



Paper CC02

Generating Multiple Parameter Reports Into Single Report Using %Do Loop And Call Symputx

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AGENDA

- Introduction
- Lab MMRM reports with multiple lab tests
- Programmer's Thinking
- Basic Programming Steps
- Programming Steps with overview of %Do loop and Call Symputx
- Take Away/Conclusion
- Questions

INTRODUCTION

STATISTICIAN



LAB MMRM REPORTS WITH MULTIPLE LAB TESTS

Values of Laboratory Analyte (highlighted in Yellow color) and Covariance structure (highlighted in Turquoise color) in Figure-1 and 2 will be changed accordingly for different Lab Test data.

Analysis of Laboratory Analyte Change from Baseline - MMRM										Page	1 of 115
ITT Patients											
ABC-DE-FGHI											

Laboratory Analyte: ALBUMIN(gram/Liter)											

Visit (Week)	Drug Group	N	Mean Change	SD	LS Mean Change	SE	Within Grp p-value [a]	LS Mean Change Difference	SE	Between Grp p-value [b]	95% CI

4(1.0)	DrugA	90	-1.51	2.62	-1.25	0.22	<.001				
	DrugB	90	-1.11	2.57	-1.04	0.23	<.001	0.21	0.31	.495	(-0.40, 0.83)
	Total	180	-1.31	2.59			<.001				
5(2.0)	DrugA	95	-1.59	2.73	-1.41	0.24	<.001				
	DrugB	95	-1.46	2.84	-1.29	0.23	<.001	0.13	0.33	.700	(-0.52, 0.78)
	Total	190	-1.53	2.78			<.001				
Overall	DrugA	94	-1.97	2.45	-1.78	0.24	<.001				
	DrugB	91	-1.85	3.04	-1.72	0.24	<.001	0.06	0.34	.853	(-0.61, 0.73)

Model: Lab Change from Baseline = Baseline + Intervention Group + Visit + Region + Intervention Group*Visit;											
Covariance Structure = Heterogeneous autoregressive (1st order) type.											

LAB MMRM REPORTS WITH MULTIPLE LAB TESTS

Analysis of Laboratory Analyte Change from Baseline - MMRM

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ITT Patients

ABC-DE-FGHI

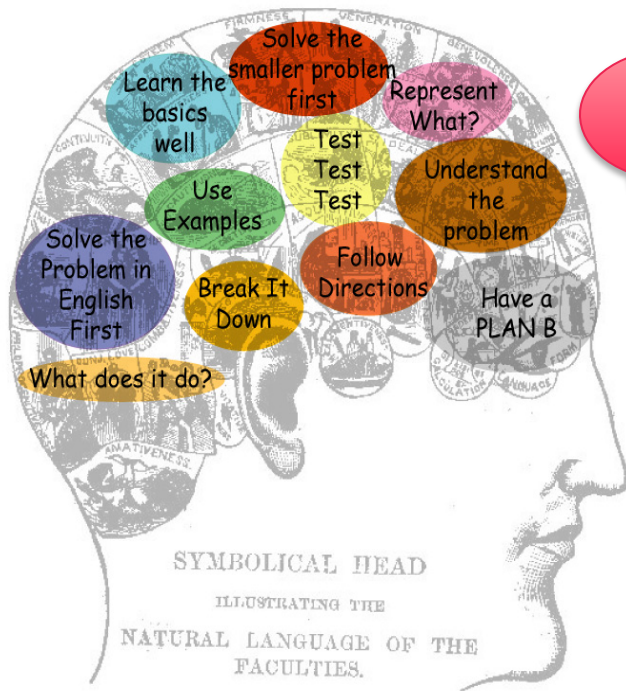
Laboratory Analyte: THYROXINE, TOTAL (T4) (nanomole/Liter)

Visit (Week)	Drug Group	N	Mean Change	SD	LS Mean Change	SE	Within Grp p-value [a]	LS Mean Change Difference	SE	Between Grp p-value [b]	95% CI
20 (52.0)	DrugA	75	1.11	21.31	3.68	1.92	.057				
	DrugB	72	4.24	16.69	3.00	1.93	.123	-0.68	2.72	.802	(-6.05, 4.69)
	Total	147	2.64	19.19			.097				
Overall	DrugA	75			3.68	1.92	.057				
	DrugB	72			3.00	1.93	.123	-0.68	2.72	.802[c]	(-6.05, 4.69)

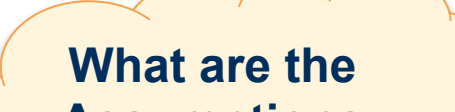
Model: Lab Change from Baseline = Baseline + Intervention Group + Visit + Region + Intervention Group*Visit;

Covariance Structure = Unstructured.

