NeuroNEXT Network

Standard Operating Procedure (SOP)

Presenting Statistical Analysis Results for a Final Study Report

Version 3.0

SOP NN BIO 906

Originators: NeuroNEXT CCC and DCC Personnel

Signature and Date: DocuSigned by Christopher Coffey Christopher Coffey | I approve this document 17-Feb-2023 | 3:51:06 PM PST C68AC8DD80334CF982AED1200765F147 17-Feb-2023
Name and Title: Christopher S. Coffey, PhD (DCC Principal Investigator)
Signature and Date: DocuSigned by Merit Cudkowicz Merit Cudkowicz | I approve this document 17-Feb-2023 | 8:27:46 AM EST 9F8FE4180E504C6AB0A67B835E80C644 17-Feb-2023
Name and Title: Merit E. Cudkowicz, MD MSc (CCC Principal Investigator)
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17-Feb-2023

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22-Feb-2023 | 11:10:12 AM EST

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22-Feb-2023

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21-Feb-2023 | 6:37:30 AM PST

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21-Feb-2023

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NN BIO 906

NEURONEXT NETWORK STANDARD OPERATING PROCEDURE FOR PRESENTING STATISTICAL ANALYSIS RESULTS FOR A FINAL STUDY REPORT

1. POLICY

This SOP describes guidelines and procedures for writing quality statistical reports that adhere to professional standards and that clearly present the data analysis and results. Statistical reports should describe the nature of the NeuroNEXT Network study, the type of data that were collected and analyzed, the statistical methods used to analyze the data, and the results of the analysis.

Contents of figures, tables, and listings are verified for accuracy, and all statistics and results that are reported in the text of a report are verified to ensure that they are correct and validly interpreted.

2. SCOPE

This SOP has been developed to be in alignment with federal regulations and Good Clinical Practices (GCP) as set forth in the 2016 Integrated Addendum to ICH E6(R1): Guideline for Good Clinical Practice E6(R2). The policies and procedures described in this SOP apply to the NeuroNEXT Clinical Coordinating Center (CCC) and Data Coordinating Center (DCC) within the context of their oversight and advisory roles for the NeuroNEXT Network, and to all NeuroNEXT investigators, staff, subcontractors, External Biostatisticians (if applicable), or other entities associated with the NeuroNEXT Network who manage, oversee, and conduct research regulated by FDA and/or applicable review committees.

3. ROLES AND RESPONSIBILITIES

NeuroNEXT DCC Biostatisticians are responsible for adhering to the procedures outlined in this SOP, and for ensuring that the procedures are followed by other DCC staff members who may participate in writing final study reports.

4. APPLICABLE REGULATIONS AND GUIDELINES

ICH E3	Structure and Content of Clinical Study Reports
ICH E6, 4.5	Compliance with Protocol
ICH E6, 4.9	Records and Reports
ICH E6, 5.1	Quality Assurance and Quality Control
ICH E6, 5.5	Trial Management, Data Handling and Record Keeping
ICH E8	General Considerations for Clinical Trials (December 1997)
ICH E9	Statistical Principles for Clinical Trials (September 1998)

5. REFERENCES TO OTHER APPLICABLE SOPS

NN BIO 904	Generation and Validation of Analysis Data Sets
NN BIO 905	Validating Statistical Programs and Deliverables

6. ATTACHMENTS AND REFERENCES

NN BIO 906 - A	Document History

7. TERMS AND ABBREVIATIONS

The following terms and abbreviations are used in this document:

CCC	Clinical Coordinating Center at Massachusetts General Hospital
DCC	Data Coordinating Center at The University of Iowa
Lead Independent Biostatistician	The unblinded lead of the DCC Biostatistics study team (a defined position in the DCC).
Independent Biostatisticians	Unblinded DCC Biostatisticians
FDA	Food and Drug Administration
GCP	Good Clinical Practices

