1. PURPOSE

This SOP defines the process for development and verification of deliverables produced by Statistical Programming to support the reporting of results arising from clinical trials.

2. SCOPE

2.1 In Scope

This SOP applies to all Global Statistic and Data Science (GSDS) personnel at all BeiGene locations who work directly on BeiGene systems on the development and verification of datasets and TFLs that support regulatory and commercialization efforts. It also applies to the development and validation of deliverables produced and maintained by the Programming Macros Team.

2.2 Out of Scope

Deliverables generated by third parties on their internal systems will follow their internal development and verification or validation processes and are out of scope of this procedure.

3. ABBREVIATIONS AND DEFINITIONS

3.1 **Validation:** The process to ensure a computer program accurately processes its input data in accordance with its requirements. Typically applied to utilities such as scripts and macros that are intended to be used multiple times across different projects.

3.2 **Verification:** The process to ensure an output file accurately reflects its input data and its specifications. Typically applied to data sets and tables, listings, and figures.

4. RESPONSIBILITIES

4.1 Study Lead programmers and Study Biostatisticians are responsible for providing accurate and complete specifications for data sets and tables, figures, and listings in accordance with the Protocol, Statistical Analysis Plan, and regulatory guidance.

4.2 Statistical Programmers are responsible for developing and verifying deliverables such as tables, figures, listings, and datasets based on relevant specifications.

4.3 The Programming Macros Team is responsible for developing and maintaining departmental utilities in accordance with applicable Work Instructions.

5. PROCEDURE

5.1 Developing and Validating Programming Macros Team Deliverables

5.1.1 Utilities such as macros and scripts produced and maintained at the department level by the Programming Macros Team are developed and validated via the procedures described in WI (VV-QDOC-00170 GSDS Macros and Utility Validation) and Form (VV-QDOC-00037 SAS Macro and Utility Change Control Form).

5.2 Developing and Verifying All Other Statistical Programming Deliverables

Statistical Programming deliverables developed at the product, filing, study, or analysis level are developed and verified in 3 phases: planning phase, execution phase and closure phase.

For verification refer to the WI (VV-QDOC-00698 Verification of Statistical Programming Deliverables).

5.2.1 Planning Phase

5.2.1.1 The Study Lead Programmer and Study Biostatistician (or designee) define the specifications for deliverables such as datasets, tables, listings, and figures.

5.2.1.2 The Study Biostatistician determines whether the analysis is key or supportive. Verification methods are determined for each deliverable and may differ on key vs. supportive analyses.

5.2.2 Execution Phase

5.2.2.1 The Production Programmer creates programs and generates deliverables according to specifications.

5.2.2.2 The Verification Programmer executes appropriate verification methods based on the type of analysis (key vs. supportive).

5.2.2.3 Programmers and Biostatisticians maintain ongoing programming and verification documentation as specified for their roles.

5.2.3 Closure Phase

5.2.3.1 The Study Lead Programmer, Production Programmer, and Verification Programmer ensure all documentation is in order upon completion of the analysis project.

5.2.3.2 Study Lead Programmer verifies and archives the analysis directory as described in the WI (VV-QDOC-00169 Statistical Programming).

5.3 Hardcoding Definition and Evaluation

5.3.1 Hardcoding, defined as using data driven programming that embeds study-specific values within program code to directly change, delete, or add observed data values with the intent to override or alter the meaning of fundamental information collected in source data, is NOT allowed in code used to generate any deliverables in scope of this SOP.

Note: Pre-defined sequence of reusable steps in SAP or other programming note, e.g. Missing data imputation, Obtaining data from external sources (the source file is available for inspection), is not considered as hardcoding.

5.3.2 Exceptions, if any, must be discussed by the project team and documented on the Exception Approval form using Template (VV-QDOC-56320 Hardcoding Evaluation and Approval). The exception should be approved by both CMO and Head of GSDS, before execution.

6. REFERENCES

6.1 Controlled Documents

6.1.1 Form (VV-QDOC-00037 SAS Macro and Utility Change Control Form)

6.1.2 Template (VV-QDOC-56320 Hardcoding Evaluation and Approval)

6.1.3 WI (VV-QDOC-00169 Statistical Programming)

6.1.4 WI (VV-QDOC-00170 GSDS Macros and Utility Validation)

6.1.5 WI (VV-QDOC-00698 Verification of Statistical Programming Deliverables)

6.2 Regulatory References

6.2.1 N/A

6.3 Other References

6.3.1 N/A

7. APPENDICES

7.1 N/A

8. DOCUMENT HISTORY PAGE

Version	Effective Date	Brief Description of Change
1.0	13 Sep 2018	Original SOP.
2.0	25 Oct 2019	Deleted section 5.5.2; revised references.
3.0	22 Oct 2021	Admin change: • Merge to latest SOP template. • Administrative updates to consistent with other control documents including role name.
4.0	30 Dec 2022	• Updated section 5.3 hardcoding policy • Administrative updated section 5.2 for consistence

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