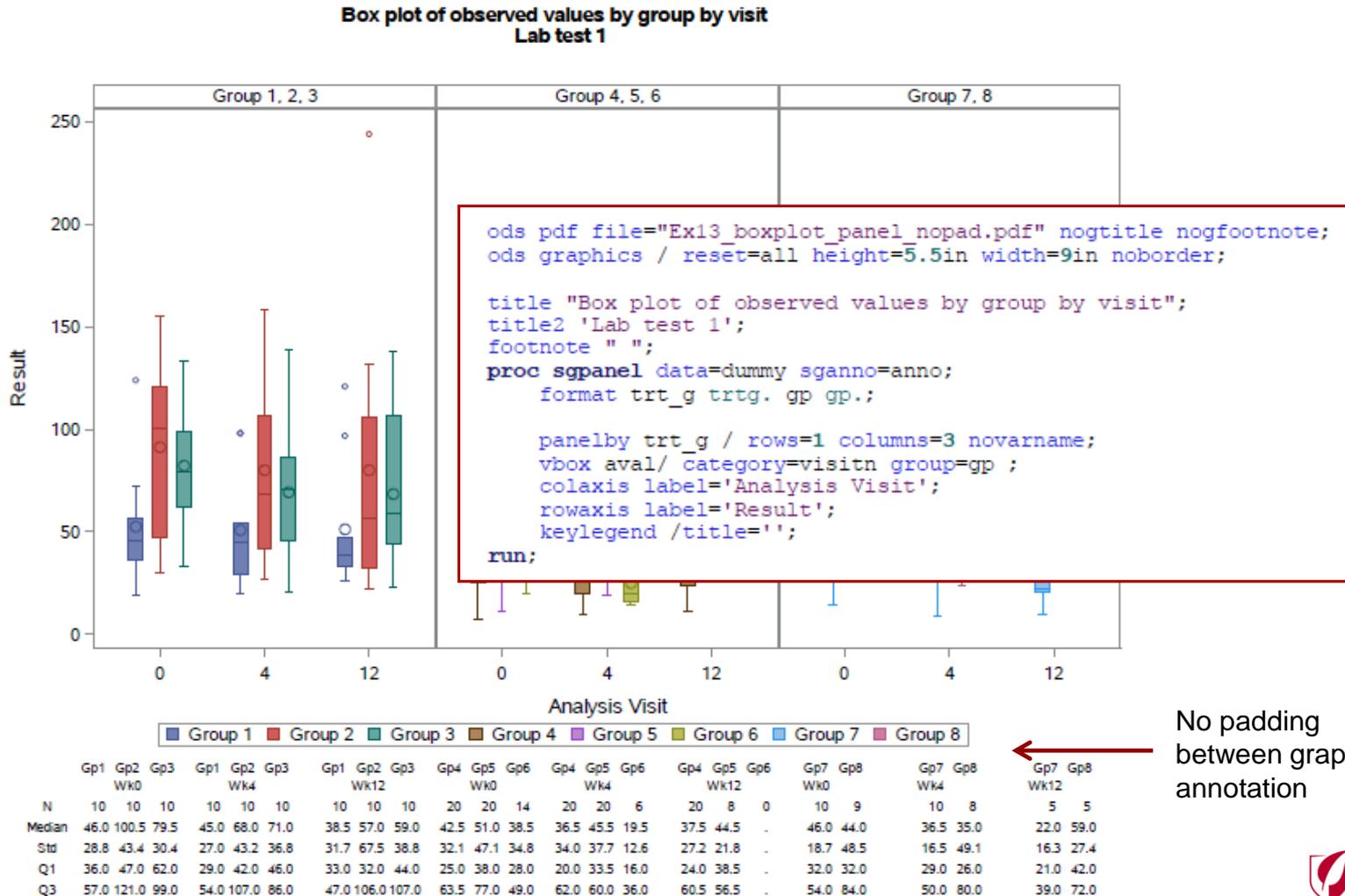


Treatment difference is estimated based on a mixed-effect model for repeated measures[, except for =ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.

