

Project Management of SAS Tasks - Excel Dashboard without Using Any Program

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ABSTRACT

Have you ever imagined having a fully automated, simple and live summary report of clinical SAS programming project tracker without running any program? Yes. This paper explains how your such a solution is feasible. A typical day of programmers in clinical research industry starts with SAS and ends with SAS since it is the one and only language widely used in clinical trial data analysis - due to FDA regulatory requirements. A typical clinical project requires several numbers of programs to be developed and managed. Often the project status is managed using Microsoft Excel which lists the primary and QC programs to be developed and assigned programmers name, date, status of the program, completion date and other attributes. This excel tracker is periodically processed using SAS programs to generate the project status reports for the team and often done manually by the programmer such as total number of programs assigned, ongoing, completed and so on, this becomes tedious and monotonous when the same programmer is working on the multiple projects and prone to manual error. This paper illustrates how to create a report template as per the requirement which is one time task and how to make it as a dynamic report. Every time the tracker is updated by the programmer, the report gets automatically updated without running any program. This automation is achieved by using the concept of pivot tables in excels.

INTRODUCTION

Project management is the process and activity of planning, organizing, motivating and controlling resources to achieve specific set of goals. Hence it becomes very necessary to manage plenty of programs developed during the clinical trials to generate and validate the datasets, tables, listings and figures (DTLFs). This project document lists out the DTLFs to be generated, assigned programmer name, QC programmer name, programming status like completed or ongoing and comments either by programmer or QC programmer and so on. There are plenty of papers that explains the clinical programming process and how to make the summary report using SAS or VBA or any other language. It is assumed that the reader is familiar with the clinical process and hence we are jumping straight away on how to make the dynamic template for the report.

CLINICAL PROJECT TRACKER OF SAS TASKS

The following is the screen shot of a typical project tracker used in clinical projects to manage and track the status of SAS programming developments. It has the information like type of DTLFs, study population, descriptions of the task, assigned programmer and qc programmer name completion date and so on. It is programmer's responsible to keep the tracker updated for their tasks. That is whenever a programming task is completed programmer has to update the status under 'completion status' column. The study lead periodically uses the SAS programs to prepare the reports for the team and management.

Seq No	Type of DTLFs	Population	Descriptions	Programer name	Program Name	Completion Status by Programmer	Completion Date	QCer Name	QC Program Name	QC Completion Status	QC Completion Date	Final Completion Status
1	Dataset	DM		aaa	dm.sas	Completed	6/14/2014	bbb	qc_dm.sas	Completed	6/14/2014	Completed
2	Dataset	AE		aaa	ae.sas	Completed	6/14/2014	bbb	qc_ae.sas	Completed	6/14/2014	Completed
3	Dataset	CM		aaa	cm.sas	Completed	6/14/2014	bbb	qc_cm.sas	Completed	6/14/2014	Completed
4	Dataset	VS		aaa	vs.sas	Completed	6/14/2014	bbb	qc_vs.sas	Completed	6/14/2014	Completed
5	Dataset	LB		aaa	lb.sas	Completed	6/14/2014	bbb	qc_lb.sas	Completed	6/14/2014	Completed
6	Dataset	MH		ddd	mh.sas	Completed	6/14/2014	aaa	qc_mh.sas	Completed	6/14/2014	Completed
7	Dataset	EG		ddd	eg.sas	Completed	6/14/2014	aaa	qc_eg.sas	Completed	6/14/2014	Completed
8	Dataset	EX		ddd	ex.sas	Completed	6/14/2014	aaa	qc_ex.sas	Completed	6/14/2014	Completed
9	Dataset	SC		ddd	sc.sas	Completed	6/14/2014	aaa	qc_sc.sas	Completed	6/14/2014	Completed
10	Dataset	SV		ddd	sv.sas	Completed	6/14/2014	aaa	qc_sv.sas	Completed	6/14/2014	Completed
11	Table	Safety	Summary of Demographic Characteristics	bbb	t_dm.sas	Completed	6/14/2015	ccc	qc_t_dm.sas	Completed	6/14/2015	Completed
12	Table	Safety	Summary of Disposition	bbb	t_ds.sas	Completed	6/14/2015	ccc	qc_t_ds.sas	Completed	6/14/2015	Completed
13	Table	Safety	Summary of Protocol Deviations	bbb	t_pd.sas	Completed	6/14/2015	ccc	qc_t_pd.sas	Completed	6/14/2015	Completed
14	Table	Safety	Summary of Adverse Events	bbb	t_ae.sas	Completed	6/14/2015	ccc	qc_t_ae.sas	Completed	6/14/2015	Completed
15	Table	Safety	Summary of Serious Adverse Events	bbb	t_sae.sas	Completed	6/14/2015	ccc	qc_t_sae.sas	Completed	6/14/2015	Completed
16	Table	Safety	Summary of Treatment Emergent Adverse Events	bbb	t_tae.sas	Completed	6/14/2015	ccc	qc_t_tae.sas	Completed	6/14/2015	Completed
17	Table	Safety	Summary of Laboratory Data(Chemistry)	bbb	t_lbchem.sas	Completed	6/14/2015	ccc	qc_t_lbchem.sas	Completed	6/14/2015	Completed
18	Table	Safety	Summary of Laboratory Data(Hematology)	bbb	t_lbhchem.sas	Completed	6/14/2015	ccc	qc_t_lbhchem.sas	Completed	6/14/2015	Completed
19	Table	Safety	Summary of Laboratory Data(Urinalysis)	ccc	t_lbur.sas	Completed	6/14/2015	ddd	qc_t_lbur.sas	Completed	6/14/2015	Completed
20	Table	Safety	Summary of Concomitant Medications	ccc	t_cm.sas	Completed	6/14/2015	ddd	qc_t_cm.sas	Completed	6/14/2015	Completed
21	Listing	Safety	Listing of Demographic Characteristics	ccc	l_dm.sas	Ongoing		ddd	qc_l_dm.sas	Ongoing	6/14/2015	Ongoing
22	Listing	Safety	Listing of Disposition	ccc	l_ds.sas	Ongoing		ddd	qc_l_ds.sas	Ongoing	6/14/2015	Ongoing
23	Listing	Safety	Listing of Protocol Deviations	ccc	l_pd.sas	Completed		ddd	qc_l_pd.sas	Completed	6/14/2015	Ongoing
24	Listing	Safety	Listing of Adverse Events	ccc	l_ae.sas	Completed		ddd	qc_l_ae.sas	Completed	6/14/2015	Ongoing
25	Listing	Safety	Listing of Serious Adverse Events	ccc	l_sae.sas	Hold		ddd	qc_l_sae.sas	Hold		Hold
26	Figure	Safety	Listing of Treatment Emergent Adverse Events	ccc	l_tae.sas	Hold		ddd	qc_l_tae.sas	Hold		Hold

