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Shining Up Our Department: Producing a Biostatistics Metrics Dashboard in Shiny

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Shining Up Our Department:

Producing a Biostatistics Metrics Dashboard in Shiny



Agenda

Objectives	Provide an overview of process, purpose, challenges and future of the project
Key questions	1. Why we are creating metrics? 2. What is involved? 3. How are the metrics produced? 4. How have we used R and Shiny? 5. What challenges have we faced?
Next steps	– Continuing to produce new metrics – Greater use of R – Automation of metrics

Process and Purpose

Process and Purpose



Why are we creating these metrics?

- Drive improvements to deliver high quality results & efficiencies
- Facilitate conversation with LT, Study Leads and other non-project initiatives
- Share with S&P community to encourage conversation and to increase awareness

“The goal is to turn data into information, and information into insight.”

Carly Fiorina, Former CEO of HP

Example: Monitoring standard macro usage, in order to maximise efficiency and ensure the macros are fit for purpose.

Example: Monitor Number of TFLs per study to ensure we are making the best use of resources

Process and Purpose



Key Areas

Our metrics focus on the following key areas:

- Timelines
- Productivity
- Efficiency
- Quality
- Innovation
- Lead
- Resources
- R adoption

Examples:

Timelines:

- Number of studies where DBF-SAC > 5 weeks

Productivity:

- Number of complete studies
- Number of active studies

Quality:

- Number of post SAC errors

Resources:

- Number of CWs and FTEs Supporting Programming and Statistics

Process and Purpose



What is involved? Data Sources

- GSP (Global Study Planner)
 - Data from repository and manually entered information by Project Programmers and Study Leads
- HARP Metadata
 - Automatically generated metadata capturing Reporting Efforts, DTFLs & macro usage
 - HARP is GSKs internal environment for study reporting and analysis
- Effort Tracking & Headcount info
- Manual Collection (Post-SAC errors & SDTM info)

	A	B	C	D	E	F
	Study ID	Reporting Effort	HARP Reporting Effort	Compound	Project ID	Therapy Area
1						
2	Study1	EOS		GSK1	project1	Infectious Diseases
3	Study2	Week 256		GSK2	project2	Infectious Diseases
4	Study3	EOS		GSK3	project3	Oncology
5	Study4	EOS		GSK4	project4	Infectious Diseases
6	Study5	Publication		GSK5	project5	Metabolic
7	Study6	EOS		GSK6	project6	Other
8	Study7	EOS	EOS	GSK7	project7	Infectious Diseases

GSP

	STUDY_ID	RE_NAME	CATEGORY_NAME	PURPOSE_NAME	TITLE	Diap_category
99591	Study1	final_01	CSR	FINAL	Listing of Serious Adverse Events - Screening Failures	Safety
99592	Study1	final_01	CSR	FINAL	Listing of Reasons for Considering as a Serious Adverse Event	Safety
99593	Study1	final_01	CSR	FINAL	Listing of All Adverse Events by Treatment Phase	Safety
99594	Study1	final_01	CSR	FINAL	Listing of Non-Fatal Serious Adverse Events with Onset During the Open-Label Treatment Phase	Safety
99595	Study1	final_01	CSR	FINAL	Listing of All Adverse Events with Onset During the Open-Label Treatment Phase	Safety
99596	Study1	final_01	CSR	FINAL	Listing of Adverse Events Leading to Withdrawal From Study / Permanent Discontinuation of Study Treatment with Onset During the Double-Blind Treatment Phase	Safety
99597	Study1	final_01	CSR	FINAL	Listing of Disease Related Events with Onset During the Double-Blind Treatment Phase	Safety