Data Extracted: xxxx

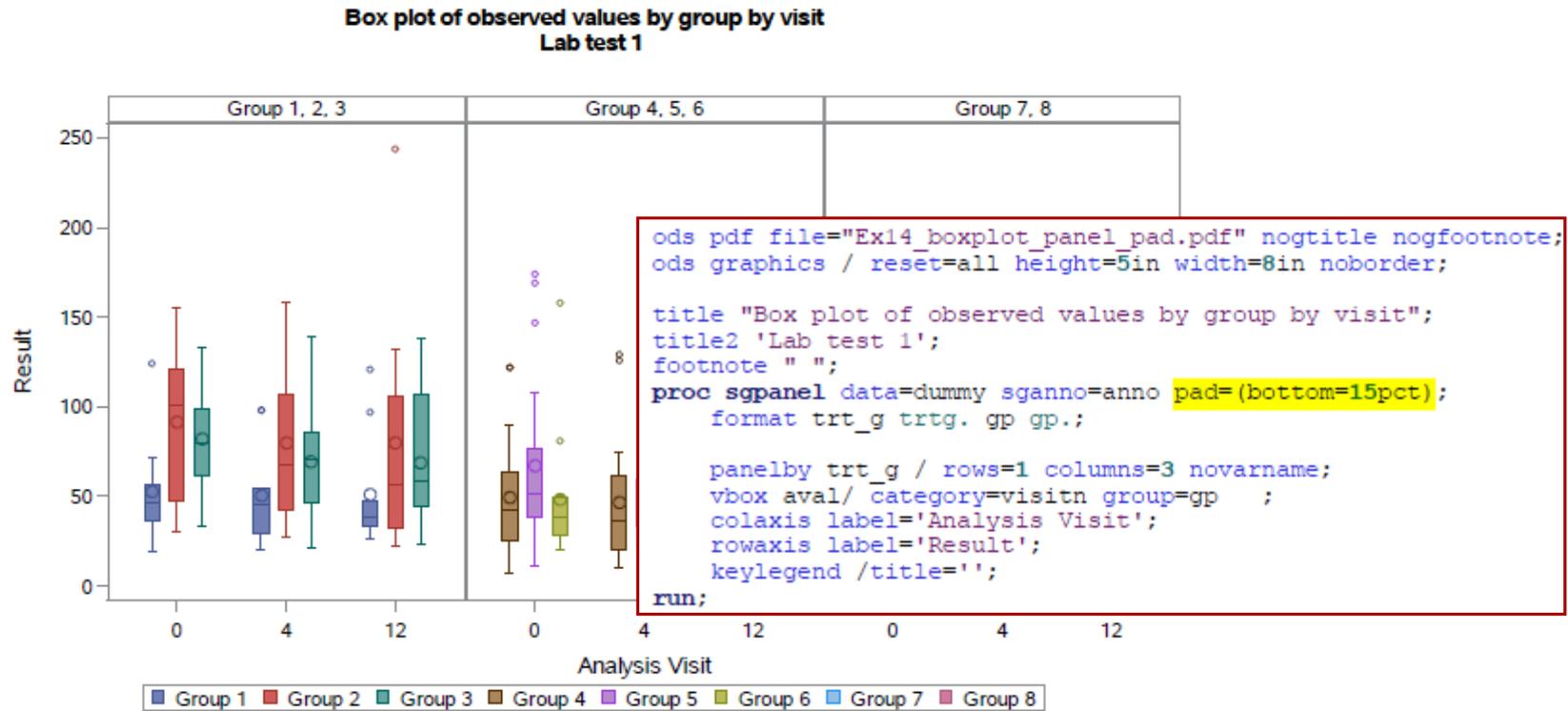
# Ex. 13: Not Specify Any pad Option

- By default, no padding is applied with graph



# Ex. 14: Add Space Between Graph and Annotation

- Add `pad=(bottom=15pct)` in Proc Sgplot will reserve 15% extra space at bottom of graph

