INTRODUCTION

- Non-compartmental Analysis (NCA) is the basic and essential analysis tool for pharmacokinetic (PK) data from phase 1 clinical studies.
- WinNonlin® is the most widely used commercial software for NCA, but has limited accessibility to some data scientists.
- R is the most widely used, open source statistical computing tool for data science.
- Authors developed a package for R as an open source tool for NCA: ‘NonCompArt.’

OBJECTIVES

- To develop an open source tool for NCA in R environment
- To provide an effective and efficient tool for writing an NCA report to PK scientists.

MAIN FEATURES

- CDISC SDTM based input and PP based output
- Automatic slope selection with the same criterion of WinNonlin®, 1e-4
- Supporting both 'linear-up linear-down' and 'linear-up log-down' method for AUC calculation
- Interval/(partial) AUCs with ‘linear’ or ‘log’ interpolation

FUNCTIONS & CALLS

- NCA
- plotPK
- plotFit
- IndiNCA
- BestSlope
- IntAUC
- AUC
- Slope
- Interpol
- linAUC
- logAUC

EXAMPLE OF OUTPUTS

Output Data

NCA REPORT
Subject=1
NONCOMPARTMENTAL ANALYSIS REPORT
Version 1.0.7 (2017-02-03)
R version 3.3.2 (2016-10-31)

Calculation Setting
- Drug Administration: Extravascular
- Observation curve excluding trailing zeros; 11 parameters
- AUC Calculation Method: Linear-up Linear-down Fit
- Weighting for Lambda z: Linear (ordinary least squares, OLS)
- Lambda z selection criteria: Weighted adjusted R-squared = 1e-4

Fitting, AUC, AUMC Result

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* Used for the calculation of Lambda z.

Calculated Values

- Cmax: Max Conc = 10.5000 mg/L
- CORRXY: Correlation Between TimeX and Log ConcY = -1.0000
- LAMZUL: Lambda z Upper Limit = 24.3700 h
- TLST: Time of Last Nonzero Conc = 24.3700 h
- AUCINF: AUC Infinity Obs = 216.6119 h*mg/L
- AUMCINF: AUMC Infinity Obs = 4505.5348 h*mg/L

Output Figures

- Forest Plots for Inter-Study and Inter-Treatment Comparisons

FUTURE DIRECTIONS

- To make urine data processing available
- To include more diverse graphical analyses
- To support NONMEM input data
- To produce full NCA report automatically
- To develop further based on feedback from end users in data science society

ACKNOWLEDGMENT

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URL for NonCompartmental Analysis Package

https://cran.r-project.org/web/packages/NonCompartment/index.html