Display 1. Project Tracker

CHALLENGES IN REVIEWING THE TRACKER

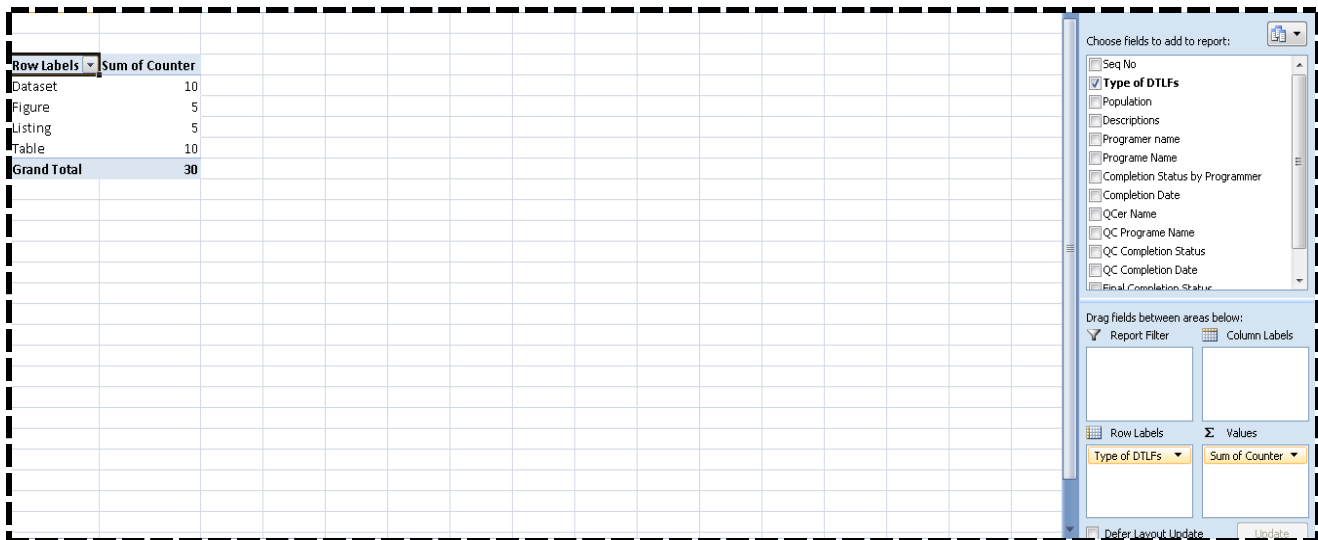
Most of the times the project tracker has at least 200 programming tasks which are assigned to many programmers. It is also possible that the same programmer might be working on multiple projects. In order to get to know the status of their task within a project or across the project, it is currently done by applying filter and selecting their name and count the non-empty cells. Further if they want to know completion status of their tasks, then an additional filter is applied which is a manual process and error prone if the counts are over looked. Alternatively one can run a SAS program for the same which is less time consuming if they are working on multiple projects. There is no way to get the status report without running any programs or doing manually.