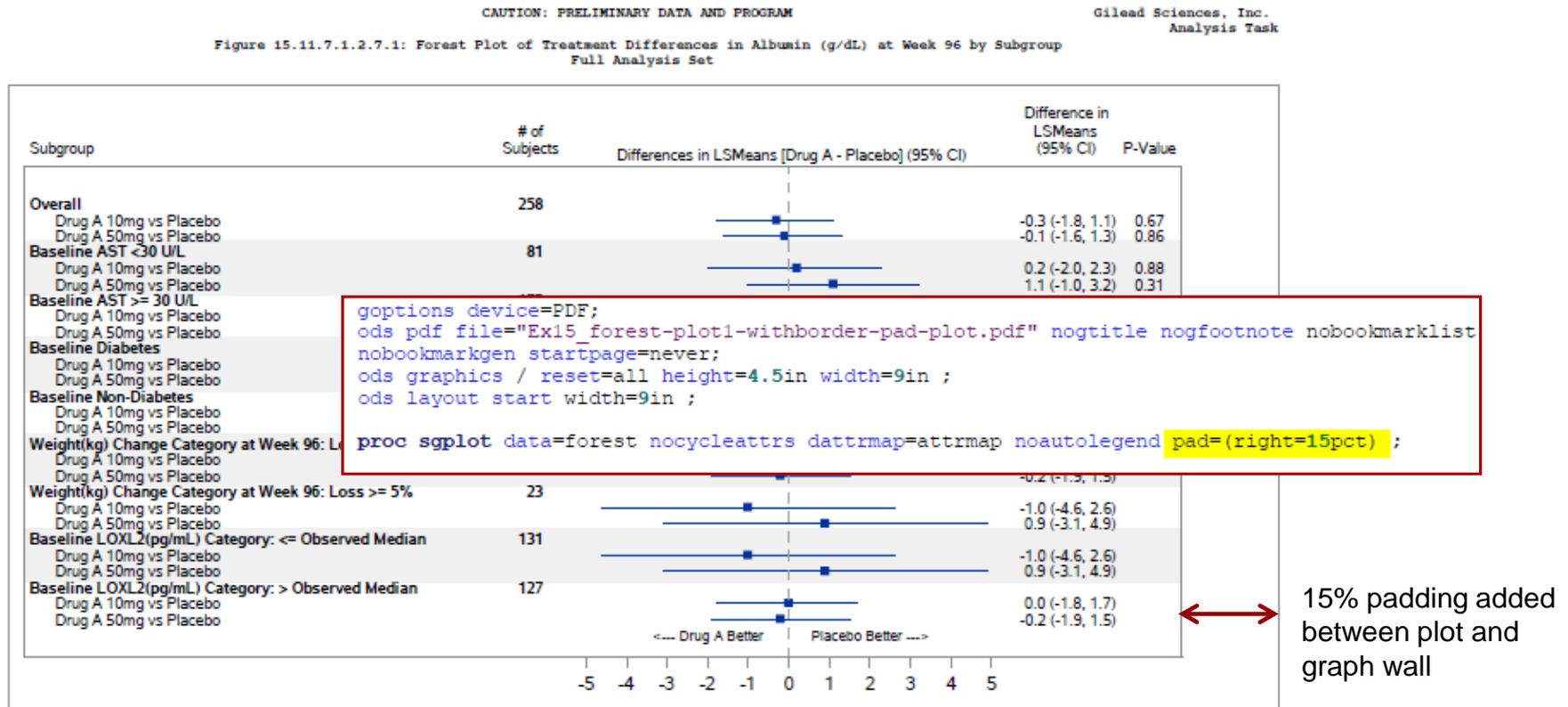


15% padding added between graph and annotation

	Gp1 Gp2 Gp3			Gp1 Gp2 Gp3			Gp1 Gp2 Gp3			Gp4 Gp5 Gp6			Gp4 Gp5 Gp6			Gp7 Gp8		Gp7 Gp8		Gp7 Gp8			
	Wk0			Wk4			Wk12			Wk0			Wk4			Wk0		Wk4		Wk12			
N	10	10	10	10	10	10	10	10	10	20	20	14	20	20	6	20	8	10	9	10	8	5	5
Median	46.0	100.5	79.5	45.0	68.0	71.0	38.5	57.0	59.0	42.5	51.0	38.5	36.5	45.5	19.5	37.5	44.5	46.0	44.0	36.5	35.0	22.0	59.0
Std	28.8	43.4	30.4	27.0	43.2	36.8	31.7	67.5	38.8	32.1	47.1	34.8	34.0	37.7	12.6	27.2	21.8	18.7	48.5	16.5	49.1	16.3	27.4
Q1	36.0	47.0	62.0	29.0	42.0	46.0	33.0	32.0	44.0	25.0	38.0	28.0	20.0	33.5	16.0	24.0	38.5	32.0	32.0	29.0	26.0	21.0	42.0
Q3	57.0	121.0	99.0	54.0	107.0	86.0	47.0	106.0	107.0	63.5	77.0	49.0	62.0	60.0	36.0	60.5	56.5	54.0	84.0	50.0	80.0	39.0	72.0

# Ex. 15: Add Space Between Plot and Graph Wall

- Add `pad=(right=15pct)` in Proc Sgplot will reserve 15% extra space at right of plot



Treatment difference is estimated based on a mixed-effect model for repeated measures[, except for =ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.

