



The Many Use Cases of **Standardized Data** and **Metadata**

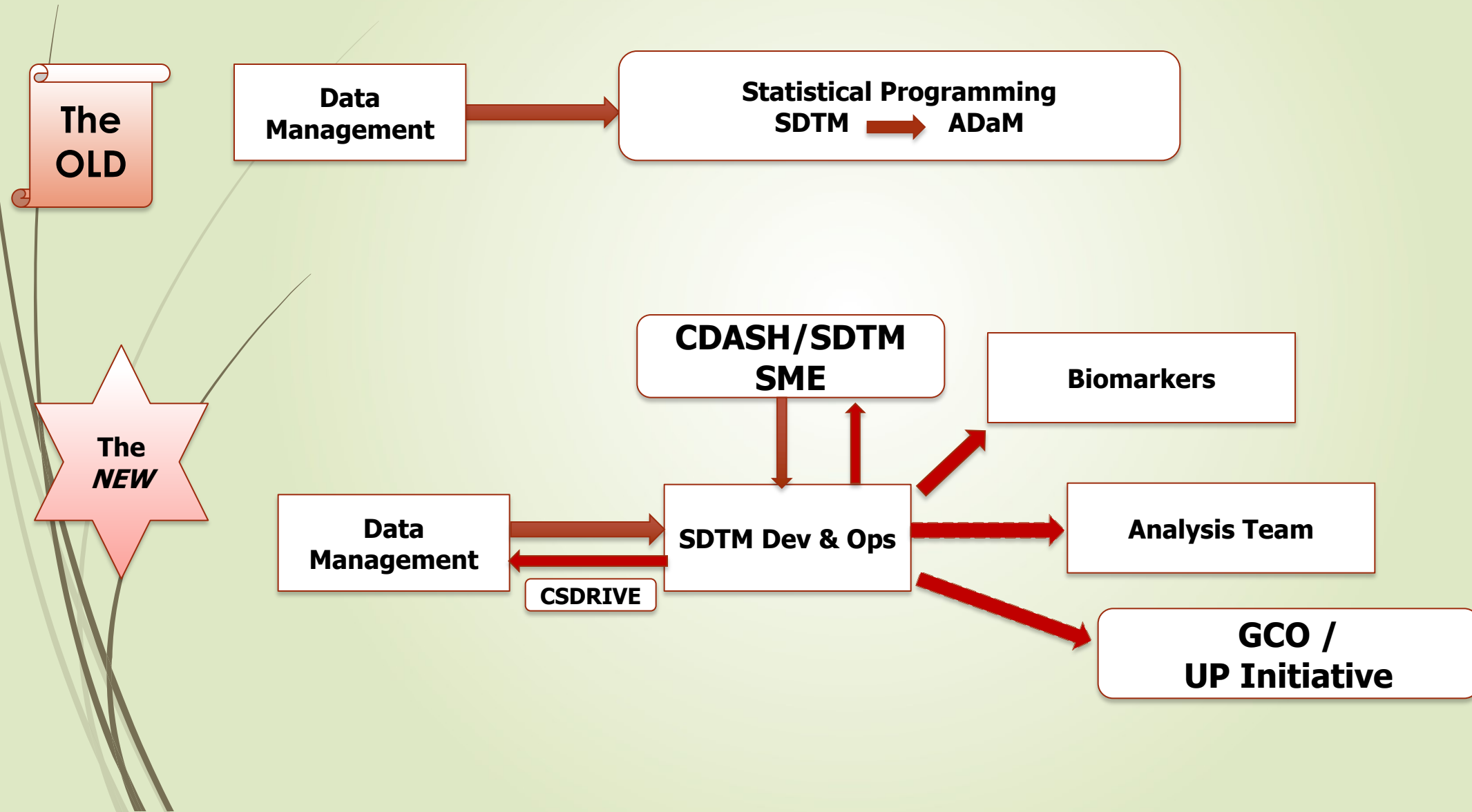
Sanjiv Ramalingam,
Data Standardization and Metadata Management



Agenda

- Biometrics Data Flow
- Metadata Applications (BRaMA and its uses)
- Standardized Data use cases
 - Representation in Clinical Trials
 - Data Management

Data Flow



Metadata Applications

BRaMA (Biogen Raw Metadata Access)



A database on the biometb01 server containing information related to Therapeutic Areas, CDM, Vendors etc. for the studies

Biometrics Pipeline



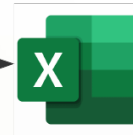
Excel Directory

Directory with 60+ database specification .xlsx files; each containing multiple tabs with multiple columns

SAS



MS Excel



SAS Procedures to generate Combined Output, a .xlsx file from multiple study database specifications

Flow diagram



ShinyR



RSCONNECT



Shiny application deployed over Biogen's Cloud environment through RSCONNECT will allow overall dynamic search, search drill-downed to specific fields, sorting, downloading combined file to export to other platforms etc.

