

Paper OS08 - The {teal} Framework Updates; How Open Source and Cross- Industry Collaboration Benefit Everyone!

Peyman Eshghi
Paul Jenkins

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Johnson&Johnson

Agenda

- **Framework Overview** - Current state of {teal}
 - **Recent Developments** - Latest enhancements and improvements
 - **Advanced Components** - Transformers and decorators
 - In-app **Access Control** using rAccess
 - **Addressing Industry-Specific Needs** - J&J's implementation experience
 - **Community Impact** - Cross-industry collaboration
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- Note: all data used in this presentation is dummy data taken from the `pharmaverseadamjnj` package

Framework Overview

What is {teal}

- **Open-source R package** for clinical data visualization
- **Standardized platform** for interactive analysis
- **Modular architecture** supporting TLF generation
- **Regulatory-compliant** design (**Accuracy, Reproducibility, Traceability**)
- **Community-driven** development

Adopted by numerous pharmaceutical organizations worldwide

Recent Developments

Latest {teal} Enhancements

UI/UX Improvements

- Enhanced layout using **bslib components**
- Improved navigation and user experience

Navigation Restructuring

- **Module dropdown** selection
- **Report previewer** modal integration
- **Teal Data Module** modal placement

Advanced Components

Transformators

What are Transformators?

- **Reusable data processing components**
- Operate at the **data layer**
- Enable **systematic data modification**
- **Eliminate code duplication**
- Ensure **maintainability**

Transformators facilitate consistent data transformations across multiple analytical modules

Advanced Components

Decorators

What are Decorators?

- **Presentation layer components**
- Enhance **UI elements and formatting**
- **Non-invasive** to core functionality
- Enable **consistent styling**
- **Systematic UI enhancements**

Decorators maintain separation of concerns while improving user experience

Access Control using rAccess

Key Features

- Role-based access control
- Module-level permissions
- Dynamic access management
- Comprehensive audit trails
- Enterprise system integration



Critical for pharmaceutical environments with strict data governance

Advanced Components

Transformators - Use Case

OR Filtering

- Build complex queries interactively
- Preview generated expressions
- More flexible than standard filtering

RECORDNG PLACEHOLDER

Advanced Components

Decorators- Use Case 1

Title and footnotes

- Add titles and/or footnotes to any display using a specified titles.xlsx file
- Add custom titles and/or footnotes to any display

RECORDNG PLACEHOLDER

Advanced Components

Decorators- Use Case 2

Plot decorator

- Change titles, axis scales and labels
- Enlarge/reduce font size
- General customization for existing default graphical displays

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Access Control using rAccess

Example .yaml file for rAccess

```
app.R x sample_rAccess.yaml x read_data.R x
1 module: rAccess
2 parameters:
3   app_name: demoApp
4   board_type: local
5   access_mode: default
6   unit_display: 'dropdown'
7   switch_size:
8   user_df: !expr tibble::tribble(
9     ~userid, ~username,
10    "PJenkin2", "Paul Jenkins")
11   dbConnection:
12   use_rconnect_users: TRUE
13   local_board_path:
14   s3_bucket:
15   s3_access_key:
16   s3_secret_key:
17   rconnect_board_server: idarconnect.jnj.com
18   verbose: FALSE
19   secure_mode: FALSE
20
21 data:
22   datapath1:
23   datapath2:
24
25 panel_str:
26 - access_panel: ADMIN
27 - access_panel: Modules
28 access_units:
29 - unit: General information about the app
30 - unit: Data Table
31 - unit: Variable Browser
32 - unit: Disposition
33 - unit: Disposition (JJCS)
34 - unit: Analysis Sets
35 - unit: Demographic and Baseline Disease Characteristics
36 - unit: Site/Country Summary
37 - unit: Prior/Concomitant Medications
38 - unit: Overall AE Summary
39 - unit: All AE Tables by Term
40 - unit: AE Severity by Term
41 - unit: Adverse Events by Grade
42 - unit: Deaths
```

RECORDNG PLACEHOLDER

Addressing Industry-Specific Needs

J&J's Approach

- **Systematic development** strategy
- **Reusable, open-source** components
- **Internal standards** alignment
- **Community contribution** focus

Goal: Benefit wider pharmaceutical community while meeting specific needs

Addressing Industry-Specific Needs

Enhanced Features - Use Case 1

AE Summary Table – by SOC/PT

- Addition of combined active treatment group column
- Addition of Risk difference calculation columns
- Addition of sort order options

RECORDNG PLACEHOLDER

Addressing Industry-Specific Needs

Enhanced Features - Use Case 2

AE Summary Table – SOC/PT/Severity

- Addition of MLT option to satisfy 3-level AE summary tables
- Omit certain llt, mlt, hlt groups from sorting choices (eg grade/severity)

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Addressing Industry-Specific Needs

Internal standards alignment - Use Case 1

LAB/Vitals Summary Tables

Home / root / Laboratory / Lab Summary Table

Active Data Summary

Data Name	Obs
ADSL	254/254
ADLB_summary	58358/58358

Filter Data

ADSL

SAFFL

FASFL

ADLB_summary

Reporter

Encodings

Select Treatment Variable

Select

TRT01A Actual Treatm

Select Endpoint Dataset:

ALT Alanine Aminotransfe

Row By Variable Dataset:

