

Title: Using a multi-platform Presentation Data Referencing (PDR) technology for efficient and inter-operable clinical data analysis and reporting across hospitals and teams

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Background: Healthcare digitalization generates large amount of data and people usually use programming to perform customized data analysis and reporting for deriving insights. In this field, with little breakthrough for the last 30 years, most data analysts are still using brute force programming to produce different tables and reports (particularly the format and layouts). Further, the brute force approach resulted in highly fragmented practices across different hospitals and analysis teams, which is very difficult to collaborate.

Method: We seek out to address the problems by first analyzing different teams' analysis and reporting workflows across multiple platforms (SAS, R, SQL...) and across multiple report file types (Word, Excel, PowerPoint...). Based on the analysis we designed and developed a multi-platform Presentation Data Referencing (PDR) technology, which enables an efficient and inter-operable approach to perform customized analysis and reporting for clinical studies.

Result: From the workflow analysis, we discovered that due to limitations in current reporting techniques, data analysts typically tend to narrow themselves to one preferred report file type and one preferred analysis and scripting software, and then to maximize the efficiency based on specific team needs to generate all the result values and predefined format and layout designs. The recurrent iterative cycles of scripting, debugging, modifying, and quality checking activities cost a lot of efforts. Meanwhile, the value adding jobs are mainly the data analysis and result generating parts, not the format and layout generating parts. Inspired by using an index structure to operate numeric arrays, we designed and developed a multi-platform Presentation Data Referencing (PDR) technology by referencing the result placeholders in a report template (e.g. a Word shell report) and referencing the specific results during the analysis, so that to inject the values directly into the report template without programming it. In this way, all the format and layout programming related activities can be eliminated from the different workflows.

Conclusion: Our multi-platform PDR technology is applicable across different programming platforms, different analysis teams, and different report file types. Our technology can boost productivity, collaboration, and inter-operability of clinical studies by different hospitals and teams. The PDR technology is now patent-pending.