* DIY: Building a Raw Metadata Library with Integrated SDTM Annotations. PHUSE 2023

Metadata Applications

BRaMA (Biogen Raw Metadata Access)



Studies	Compounds	Therapeutic Areas
89	36	5

Show entries

compound	Therapeutic_Area	studyno	dcs_ver	sdtm_ver	formoid	draftformname	fieldoid	SDTM_DOMAIN	SDTM_Annotation
All	All	All	All	All	All	All	All	All	All

pretext_or_CRFprompt	Ordinal	DataFormat	DataDictionaryName	userdatastring_or_values	CodingDictionary	ControlType	FixedUnit	SASLabel
All	All	All	All	All	All	All	All	All

Action taken with Sodium Fusidate treatment:	11	\$16	Action Taken With Study Treatment	Dose Not Changed Drug Withdrawn Drug Interrupted Not Applicable	DropDownList	Action Taken with Study Treatment
--	----	------	-----------------------------------	---	--------------	-----------------------------------

LowerRange	UpperRange	DefaultValue	First_Site_Active_Date	DM_Vendor	CDM
1	All	All	All	All	All
18	65		2016-05-03	Covance	RAVE

Metadata Applications

BRaMA (Biogen Raw Metadata Access)

➤ **SDTM Development & SDTM SME**

- SDTM Annotations
- Reduces need for ad-hoc requests to SDTM SMEs
- Empowers SMEs by providing relevant information

➤ **Data Management**

- Streamlines database design by referencing prior assessments
- Integrates with EDC specification process for seamless workflow

Metadata Applications

BRaMA (Biogen Raw Metadata Access)

Supporting IVDR Implementation

- Biomarker team in EU faced challenges addressing gaps in new In Vitro Diagnostic Medical Devices Regulation (IVDR)
- Needed to identify measurements on EU patients requiring CE marking
- CE stands for Conformité Européenne (European conformity) and indicates device meets IVDR safety and performance requirements
- Ensures product safety and quality for European market

Metadata Applications

BRaMA (Biogen Raw Metadata Access)