8. SPECIFIC PROCEDURES

A. General Considerations

#	*Who*	*Task*	*Attachment/ Reference*	*Related SOP*
1.	DCC Biostatisticians	When writing a final study report, DCC Biostatisticians should conform to standards of professional ethics for presenting and interpreting data analysis results. These standards include: • ensuring that authorship conforms to the study's standards; • reporting statistical and substantive assumptions made in the study; • identifying who is responsible for the statistical work; • accounting for all data considered in the study and explaining the sample(s) actually used; • reporting the sources and assessed adequacy of the data; • reporting the data cleaning and screening procedures used, including any imputation performed for missing data; • reporting clearly and fully the steps taken to guard validity (this includes addressing the suitability of the analytic methods and their inherent assumptions relative to the circumstances of the specific study, and		

#	Who	Task	Attachment/ Reference	Related SOP
		identifying the computer routines used to implement the analytic methods); • where appropriate, addressing potential confounding variables not included in the study; • identifying the ultimate financial sponsor of the study, the stated purpose, and the intended use of the study results; • when reporting analyses of volunteer data or other data not representative of a defined populations, including appropriate disclaimers; • reporting the limits of statistical inference of the study and possible sources of error.		
2.	DCC Biostatisticians	Include summary data in all reports; this will enable the reader to understand and interpret the data. When appropriate, use tables and figures. Report estimates along with their standard errors or appropriate confidence intervals.		NN BIO 904
3.	DCC Biostatisticians	Clearly identify in report the authors and the data source.		
4.	DCC Biostatisticians	Include a descriptive title in the report.		

B. Statistical Methods

#	Who	Task	Attachment/ Reference	Related SOP
1.	DCC Biostatisticians	Clearly describe the statistical methods used for the analysis.		
2.	DCC Biostatisticians	State whether the study was randomized (or other form of a designed experimental study), a panel study, case-control study, cohort study or other type of design.		
3.	DCC Biostatisticians	State statistical methods clearly in the text. Where applicable, state the statistical models that were used, along with the assumptions upon which these models were based.		
4.	DCC Biostatisticians	Specify whether the data are cross-sectional, longitudinal, or from a designed experiment. Indicate whether data were collected cross-sectionally, retrospectively, or prospectively.		

#	Who	Task	Attachment/ Reference	Related SOP
5.	DCC Biostatisticians	State whether the data represent the full universe of cases in the place and time as specified by the study design, or that they represent a sample thereof.		
6.	DCC Biostatisticians	Report the number of cases in the final analytic data set.		
7.	DCC Biostatisticians	If applicable, state the number of cases lost to follow-up.		

C. Presenting Statistical Analysis Results

#	Who	Task	Attachment/ Reference	Related SOP
1.	DCC Biostatisticians	Communicate the results of statistical analyses in a manner that is understandable and that follows professional standards.		
2.	DCC Biostatisticians	Tabulate and present basic univariate descriptive statistics for each variable used in the analysis. For categorical variables, present a frequency distribution and note the modal category. For continuous variables, present at a minimum the sample mean, standard deviation, minimum and maximum values.		
3.	DCC Biostatisticians	Estimate bivariate associations between independent and dependent variables, when applicable, using appropriate statistical methods, e.g., estimation of Pearson's correlation, Analysis of Variance or cross-tabulations.		
4.	DCC Biostatisticians	Label tabular and graphical summaries of descriptive statistics in a manner so that their contents are clearly understood: • for both tables and graphs, include a title that describes the overall contents; • for tables, row and/or column labels should clearly identify the contents of the table cells; • for tables, put information that does not easily fit into labels in a note at the end of the table; • for graphs, label axes and include a legend if needed.		
5.	DCC Biostatisticians	For statistical tests of hypotheses: • state the test;		

		• state null and alternative hypotheses clearly; • clearly interpret the results of hypothesis tests. Where appropriate, observed values of test statistics and p-values should be reported.		
6.	DCC Biostatisticians	For statistical models: • when statistical models are used, clearly state the model along with its assumptions; • for categorical independent variables, present estimated model coefficients and the size of each effect relative to the reference category; • for continuous independent variables, report coefficients and express effect in 1-unit increase (if 1-unit increase is not of interest, use more meaningful increase to describe effect size); • present main effects in the presence of interaction —supplement the estimated model coefficients with a table or graph to display the interaction effect; • for generalized linear models and generalized linear mixed models, estimated model coefficients may be presented in terms of the link function, but key results should be reported using the inverse of the link function for ease of understanding; • present estimated model coefficients with estimates of their variability (estimates may be in the form of standard errors or confidence intervals).		
7.	DCC Biostatisticians	Communicate results of statistical analyses in the report in a manner that is clearly understood: • use vocabulary that is understood by intended audience; • identify and define any mathematical terms used; • interpret results of analyses and relate them back to the main topic; • specify the direction and the size of the association between important variables.		