EXCEL PIVOT TABLE

Pivot table in excel is one of the best and frequently used method to analyze the data and also for the data visualization using inbuilt excel graphs. It is an interactive report that allows the user to summarize the large data in a concise format. It has the option for data summary like minimum, maximum, average, count and so on. Excel allows the user to create the tables by dragging and dropping the relevant information into the appropriate levels like row, column or report filter. In order to create reports using pivot table, it must connect to a data source which is nothing but the sheet in which the tasks are listed. It also allows the user to connect to the outside data source for the analysis. It is recommended that user should have an idea of pivot table to make the interactive dashboards template. A tricky part with Pivot table is utilizing or exploring the various available options to make your report readable, interactive and more dynamic.

PIVOT TABLE REPORT

In order to create the pivot table report, add a counter variable column with the constant value 1 in the project tracker as displayed below which is required to summarize the character variable in the report. Add a work sheet named 'Dashboard' in the project tracker and keep it as first sheet in the tracker. Now follow the below steps to create report to summarize the number of tables, listings, figures and datasets in the project tracker.

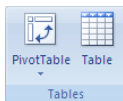


Row Labels	Sum of Counter
Dataset	10
Figure	5
Listing	5
Table	10
Grand Total	30

The screenshot also shows the PivotTable task pane on the right. The 'Choose fields to add to report:' section has 'Type of DTLFs' selected. The 'Drag fields between areas below:' section shows 'Type of DTLFs' in the 'Report Filter' area and 'Sum of Counter' in the 'Values' area. The 'Values' area shows a dropdown menu with 'Sum of Counter' selected.

Display 2. Summary Report1

1. On the Insert tab, in the Tables group, click PivotTable, and then click PivotTable



Excel displays the **Create PivotTable with PivotChart dialog box**

2. In the create PivotTable dialog box, select the range of cells from the project tracker sheet. It is advisable to select at least 500 rows even though the data is not available in all those rows. This way, the same report can be utilized for the other projects as it is when the number of rows increases till 500.
3. Click on 'Existing Worksheet' and specify the location in Dashboard sheet by keeping the cursor in an appropriate place. When all the options are selected click on OK button. Now pivot table will be placed and the cursor will be moved to dashboard sheet.

- Excel adds an empty PivotTable report to the dashboard location and displays the PivotTable Field List on the right hand side so that you can add fields, create a layout, and customize the PivotTable report.
- For the summary report on the column B, add 'Type of DTLFs' to Row labels and Counter variable to Values field.

REPORT FORMATTING

The Display 2 looks very simple and let's now starts beautifying the report to make it Display 3 which is a dynamic and more users friendly as follows.

Summary of DTLFs	
DTLFs	Total
Dataset	10
Listing	5
Table	10
(blank)	
Figure	5
Grand Total	30

Display 3. Summary of DTLFs Dashboard

- Add the proper title just above to the report and apply the reasonable color format, widen the cell height and width and increase the font size and so on.
- Select the table range and apply the All Borders format, center the summary values and so on.
- Modify the report headers with the appropriate titles

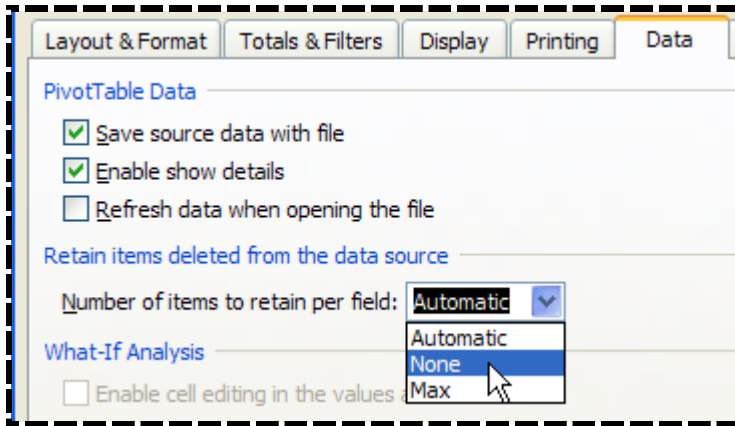
The following are the important steps to be followed in order the maintain the same report format across all the projects and also to keep tracker refreshed automatically whenever the source data is updated.