Supporting IVDR Implementation

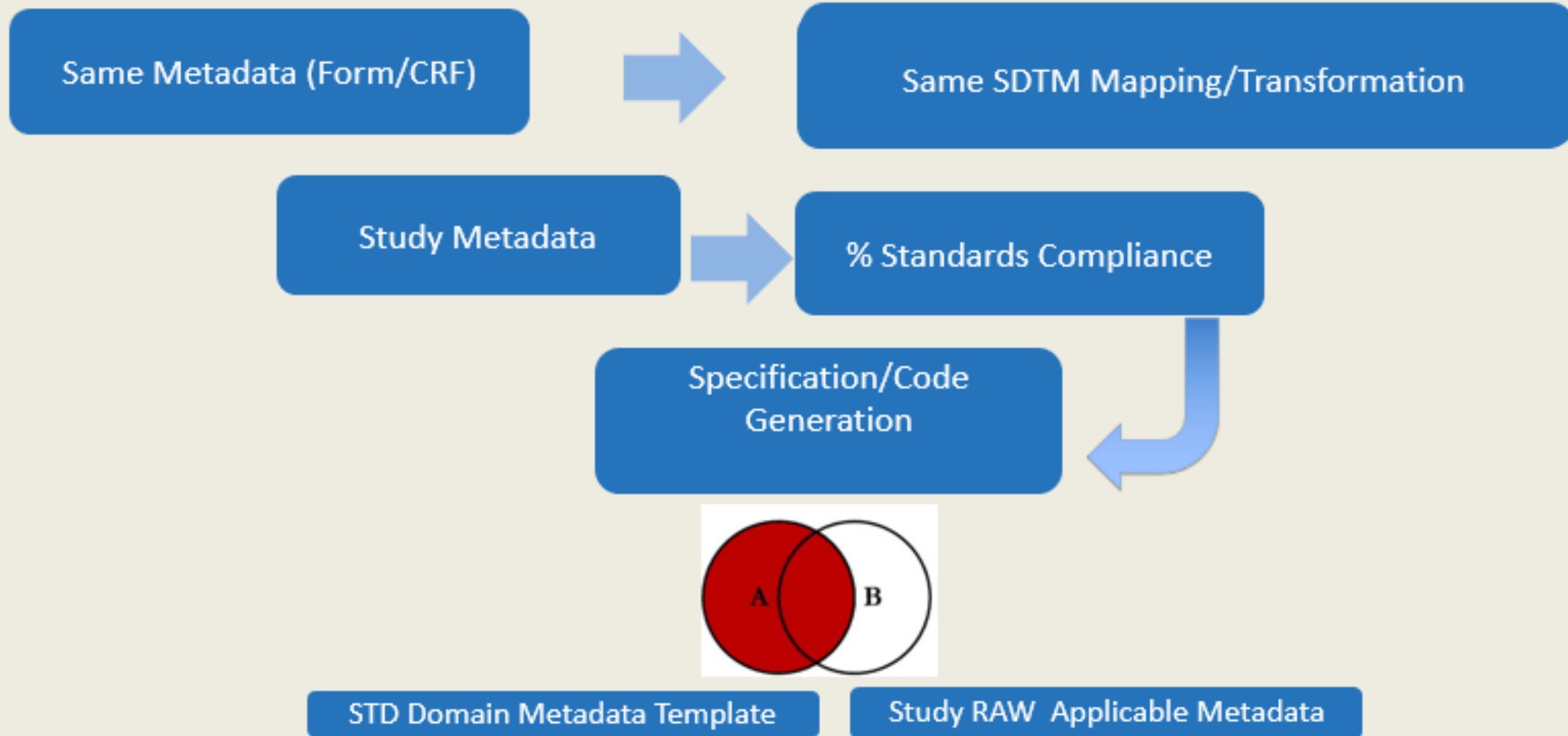
- Programmatically identified relevant measurements for EU patients
- Simplified process for determining CE marking requirements

Domain	LBTESTCD	LBTEST	LBCAT	LBSCAT
LAB	MMP9	Matrix Metalloproteinase 9	BIOMARKER	
LAB	OHGLB4	4-Hydroxy Glyburide	BIOMARKER	
LAB	MMP9	Matrix Metalloproteinase 9	BIOMARKER	
LAB	ALB	Albumin	CHEMISTRY	

formoid	draftformname	fieldoid	pretext_or_CRFprompt	userdatastring_or_va
ABGM	Additional Blood Glucose Measurement	ABGMYN	Please only use this form to record	Yes No
ABGM	Additional Blood Glucose Measurement	BGMANL	Analysis method:	Point-of-care Laborat
ABGM	Additional Blood Glucose Measurement	BGMDAT2	Date of sample collection: (dd-mon-yyyy)	
ABGM	Additional Blood Glucose Measurement	BGMGLU	Blood glucose:	
ABGM	Additional Blood Glucose Measurement	BGMRES	Reason for additional blood glucose	Hypoglycemia Other

Standardized Data Use Cases

PREMISE



Standardized Data Use Cases

Become more representative in our clinical trials



Our Task

A Collaborative Effort between Biometrics and Clinical Operations



Understand and benchmark Biogen's past clinical trials' participant demographic distribution.

View and measure the diversity and representation of participants in Biogen's CTs throughout the enrollment period as compared to prevalence targets.