D. Conclusions

#	*Who*	*Task*	*Attachment/ Reference*	*Related SOP*
1.	DCC Biostatisticians	Summarize and interpret the results of the analysis.		
2.	DCC Biostatisticians	State any conclusions that may be drawn from the analysis.		

E. Validating and Documenting Report Contents

#	*Who*	*Task*	*Attachment/ Reference*	*Related SOP*
1.	DCC Biostatisticians	Validate the code used to generate the analysis results and any deliverables (e.g. tables, figures), and document the code validation process.		
2.	DCC Biostatisticians	Verify that the contents of figures, tables, and listings are accurate. Verify that all numbers and results reported in the text are correct and validly interpreted.		
3.	DCC Biostatisticians	Ensure that all information pertaining to the report and how it was generated are documented, reproducible, and easily accessible by NeuroNEXT DCC Biostatistics personnel.		NN BIO 904 NN BIO 905

F. Archiving the Final Report

#	*Who*	*Task*	*Attachment/ Reference*	*Related SOP*
1.	DCC Biostatisticians	Archive the report, the results of program validation, and a copy of the computer program(s) that produced the results, in a clearly defined folder on the DCC shared drive.		

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Joan Ohayon ohayonj@ninds.nih.gov Security Level: Email, Account Authentication (Required)	 Signature Adoption: Pre-selected Style Signature ID: 72C6AAFD-8CC4-4855-82AC-A0700072901A Using IP Address: 156.40.137.188 With Signing Authentication via DocuSign password With Signing Reasons (on each tab): I approve this document	Sent: 2/17/2023 8:27:15 AM Resent: 2/21/2023 8:25:27 AM Viewed: 2/21/2023 9:36:56 AM Signed: 2/21/2023 9:37:47 AM
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Marianne Chase MCHASE@mgh.harvard.edu Sr Director, Clinical Trial Operations Insight OBO The Massachusetts General Hospital Security Level: Email, Account Authentication (Required), Logged in	 Signature Adoption: Pre-selected Style Signature ID: 58FE690F-6BCA-4F23-90E3-DA15BCE3F578 Using IP Address: 73.114.253.109 With Signing Authentication via DocuSign password With Signing Reasons (on each tab): I approve this document	Sent: 2/17/2023 8:27:14 AM Viewed: 2/17/2023 1:28:21 PM Signed: 2/17/2023 1:28:43 PM
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Merit Cudkowicz cudkowicz.merit@mgh.harvard.edu Chief of Neurology Security Level: Email, Account Authentication (Required), Logged in	 Signature Adoption: Pre-selected Style Signature ID: 9F8FE418-0E50-4C6A-B0A6-7B835E80C644 Using IP Address: 68.239.56.73 With Signing Authentication via DocuSign password With Signing Reasons (on each tab): I approve this document	Sent: 2/17/2023 8:27:14 AM Viewed: 2/17/2023 8:27:36 AM Signed: 2/17/2023 8:27:48 AM
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Stacey Grabert sgrabert@mgh.harvard.edu Director QA Stacey Grabert Security Level: Email, Account Authentication (Required)	 Signature Adoption: Pre-selected Style Signature ID: 60CC52B0-747A-44E6-B220-8D8D880698C0 Using IP Address: 132.183.56.49 With Signing Authentication via DocuSign password With Signing Reasons (on each tab): I approve this document	Sent: 2/17/2023 8:27:15 AM Resent: 2/21/2023 8:25:27 AM Viewed: 2/22/2023 11:10:01 AM Signed: 2/22/2023 11:10:15 AM
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Signing Complete	Security Checked	2/22/2023 11:10:15 AM
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