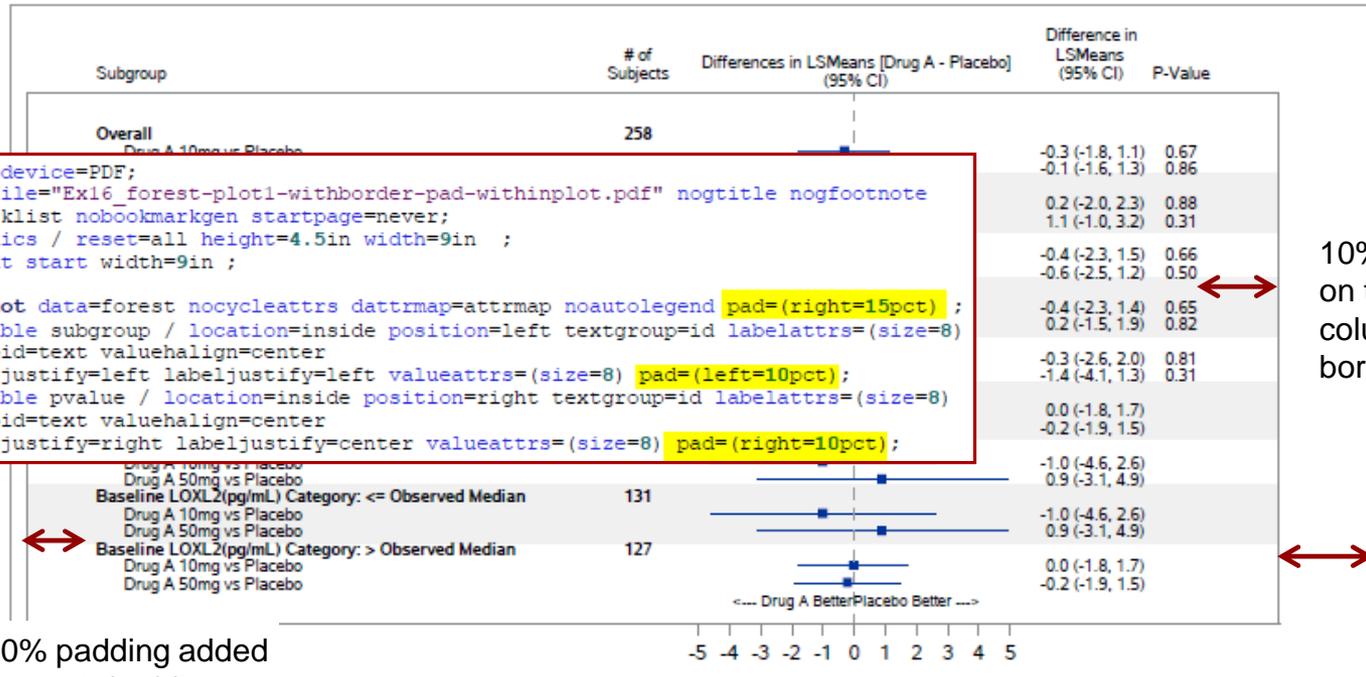
Data Extracted: xxx

# Ex. 16: Add Space Between Data and Plot Border

- ❑ Add `pad=(left=10pct)` in `yaxistable` will reserve 10% space at left of the specified column
- ❑ Add `pad=(right=10pct)` in `yaxistable` will reserve 10% space at right of the specified column

CAUTION: PRELIMINARY DATA AND PROGRAM  
 Figure 15.11.7.1.2.7.1: Forest Plot of Treatment Differences in Albumin (g/dL) at Week 96 by Subgroup  
 Full Analysis Set

Gilead Sciences, Inc.  
 Analysis Task



```

goptions device=PDF;
ods pdf file="Ex16_forest-plot1-withborder-pad-withinplot.pdf" nogtitle nogfootnote
nobookmarklist nobookmarkgen startpage=never;
ods graphics / reset=all height=4.5in width=9in ;
ods layout start width=9in ;

proc sgplot data=forest nocycleattrs dattrmap=attrmap noautolegend pad=(right=15pct) ;
  yaxistable subgroup / location=inside position=left textgroup=id labelattrs=(size=8)
  textgroupid=text valuealign=center
  valuejustify=left labeljustify=left valueattrs=(size=8) pad=(left=10pct) ;
  yaxistable pvalue / location=inside position=right textgroup=id labelattrs=(size=8)
  textgroupid=text valuealign=center
  valuejustify=right labeljustify=center valueattrs=(size=8) pad=(right=10pct) ;
  
```

10% padding added on the right of last column and plot border

15% padding added between plot and graph wall

10% padding added on the left of first column and plot border

Treatment difference is estimated based on a mixed-effect model for repeated measures[ except for ANCOVA Analysis] where the treatment difference at Week 96 is estimated based on an ANCOVA model]. Refer to the corresponding tables for the factors and covariate in the models.



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*Thank You!*