Actions Taken

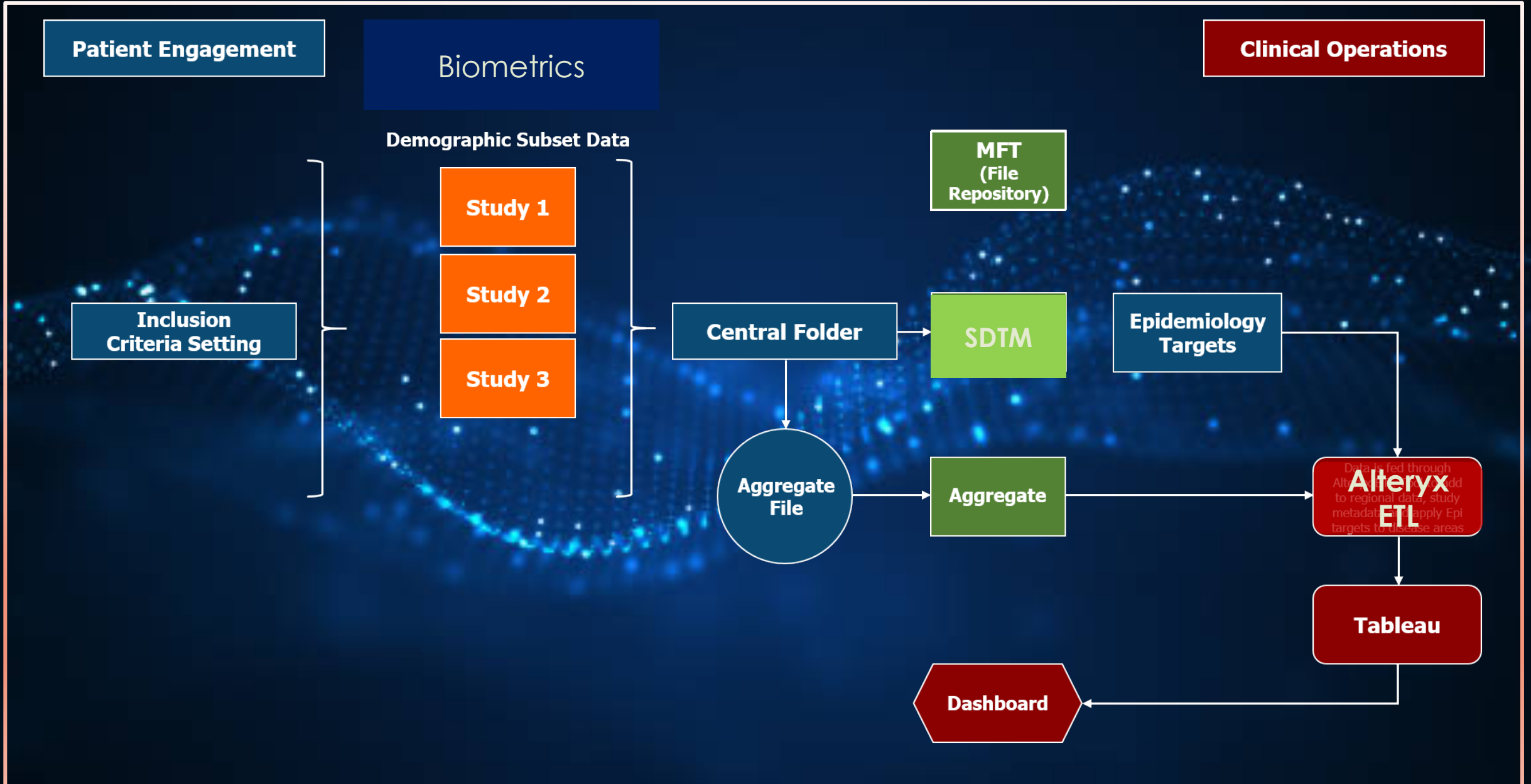
Collaborated with GCO to obtain lists of all completed and ongoing studies that have not locked.

Generated a process to extract relevant demographic data and move it into an approved and consistent format for data ingestion.