- Right click on the report, select PivotTables Options, select the 'For empty cells show' to display required value. I would recommend to keep that as blank
- Right click on the report, select PivotTables Options, select the 'Preserve cell formatting on update' to keep the report format as it is across all the projects.
- Right click on the report, select PivotTables Options, click on the Data tab and select the option 'Refresh data when opening the file'. This option helps the report to be updated whenever the report is opened.
- Now it is the time finalize the report and make it to be the more attractive and readable report. Once all kinds of reporting formats are done, Click on View tab from the menu bar, under the Show/Hide group, deselect all the options to hide the ruler, Gridlines, formula bar and the headings.

FURTHER FORMATTING

The report can be further formatted with more information, attractive and dynamic as follows.

- Right click on the report and click on Hide Field List to hide PivotTable Field List on the right side
- Add shapes and project name in the header part of the dashboard.
- The similar reports can be generated by nesting the columns and can be done on the same dashboard sheet
- It is important to prevent the old items from being retained when the same template is used across all the projects. For that, Right click on the report and select PivotTable options. In the Retain Items section, select None from the drop down list as follows.



Display 4. Restricting Retain value option

MULTIPLE REPORTS

In the similar way, report templates can be designed to have various useful reports depending on the requirement by nesting more number of columns and making use of report filter option in pivot. The display 5 shows summary report of task type for each programmer.

ABC PROJECT TRACKER - DASHBOARD																																																																																																															
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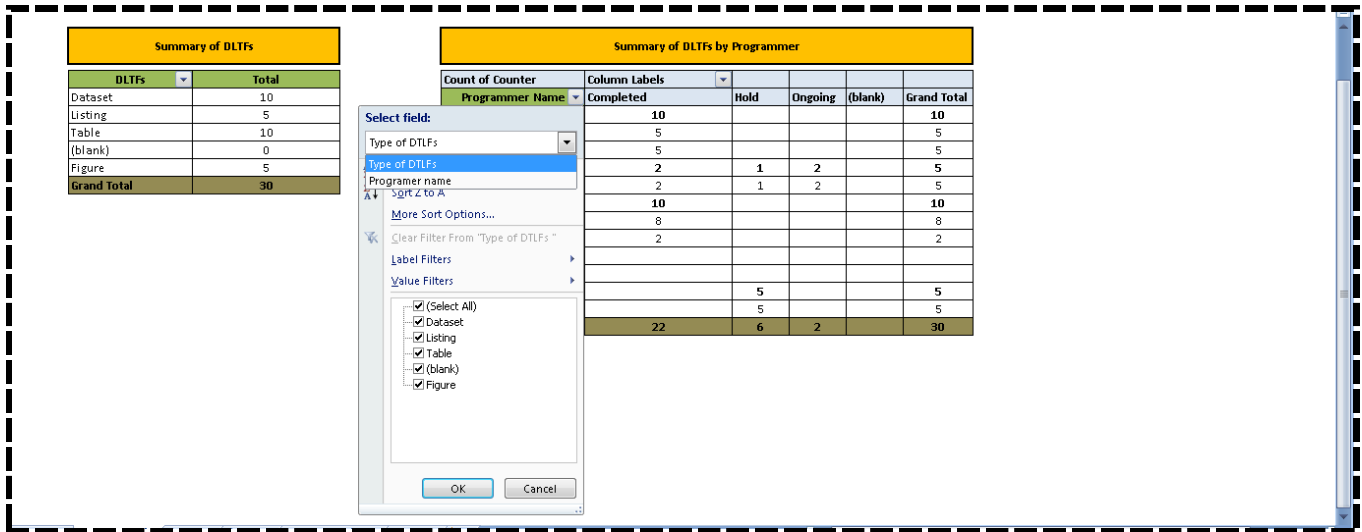
Display 5. Multiple reports

MULTIPLE REPORTS

A programmer sometimes might be interested to know only the task assigned to them. Pivot table has the option to apply filter on the same report for the specific item. To do that, Right click on the header cell and click on the filter as follows. In this example, either programmer can select any one of task or programmers name as displayed below. In the similar way, on the same dashboard report, one can map various data sources.

For example, if a programmer is working on the projects, all the three can be reported on the same dashboard as a separate report by changing the data sources and as mentioned in formatting section programmer can provide appropriate titles to each of them. These kinds of reports ease the programmer's life from looking at the multiple project trackers and manually counting the information.

Since the option "Refresh data when opening the file" is selected in the report, whenever the dashboard is opened, it is automatically fetches the information from the source data and shows the updated result. Alternatively, it can be done using the refresh option by doing right click on the report and select the 'refresh' option. If there are many reports created in the dashboard, it is enough to do the refresh only once on any report which does automatically updates the rest of the pivot reports.



Display 6. Multiple reports

CONCLUSION

Managing and tracking multiple tasks is critical in clinical trials. Management prefers to monitor and track projects in excel, this need is best addressed by this excel based tracker used for project management. In addition, excel pivot table is having option for making the dynamic graphs which can be leveraged with these dashboards as pictures is worth a thousand words.

CONTACT INFORMATION

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