HARP Displays

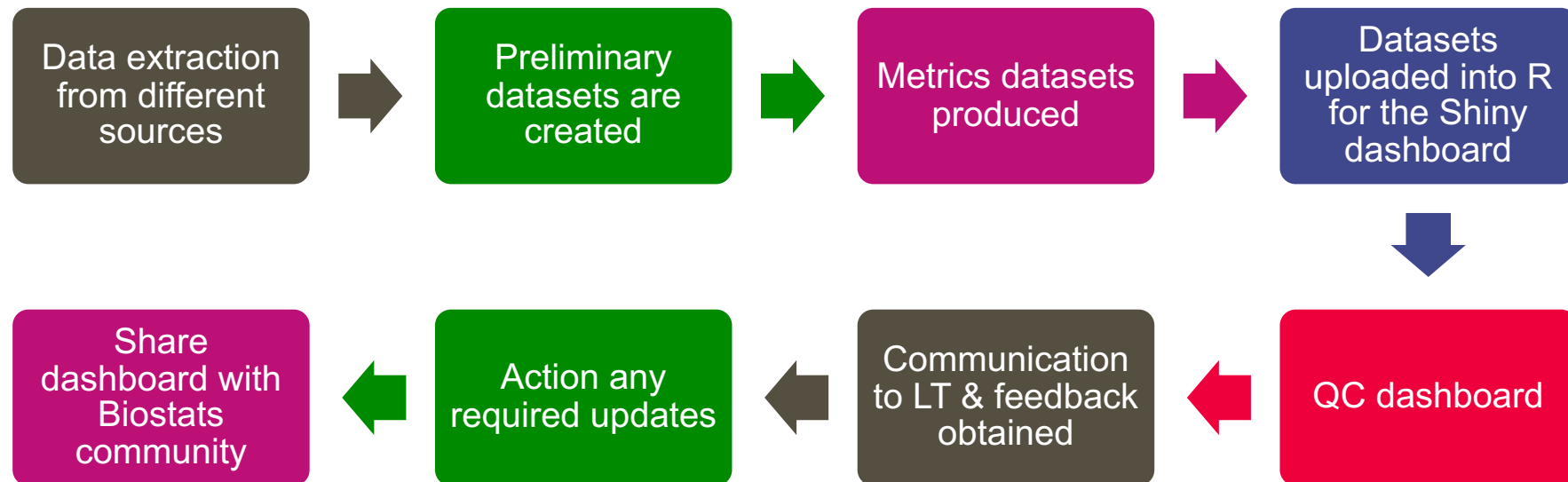
Note: The data used in this slide is dummy data and is not reflective of GSK studies or metrics

Process and Purpose



When and how are the metrics produced?

Metrics produced quarterly





Production of Shiny App

Production of Shiny App



Transition to R and Shiny

In 2020 we decided to move away from SAS and make the entire metrics project R based.



- Free
- Flexible
- Open source
- Advanced graphical capabilities
- Leverage new technologies

Production of Shiny app



Transition to R and shiny

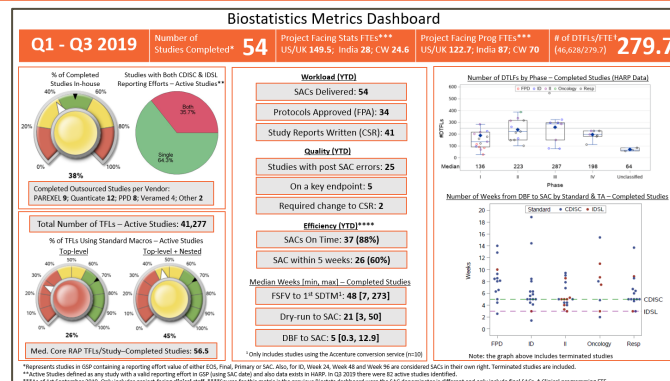
PowerPoint Dashboard:

- Hard to compare between quarters
- Could not compare between TAs or look into individual studies
- Limited in space
- Less engaging, static

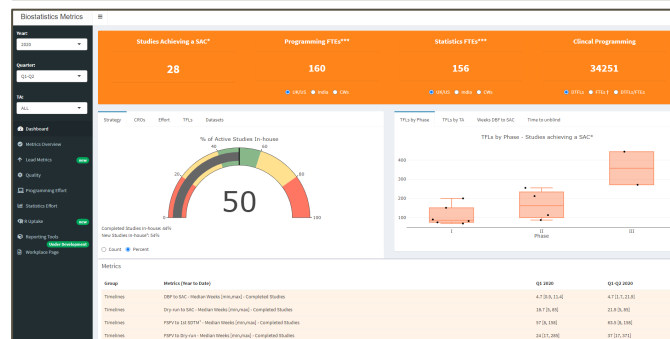
Shiny Dashboard:

- Comparison between quarters, TAs and can look into individual studies
- Unlimited Space
- Interactive and engaging
- All in one place
- Use of GitHub allows us to work collaboratively

Old PowerPoint Dashboard



New Shiny Dashboard



Note: The data used in this slide is dummy data and is not reflective of GSK studies or metrics

Production of Shiny app



What is Shiny?

- Shiny is an R package which allows users to create interactive web applications
- The entire interface can be built using R, however it can also be written using HTML, CSS or JavaScript
- Customize your app in many different ways such as through the layout and with animations
- Create reactive content, which gives the app a 'live' quality

A Shiny app has three different scripts:

Ui.R

The code to define how the user interface should be set up

Server.R

The server-side of the application, the code running behind the user interface

Global.R

The global environment, this code is visible and run before ui.R and server.R



Shiny App Demo

Challenges

Challenges



Some of the challenges that we have faced include:

GSP errors due to manual entry by different people

Data sources changing formats across quarters

Changing requirements across quarters

Incorporating last minute feedback/updates to the dashboard

Team setup, limited number of people know R and Shiny on the team

Learning Shiny and R from scratch

Team members leaving and getting new members on board with the project

Future

Future



What are our next steps?

Create clear business rules describing metric logic

Increase automation of metrics production

Move entire project into R

Continuing to create more new metrics

Better system to store source metrics data

Dashboard redesign

Any Questions?