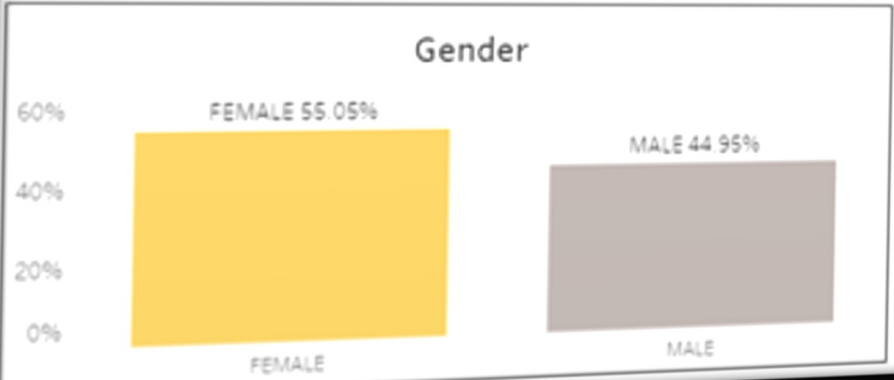
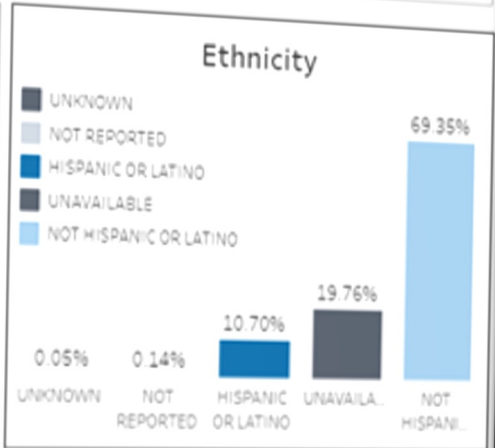
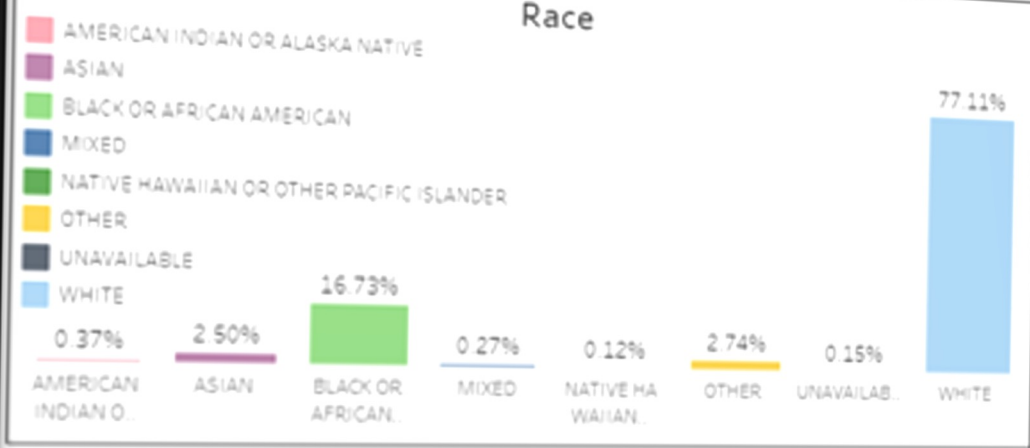
Developed a dashboard to compare the prevalence of high priority disease areas by demographics (race, ethnicity, age, and sex) to the participant distribution in clinical trials.

Visualized patient enrollment across therapeutic areas, indication, program, and study, and epidemiologic targets in those disease areas for past and ongoing studies.

Data Flow Process



Year (All) TA (All) Indication (All) Program (All) Phase (All) Region (All) Study (All)



Underrepresented Population Dashboard

Current Status

- Epidemiologic targets are published internally by Epidemiology
- Dashboard is live and refreshed weekly on Fridays
- Dashboard is accessible to R&D with information distributed to Study and Program teams
- Incorporate live feed of ongoing trials