Programmer's Mind



**How do I
generate the
report?**

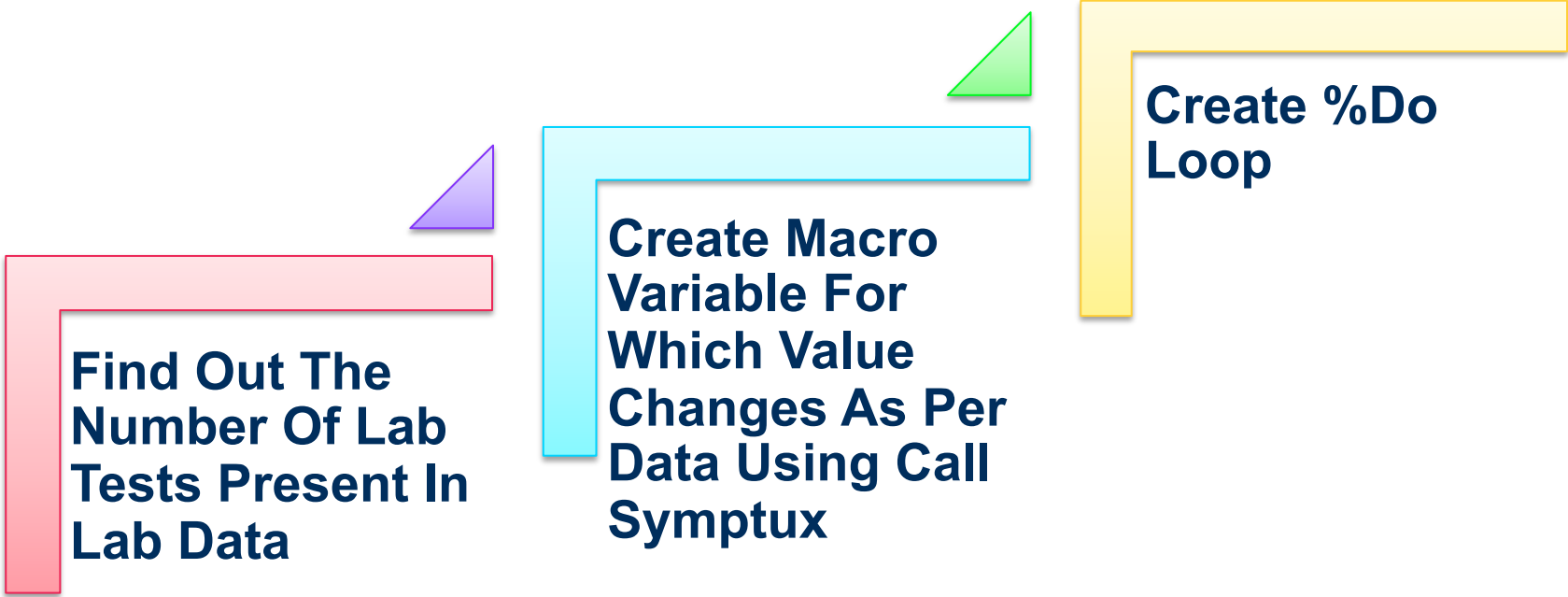


What are the Assumptions ?



**Do I have all
the necessary
information?**

BASIC PROGRAMMING STEPS



**Find Out The
Number Of Lab
Tests Present In
Lab Data**

**Create Macro
Variable For
Which Value
Changes As Per
Data Using Call
Symptux**

**Create %Do
Loop**

PROGRAMMING STEPS

Find out the number of Lab Tests present in Lab data

```
proc sort data=lab out=test nodupkeys;  
    by lbtest;  
run;
```

```
proc sql;  
    select count(distinct lbtest) into : max  
    from test;  
quit;
```

PROGRAMMING STEPS (CONT.)

Create macro variable CD having value of Lab test and TEXT having value of Lab test description to display in the report

```
data _null_;  
  set test;
```

```
  call symputx("cd" || compress(put(_n_,8.)), compress(lbtest),  
    'G');
```

```
  call symputx ("text" || compress(put(_n_,8.)), lbunit, 'G' );  
run;
```

PROGRAMMING STEPS (CONT.)

create %DO loop which runs from 1 to MAX(max macro variable created in above step) maximum number of Lab test count;

```
%do i = 1 %to &max;
```

```
data labs_final;  
    set lab(where = (lbtest = "&&cd&i."));  
run;
```

*** add other analysis steps as needed above;

```
data &&cd&i;  
    set final_data;  
    c0 = "&covariance.";  
run;  
%end;  
*** %DO loop ends here ***;
```

PROGRAMMING STEPS (CONT.)

```
%do i = 1 %to &max;
```

```
data _null_;  
  set &&cd&i.;
```

*** c0 variable has value of covariance structure for particular lab test as per above step, macro variable covariance will have value of covariance structure;

```
call symputx ("covariance", c0, 'G');  
run;
```

PROGRAMMING STEPS (CONT.)

```
proc report data = &&cd&i. headline missing
nowindows split = "#";
    column c1 - c12;
    define c1/"#Visit#(Week)" width = 9 left flow;
*** add other proc report steps
    compute before _page_;
        line @2 "Laboratory Analyte: &text&i.";
    endcomp;

    compute after _page_;
        line @2 "Covariance Structure = &covariance.";
    endcomp;

run;

%END;
```

TAKE AWAY/CONCLUSION

- **DO NOT FORGET** to add 'G' option in the Call Symputx. It will create Global Macro Variable.
- Iterative %DO is very similar to the DO statement used in the DATA step, but it is not confined to the DATA step. It can be used anywhere inside of a macro. The iterative %DO defines and increments a macro variable.
- One might think that reports given as an example can be easily generated by passing Lab test variable in BY statement, but MMRM ANOVA/ANCOVA model of all lab parameters may not get converged for same variance covariance matrix and one needs to find out the best covariance structure for each lab test separately.





CONTACT INFORMATION

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