PARAM Parameter, I

Summarize Variables for Count

Summarize Variables for Mean

AVAL Analysis Value

AVAL Analysis Value, 1

Apalutamide						
N=72				Apalutamide Subgroup		
Parameter	N=72			N=96		
Analysis Visit	n/N (%)	Mean (95% CI)	Mean Change from Baseline(95% CI)	n/N (%)	Mean (95% CI)	Mean Change from Baseline(95% CI)
Alanine Aminotransferase (U/L)						
Baseline	72/72 (100.0%)	19.2 (16.8, 21.6)		94/94 (100.0%)	18.1 (16.4, 19.9)	
Cycle 02	70/70 (100.0%)	21.2 (19.1, 23.3)	2.2 (0.6, 3.7)	88/88 (100.0%)	20.7 (18.5, 22.9)	2.3 (0.8, 3.8)
Cycle 03	72/72 (100.0%)	21.3 (19.1, 23.5)	2.3 (0.6, 3.9)	72/72 (100.0%)	17.5 (15.7, 19.3)	-0.6 (-1.6, 0.4)
Cycle 04	66/66 (100.0%)	21.2 (18.9, 23.6)	1.7 (0.2, 3.2)	62/62 (100.0%)	17.0 (15.0, 19.0)	-1.1 (-2.4, 0.2)
Cycle 05	56/56 (100.0%)	22.8 (18.1, 27.5)	3.3 (-1.3, 7.9)	60/60 (100.0%)	17.6 (15.6, 19.7)	0.0 (-1.5, 1.5)
Cycle 06	-	NE (NE, NE)	NE (NE, NE)	1/1 (100.0%)	16.0 (NE, NE)	-2.0 (NE, NE)
Cycle 07	50/50 (100.0%)	21.0 (18.1, 23.9)	0.9 (-1.6, 3.4)	51/51 (100.0%)	18.5 (14.9, 22.0)	0.4 (-2.4, 3.2)
Cycle 08	-	NE (NE, NE)	NE (NE, NE)	-	NE (NE, NE)	NE (NE, NE)
Cycle 09	37/37 (100.0%)	19.6 (17.0, 22.1)	0.0 (-2.4, 2.4)	42/42 (100.0%)	17.3 (15.0, 19.6)	0.7 (-1.1, 2.5)
Cycle 10	1/1 (100.0%)	12.0 (NE, NE)	1.0 (NE, NE)	2/2 (100.0%)	17.0 (-8.4, 42.4)	-2.0 (-27.4, 23.4)
Cycle 11	31/31 (100.0%)	19.6 (17.1, 22.1)	-0.3 (-3.3, 2.8)	30/30 (100.0%)	16.7 (14.3, 19.1)	1.1 (-0.8, 3.0)
Cycle 12	1/1 (100.0%)	42.0 (NE, NE)	32.0 (NE, NE)	-	NE (NE, NE)	NE (NE, NE)
Cycle 13	30/30 (100.0%)	21.0 (17.7, 24.2)	0.3 (-2.7, 3.3)	26/26 (100.0%)	18.2 (14.5, 21.9)	1.8 (-0.5, 4.2)
Cycle 15	-	NE (NE, NE)	NE (NE, NE)	-	NE (NE, NE)	NE (NE, NE)
Cycle 17	-	NE (NE, NE)	NE (NE, NE)	1/1 (100.0%)	15.0 (NE, NE)	1.0 (NE, NE)
Cycle 18	-	NE (NE, NE)	NE (NE, NE)	1/1 (100.0%)	20.0 (NE, NE)	0.0 (NE, NE)
End Of Treatment	27/27 (100.0%)	18.9 (16.1, 21.6)	-1.9 (-4.6, 0.7)	25/25 (100.0%)	17.8 (13.9, 21.8)	1.6 (-1.0, 4.3)

Addressing Industry-Specific Needs

Internal standards alignment - Use Case 2

LAB Shift Table

Active Data Summary

Data Name	Obs	Subject
ADSL	254/254	254/254
ADLB	59580/59580	254/254

Filter Data

ADSL

SAFFL

FASFL

ADLB

Reporter

Encodings

Select Treatment Variable

TRT01A Actual Treat

Select Timepoint Variable

AVISIT Analysis Visit

Select Timepoint Value

AVISIT Analysis Visit

Baseline

Select Parameter Category Value

PARCAT1 Parameter

CHEMISTRY

Groups

Active: Apalutamide

Apalutamide Subgroup

Laboratory Test	N	Low	Normal	High	Total
Study Visit					
Apalutamide	72				
Apalutamide Subgroup	96				
Placebo	86				

Alanine Aminotransferase (U/L)	Baseline	N	Low	Normal	High	Total
Apalutamide		72				
Low			0	0	0	0
Normal			0	68	0	68
High			0	0	4	4
Total			0	68	4	72
Apalutamide Subgroup		94				
Low			1	0	0	1
Normal			0	89	1	90
High			0	1	2	3
Total			1	90	3	94
Placebo		86				
Low			0	0	0	0
Normal			0	82	0	82
High			0	0	4	4
Total			0	82	4	86

Community Impact

Cross-Industry Collaboration

- **Accelerate development** timelines
- **Promote standardization** across industry
- **Improve quality** through peer review
- **Reduce duplicated effort**
- **Share knowledge** and expertise

Enhancements benefit entire pharmaceutical community, not just individual organizations

Key Takeaways

- **Transformators & decorators** enable powerful customization
- **Enterprise features** support access control
- **Custom modules** address specific needs
- **Cross-industry collaboration** drives innovation
- **Unified community voice** accelerates progress

Call to Action

- **Participate** in PHUSE Working Group and developing the {uteals} package
- **Contribute** to {teal} community
- **Share knowledge** and innovations



Thank you

If you have more questions, please contact:
Peyman Eshghi (Peshghi@its.jnj.com)
Paul Jenkins (PJenkin2@its.jnj.com)

Johnson&Johnson