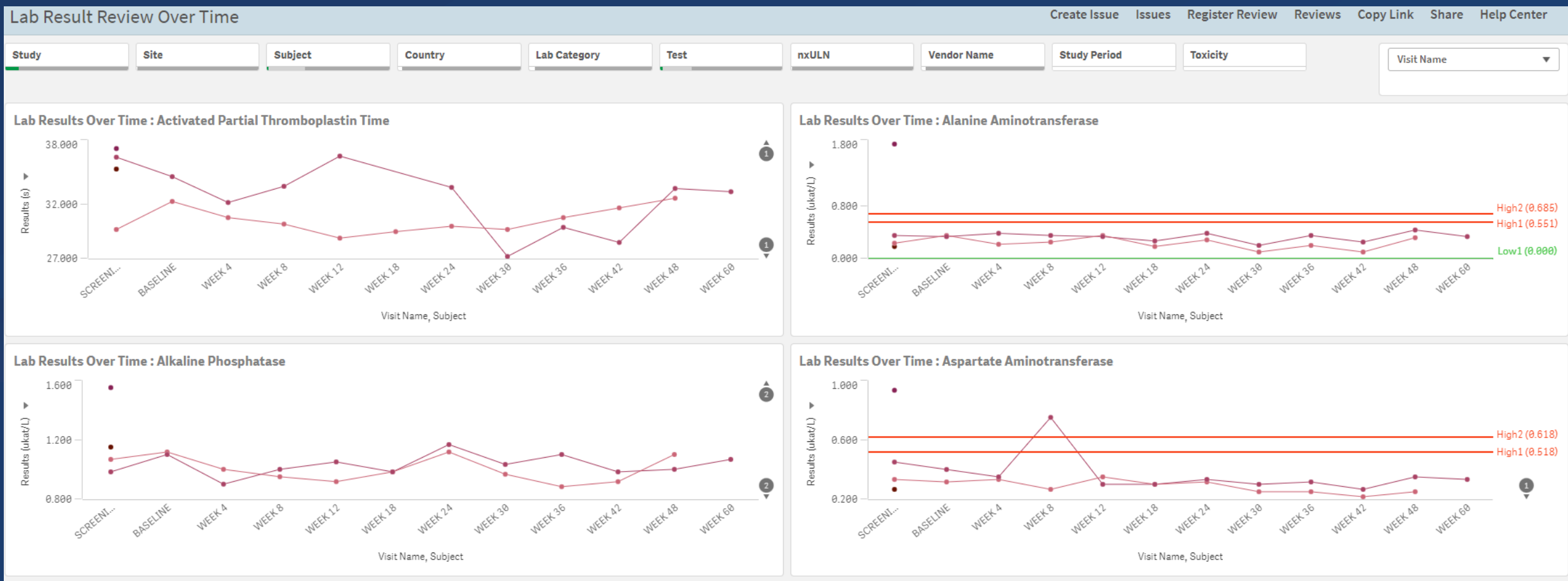
Data Management

Overall objective to reduce Database Lock Timelines

- Standardized Data is the foundation of Data Visualization and Analytics (DV&A)
- Refreshed daily for real-time insights
- Cross-functional collaboration for seamless data movement

Data Management

Anomaly Detection



Data Management

Anomaly Detection

Lab Numerical Results by Visit Name											
Test	Visit Name										
	UNSCHEDULED - DAY -64	UNSCHEDULED - DAY -52	UNSCHEDULED - DAY -42	UNSCHEDULED - DAY -40	UNSCHEDULED - DAY -35	SCREENING	UNSCHEDULED - DAY -34	UNSCHEDULED - DAY -30	UNSCHEDULED - DAY -29	UNSCHEDULED - DAY -28	UNSCHEDULED - DAY -27
⊕ Activated Partial Thromboplastin Time (s)	-	-	-	37.200	32.800	33.159	-	28.000	30.400	-	-
⊕ Alanine Aminotransferase (ukat/L)	-	-	0.468	0.184	-	0.340	-	-	-	-	-
⊕ Albumin (g/L)	-	-	44.000	51.000	-	36.122	-	-	-	-	-
⊕ Albumin/Creatinine (mg/mmol)	-	-	-	-	-	4.749	-	-	-	-	-
⊕ Alkaline Phosphatase (ukat/L)	-	-	0.935	1.470	-	1.229	-	-	-	-	-
⊕ Aspartate Aminotransferase (ukat/L)	-	-	0.468	0.217	-	0.357	-	-	-	-	-
⊕ Basophils (10^9/L)	0.010	0.060	-	0.070	-	0.049	-	-	-	0.040	0.060
⊕ Basophils/Leukocytes (%)	0.200	1.200	-	1.200	-	0.804	-	-	-	0.500	0.900
⊕ Bicarbonate (mmol/L)	-	-	28.000	24.000	-	24.991	-	-	-	-	-
⊕ Bilirubin (umol/L)	-	-	5.130	10.260	-	9.886	-	-	-	-	-
⊕ Calcium (mmol/L)	-	-	2.300	2.450	-	2.407	-	-	-	-	-
⊕ Chloride (mmol/L)	-	-	101.000	99.000	-	102.144	-	-	-	-	-
⊕ Creatinine (umol/L)	-	-	102.544	100.776	-	4,508.346	19,000.000	-	-	-	-
⊕ Direct Bilirubin (umol/L)	-	-	-	-	-	4.554	-	-	-	-	-
⊕ Eosinophils (10^9/L)	0.040	0.120	-	0.160	-	0.134	-	-	-	0.070	0.240

Acknowledgement

- Sian Smethurst, Allison Brailey, Jeff Daniels for the support
- Jagadish Dhanraj, Patti-Ann Lastenet, Pankaj Kumar, Shriram Sivaraman, Kate Wilson, Alicia Palleschi, Lukasz Kniola, Isha Mehta, Anuja Das for the joint collaborations
- The Data Standardization team for the flawless execution !