

## Implementing CDISC, SDTM, and ADaM in a SAS® Environment

Pankaj Bhardwaj, Tata Consultancy Services

### ABSTRACT

Pharmaceutical companies require speedy regulatory approval for their medicines, to ensure faster time to market and to remain competitive. Regulatory bodies are inundated with large amounts of clinical trial data from various organizations, in non-standard format, resulting in delays in the review and approval process. The existing situation has served as a catalyst in furthering initiatives that focus on establishing standards for clinical trial data submissions, leading to a streamlined approval process. Organizations are implementing frameworks that offer support for this standardization.

### INTRODUCTION

With pharmaceutical companies conducting research on various fronts, the amount of clinical trial data generated has exploded in the last few years. Organizations are often forced to deploy readily available tools and products in a bid to standardize this data and the corresponding approval process. But the high cost of licensing and implementation of off-the-shelf products continues to pose a roadblock in the drive for standardization, and organizations are increasingly looking at implementing their own standardization frameworks. This paper provides insight into building a Metadata oriented Solution in order to implement the Clinical Data Interchange Standards Consortium (CDISC) Study Data Tabulation Model (SDTM) and Analysis Data Model (ADaM) standards in the SAS environment, to achieve legacy trials transformation and conduct future trials as per the CDISC Standardised framework.

### STANDARDISATION PLATFORM DESIGN

#### KEY CONSIDERATIONS FOR DESIGNING THE PLATFORM

- For future trials, at commencement, complete ready-to-use metadata should be available. This metadata can be created by customizing (making trial specific) the already present SDTM metadata as per CDISC Operational Data Model (ODM) guidelines.
- The generalised standardised framework should be usable for both, legacy and future trials, given the growing need for this. Many organisations currently restrict the use of the standardised framework to converting legacy trial data into the desired standard format.
- The platform should offer an automatic provision for generating key deliverables like Patient Profiles, Define.xml etc. through the same standardised framework, ensuring data traceability at every stage of the approval process.
- SAS validation codes need to be used for data integrity validation at source, SDTM as well as ADaM levels, once standardised datasets are ready. Metadata compliance should be checked using the Open CDISC Validator.

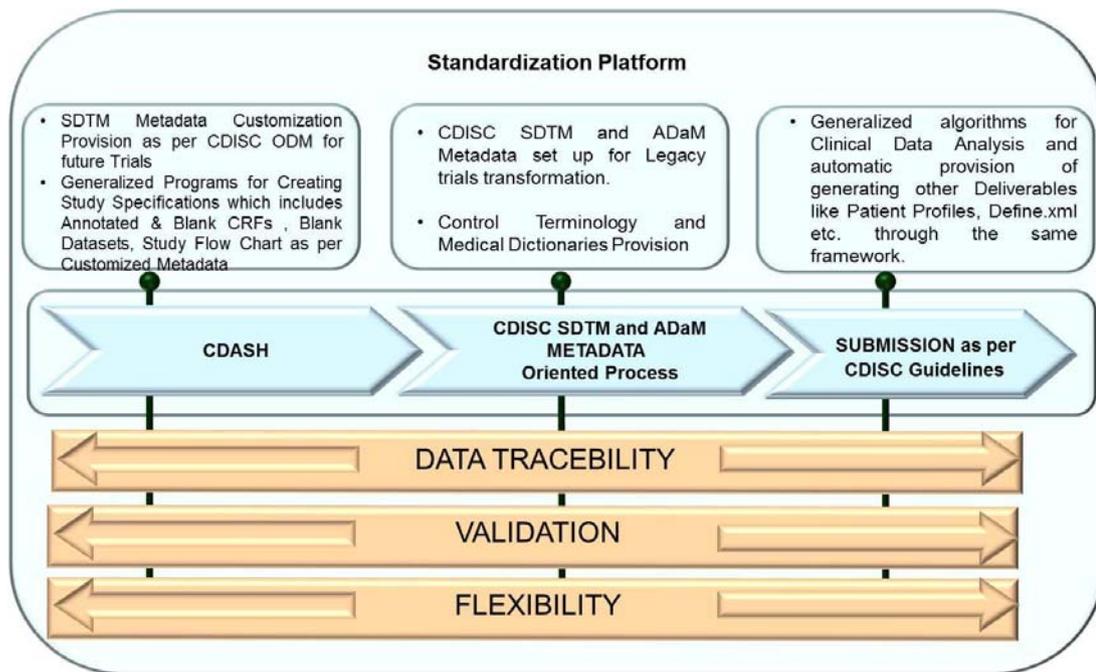


Figure 1: The Standardization Platform

## STANDARDISATION FRAMEWORK IMPLEMENTATION

For a standardization framework, organizations need to implement:

- SAS datasets: For holding the SDTM, ADaM Metadata (using SDTM and ADaM guidelines), CDISC control terminology codes and values, and medical dictionaries data. This metadata will be utilized for legacy transformations.
- Base SAS code: For integrating source data with SDTM metadata and generating the standardised datasets.
- Base SAS code: For creating Study Specifications which include annotated and blank CRFs, blank datasets, study flow chart as per customized metadata (trial specific and as per CDISC ODM) for future trials.
- Base SAS code: For loading the standardised datasets into the clinical data repository.
- Parameter based generalized SAS code: For handling non-uniform source data variables and validating the source data against standardized and analysis SAS datasets.
- Generalized algorithms: For clinical data analysis and provision for automatic generation of key deliverables like patient profiles, define.xml etc. through the same framework.
- GUI Screens framework: For wrapping all the above functionalities into a single interface. The GUI can be made in Java/.Net or SAS A/F.
- Windows or Unix operating system: To implement the SAS platform.

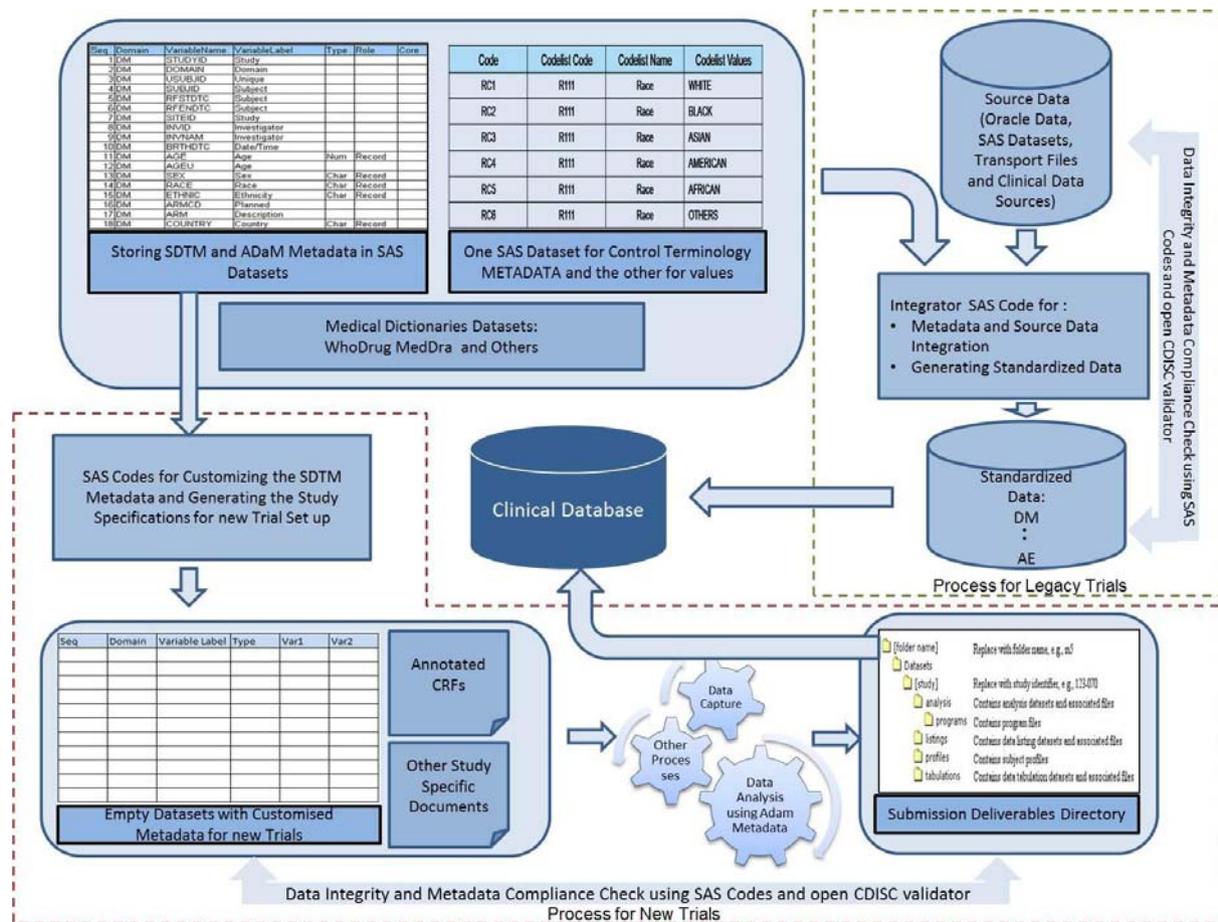
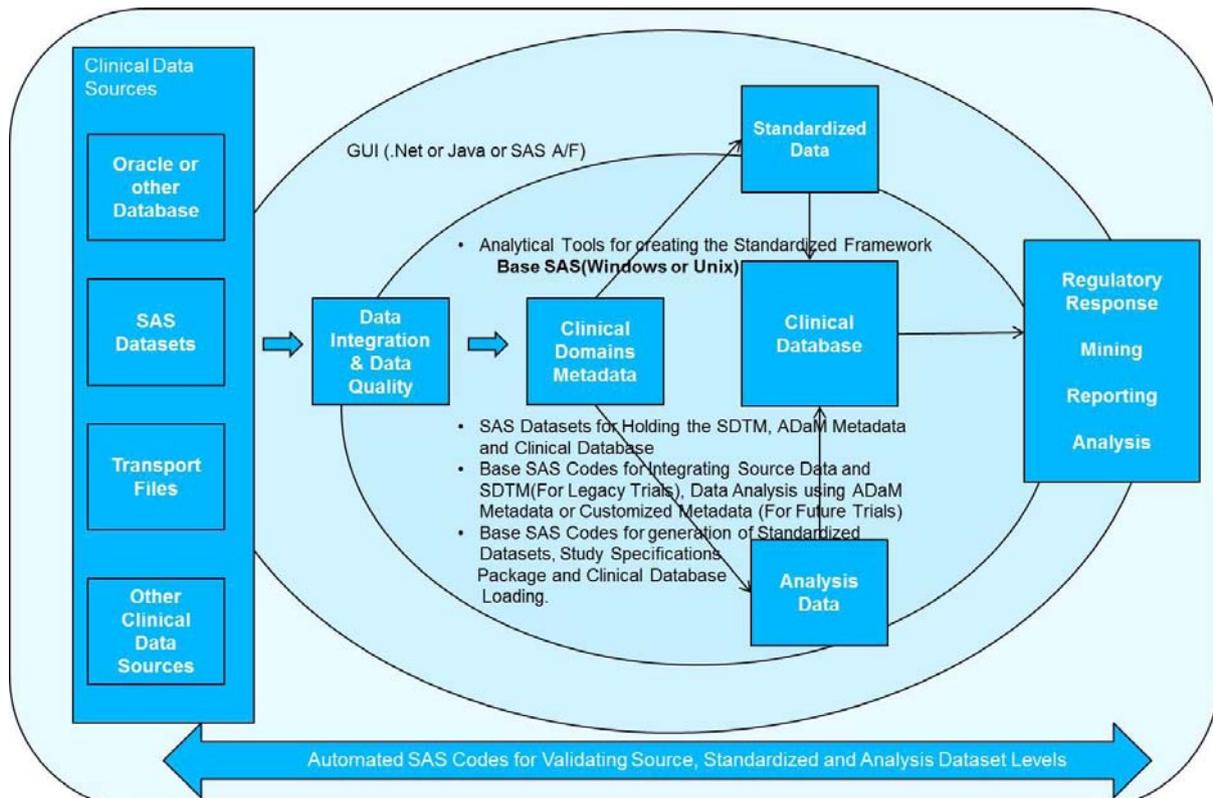


Figure 2: Implementation set-up for Legacy and Future Trials

### END TO END CLINICAL PROCESSES WITHIN THE STANDARDIZED FRAMEWORK

With the implementation of this standardized platform, all clinical trial processes: broadly clinical data management, data analysis and submission can be governed through it. Clinical trial processes can now be aligned in accordance with metadata, making the entire system more flexible. For each CDISC version, a different version of metadata should be maintained.



**Figure 3: Metadata: The base of the standardised framework, key to integrated processes**

## CONCLUSION

The cost effective metadata oriented Standardization platform can help govern end to end Clinical trial processes, broadly clinical data management, data analysis and submission. Implementing a standardized platform offers organizations high flexibility and data traceability. Streamlining the process leads to higher accuracy and productivity in the system.

In forthcoming years, if organisations are able to ensure that all their submissions related to future trials are in standardised format, it will result in a more efficient, streamlined and smooth approval process – a significant achievement for both, organisations and regulatory bodies.

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## CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Author Name Pankaj Bhardwaj

Company Tata Consultancy Services

Email: [pankaj.bhardwaj@tcs.com](mailto:pankaj.bhardwaj@tcs.com)

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